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ALTERNATIVE FARMING OPPORTUNITIES FOR THE SOUTH



Proceedings of a Regional Conference

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1987

Mississippi State University
January 26-28, 1987



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ALTERNATIVE FARMING OPPORTUNITIES FOR THE SOUTH

Bost Extension Center
Mississippi State University
January 26-28, 1987

Sponsored by

- Farm Foundation
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PREFACE

The American farm community is undergoing economic hardships that have been unmatched since the Great Depression of the 1930s. Although the factors surrounding the crisis are diverse, the large supply and weak demand for traditional farm products are the underlying causes of the problem. It is apparent that if agriculture is to regain profitability, exploration of economically viable farm alternatives is essential.

On January 26-28, 1987, the Southern Rural Development Center, Farm Foundation, Tennessee Valley Authority and Southern Legislative Conference sponsored a Conference on Alternative Farming Opportunities for the South at Mississippi State University in a region-wide effort to address alternative farming opportunities. Specifically, the charge was to bring together the research and extension communities of land-grant universities, U.S. and state departments of agriculture, farm organizations, lending institutions and agribusiness people to identify and examine current activities in the Southern region related to cost-effective alternative farming opportunities that enhance farm profitability. This proceedings contains the papers presented at the conference.

Appreciation is expressed to the more than 200 participants representing 20 states who attended the conference, and particularly to those who participated on the program. I would also like to thank my fellow members of the conference planning committee: Dr. William O. Mizelle, Jr., of the University of Georgia, Chairman; Dr. Lanny Bateman of Mississippi State University; Dr. Milton Coughenour of the University of Kentucky; Dr. Edmund A. Estes of North Carolina State University; Dr. W. Joe Free of the Tennessee Valley Authority; Dr. W. I. Golden of the University of Georgia; Dr. H. L. Goodwin of Texas A&M University; Dr. R. J. Hildreth of the Farm Foundation; Dr. Dewayne L. Ingram of the University of Florida; Dr. Richard H. Mullenax of Mississippi State University; Dr. Cathy Sabota of Alabama A&M University; and Dr. Joseph F. Schmidt of Mississippi State University.

The conference planning committee and support organizations hope that all readers of this proceedings will be able to gain and utilize from it helpful, factual information concerning the many issues of alternative farming opportunities facing the South and the nation.

Doss Brodnax
Southern Rural Development Center

Alternative Farming Opportunities: A Perspective

Leo Polopolus

ABSTRACT

The widespread search throughout rural America to find new or alternative crop and livestock enterprises is legitimately based upon the need to improve farm profits. Farmers should consider at least the following factors when considering a shift to alternative crops: opportunity costs, diversification and risk, management, market windows, technology, coordination and group action, and consumer behavior and demand. Close and mutual cooperation between private firms in agriculture and various public institutions is required for growth and development of the rural economy through alternative farming. Appropriate roles of local and state government, federal agencies, and university research and extension are identified. The current and prospective low inflation environment provides a reasonable basis for economic survival if increased priority is placed upon the optimum enterprise mix, labor and other resource productivity growth, operations management, and selling and marketing strategies.

INTRODUCTION

The frantic search throughout rural America for alternative enterprises to replace traditional crops and livestock is both "good news" and "bad news." The "bad news" is that economic conditions down on the farm are now approaching the pitiful Depression Days of the 1930s. Farm prices received for agricultural output continued to fall in the mid-1980s, dropping 5.5 percent in 1986 alone. Farm bankruptcies and farm foreclosures are widespread throughout rural America. It is not surprising that the number of full time commercial farms has decreased substantially. Farmland values have nose-dived in most areas of the nation and they have not yet bottomed out. Export markets for U.S. agricultural commodities are continuing to shrink, while imports of foreign agricultural products are increasing steadily over time. Many rural communities in the South and elsewhere are becoming ghost towns as the income and employment flows generated from agricultural production are dissipating. Farmers are simply unable to invest in new capital equipment as long as their sales revenues are moving in a downward direction. These are just a few of the symptoms of the economic condition of the agricultural sector in America. You and I both know too well that our agricultural sector is sick and suffering.

Adversity can be a virtue if we rise to the challenges presented by the current situation. The "good news" is that farmers and associated agricultural institutions have the opportunity to turn the tide from red ink to profitability. American farmers have an opportunity to demonstrate their integrity, skill, and competitiveness by dealing head-on with their economic plight, even

though they are not to blame individually for their own economic condition. Finding new and alternative enterprises is an important aspect of maintaining a viable agricultural sector. Alternative farming will not however, singlehandedly solve the larger problems of excess capacity and dwindling export markets.

There is a great deal at stake in the ability of American agriculture to remain as a viable sub-sector of the U.S. economy. We as a nation have lost much of our competitiveness in steel, automobiles, cameras, electronic equipment, shoes, plastics, and textiles, to mention only a few products. For all goods, the value of imports into the United States each month now vastly exceeds exports from the United States. More importantly, the trend of larger and larger negative trade balances is worsening over time. Even the value of agricultural imports into the U.S. has surprisingly exceeded the value of our agricultural exports for a few months in 1986.

Whenever farm prices fall and crop surpluses mount, a finger is quickly pointed to the excessive amount of resources devoted to agricultural production in America. There is no doubt that resource adjustments are needed to realign resources with market requirements. And our inquiry this week into the feasibility of alternative farming enterprises assumes that adjustments are needed in the current use of resources. The problem is to find out **what** new enterprise combinations will increase farm level returns from the existing base of resources. Thus, the widespread search throughout rural America to find new or alternative crop and livestock commodities has a legitimate basis, i.e., finding more profitable enterprise combinations.

HISTORICAL PERSPECTIVE

Resource adjustment has occurred almost continuously in the South over the past 300 years. In the 17th Century the Southern colonies were oriented to the production of such crops as rice, tobacco, forest products, and cotton for export to Europe. Production of corn, wheat, soybeans, peanuts, beef, hogs, dairy, poultry, and sugarcane also emerged as major agricultural enterprises, at least for certain locations of the region. Wars, government programs, and fluctuating national and international economic conditions have profoundly affected the level of agricultural production, as well as the mix of agricultural commodities produced in the South. In recent years, for example, cotton and tobacco have been replaced by cattle, soybeans, and broilers as the major commodities in terms of cash farm receipts in the South. In the Southeast, the production of traditional crops such as tobacco, peanuts, cotton, and corn for grain has declined over the past decade, while the production of wheat, soybeans, and vegetable crops has increased. Over the past few years, however, the economic weakness of markets for grains, soybeans, and other traditional commodities has created pressure for reduction in the production of these commodities and an intensified search for nontraditional enterprises as substitutes.

Thus, changes in resource use, the types of crop and livestock enterprises, and the location of production are expected to continue in the future. Diversified farming systems are expected to intensify in the immediate future, casting away any precept of the South as a region of monoculture. Moreover, the increasingly unstable price environment for commodity markets and the increasingly interdependent global nature of market competition translate to even faster rates of resource adjustment in the region when compared to the historical record.

FACTORS FARMERS SHOULD CONSIDER IN SHIFTING TO ALTERNATIVE CROPS

The aim of commercial agriculture is maximizing profit from given resources or fulfilling some other preconceived goal from farming operations. A non-optimizing goal may be simply survival as an independent family farmer. Usually, however, farming is regarded by farmers as a business; the goal prior to each planting season is maximum net returns. The question now being asked by more and more agricultural producers is what new or nontraditional agricultural enterprises

should be included in the farm plan to increase net returns. Would farmers be better off by selling off all their farm assets and investing the proceeds in a money market account paying 5.5 percent per annum?

Opportunity Costs

If returns from farm resources are less than returns from an alternative investment, such as a money market account, a farmer is foregoing a profit. This profit foregone is the opportunity cost of farming. Because investment in farming involves a greater risk when compared with investing in a CD, expected returns from agriculture should be greater than the 5.5 percent return on a CD.

Opportunity costs also invade our crop and livestock selection decisions. If I plant corn and make X dollars from the corn enterprise, I have suffered an indirect opportunity cost Y from not planting jalapeno peppers, if jalapeno peppers would have returned a higher level of profit, other things being equal. Farmers, then, need to seriously consider and evaluate a large but manageable list of alternative enterprises to determine what their present cropping and livestock plan is costing them from income given up by not doing something else.

Diversification and Risk

One can shift to an alternative crop and become a monoculturalist in the new crop. This is likely to increase risk to the farming operation, particularly if there is both production and price risk with the new enterprise. The more common approach is for farmers in the South to **increase** the number of enterprises produced each year so as to reduce production and price risks. The addition of new and nontraditional enterprises does not guarantee, however, risk reduction. In fact, farmers may be increasing their risk with new and highly exotic enterprises if these alternative enterprises have greater variance in returns than the traditional enterprises. This greater risk with new enterprises may come from higher variability in production and/or higher variability in market prices. In general, however, increasing the number of enterprises reduces risk. With a larger number of enterprises, the farm is sacrificing some profit that would come from specialization of the one enterprise which yields the highest profit per resource unit. Thus, diversification may reduce risk, but it also may lower net returns from the optimum level. Diversification may also be associated with a reduction in the amount of purchased inputs for given production levels.

Management

An almost universal truth about diversified alternative farming is that the level of management services must be enhanced. Labor management also becomes much more critical and sensitive to successful outcomes. Take for example a hypothetical farmer in the South who has "traditionally" grown 600 acres of corn and soybeans. In order to attempt to increase net returns, this farmer now introduces horseradish, cantaloupes, tomatoes, sweet potatoes, strawberries, and pumpkins into the farming operation. While the new enterprises may involve a total of only 90 acres, the management function has been increased tremendously. If we further assume that some of these new crops are sold on a pick your own basis and some sold through wholesale produce markets, it does not take a Ph.D. degree in management to conclude that scheduling of farm operations and labor management of the whole farm will be much more complicated in the new set-up.

Because there is a learning curve for each new enterprise that requires both time and experience, it is advisable for producers considering new enterprises to start with only one or two at a time. More importantly, since many of these new commodities may have highly risky market windows, it is prudent for farmers to start new enterprises on a relatively small scale.

Market Windows

For seasonal and/or perishable commodities, timing of production with a potentially profitable price environment is an important consideration. Farmers need to evaluate the economic feasibility of a new enterprise from the realities of the market place when their production is likely to come onto the market. The market window technique has been developed to assist producers in identifying the most promising alternative enterprises. The technique involves a search for periods of time in a given product market when expected prices are likely to be greater than expected delivered costs to a specific market. Farmers need to know not only their production costs for an alternative enterprise, but also the costs of assembly and transportation to market. Prices need to be fairly accurately estimated for weekly, or even in some cases, daily periods.

Thus, the market window technique provides a preliminary screening device for investigating the market potential of a number of diverse enterprises. It is useful in assessing changes in production costs, yields, transportation costs, and other factors important for breaking into a new market. The technique can also be used to compare a staggered planting-harvesting scheme with planting and harvesting for one fixed market period. In the course of conducting the market window analysis it may be possible to uncover problems with new enterprises that require either plant or animal research from universities or private agribusiness corporations. For example, it may be necessary to develop earlier varieties, higher yielding varieties, varieties that handle heat stress better, and/or cultural practices that reduce production costs to meet the competition from other regions of the country or world.

Technology

Winners in market competition invariably are either the most efficient (low cost) producers-marketers or they are subsidized by governments to make up for their relative inefficiency. Since alternative enterprises are rarely recipients of government subsidies, efficiency in production is the key to market success and profitability. Achieving the efficiency goal is hindered by the relatively small scale of output of most new enterprises on the farm. It, therefore, becomes important for farmers to seek out the most progressive and innovative methods of production. This quest for knowledge should not be limited to the closest county agent or state agricultural experiment station. Research reports of agencies with acknowledged expertise in the commodity or product should be carefully considered, whatever location. Another source of information is the feed, seed, fertilizer, machinery, and agrichemical corporations. You may need second opinions on some industry sourced information, if the "sales approach" makes the new enterprise sound like you have discovered a gold mine. The Southern landscape is replete with skeletons of former producers of rabbits, mink, earthworms, peaches, grapes, and sunflowers, to name only a few disappointments. However, under certain limited conditions each of the commodities can have a feasible and profitable outcome.

Thus, producers should attempt to produce alternative enterprises at the lowest possible cost, utilizing the best known technology. It is unlikely that the biotechnology revolution will reach the small to medium size farmer anytime soon with miracle varieties and production techniques. In fact it will take several years for the current investment in biotechnology research in agriculture to reach commercial application. Part of the delay is due to the need for testing and litigation over environmental safety. Moreover, it is expected that the larger and more specialized farms will capitalize most from biotechnological developments.

One futuristic view of the food and fiber industry would have farms replaced by high tech laboratories in urban areas. For example, cotton fiber can now be produced in test tubes. Biologists at Texas Tech University have been able to make single cotton cells produce fibers in a test tube that are one-half the length of fibers produced from a cotton plant. Also, orange juice can now be produced from orange sacs in a test tube. The juice that is extracted from these orange sacs is chemically similar to what is squeezed from tree-grown fruit. According to the USDA research lab in Pasadena, California, it does not make much sense to tend to millions of trees when you can grow the final product directly in a laboratory. If this type of biotechnology improves sufficiently, a new farmer will be created that squeezes profits from a test tube instead of plants and animals.

On a more realistic level, it is hoped that the new biotechnology revolution will enable the bona fide farmer to improve the quality of existing agricultural commodities. For example, biotechnology research offers the prospect of developing new cotton varieties that better adapt to newer, faster spinning techniques. Instead of ten years to develop a new variety from field research trials, new traits of cotton lint for spinning can be discovered from test tubes in a year or so. Similarly, test tube research of orange juice quality could have the effect of reducing the time involved in improving citrus products. Overall, biotechnology breakthroughs offer the promise of not only improving the quality of products, but enhancing America's competitive position in domestic and international markets.

Coordination and Group Action

Farmers face a dilemma between trying to develop a profitable new venture as a loner versus trying to develop a new venture with the support of other competing farmers of the same new enterprise in the region. The answer to the dilemma lies in the potential aggregate market for the new enterprise under consideration. For ginseng, horseradish, zucchini flowers, and sapota the aggregate market may be so small that only a few producers could profitably grow the product in the region. But for catfish, blueberries, tomatoes, and broccoli, the aggregate market is so large that the region's competitiveness could be enhanced with joint ventures in packing, processing, assembling, transporting, and promoting.

Group action could take the form of (1) supply cooperatives to lower input supply costs; (2) product marketing cooperatives to pack and/or process products; (3) private marketing corporations of two or more producers; and (4) marketing orders for establishing minimum quality standards and/or market support activities, such as advertising and promotion programs. Another route is to organize a trade or industry organization to lobby for laws, regulations, research, and public support for the industry's perceived needs.

All too often farmers are fearful of divulging their production and marketing secrets of a new enterprise in the region. What usually happens is that other producers of the same commodity have the same fear. Unconsciously, the aggregate effect of the total industry is over production, poor quality, poor coordination with buyers, and not surprisingly, lower than expected profits. It is also the small and medium sized producers who need assistance on packing and marketing the most but tend to shy away from group activity. Coordination of farm production with market requirements is a necessary and acquired skill. Alternative farming, if it is to be successful, requires close attention to the market's demands for timeliness of deliveries, packaging, refrigeration and/or product conditioning, mix of products, quality of pack, geographic concentration of shipments, among other factors. Close coordination is often required not only between buyer and seller, but between and among competing sellers (farmers).

Consumer Behavior and Demand

Major changes are occurring in consumer tastes, purchasing behavior, and buying patterns. Producers, among others in the food and fiber marketing system, need to understand these changes and be able to predict future changes. The cardinal rule is that the consumer is the king. Markets are designed to reflect what consumers want, not what producers want to offer to the market. Unfortunately for farmers, much of the drama of product development for consumer tastes and preferences takes place in the laboratories of multinational corporations. These corporations are able to utilize low priced and abundant commodities and create new processed products for consumers aided with millions of dollars of consumer advertising.

Producers should attempt to understand the nutritional and diet mania of the consuming public. Recent emphasis upon low cholesterol, low sodium, less sugar, more fiber, fewer additives in processed foods, and generally fresh foods as opposed to processed foods have provided dramatic market growth for certain products and decreased opportunities for others. We all know the

downward direction of red meat consumption and the increasing consumption trends for poultry and fish. Even though vegetable consumption per capita in the aggregate has not changed much over time, the growth in broccoli, cauliflower, and fresh market tomatoes has been substantial. The influence of the American Cancer Association and the American Heart Association is being felt through dramatically increased consumption of such vegetables as rapini, purple cauliflower, and oyster plants. On the other hand, the consumption of canned vegetables, except for tomato products for pizza, has generally declined in recent years. We can expect a torrent of new processed food products to be supplemented with calcium and fiber. The salad bar craze at food service establishments has been an important factor increasing the consumption of fresh vegetables. We are also reminded of the declining per capita consumption of milk, but yogurt and cheese consumption is exploding. Also, vegetable fats are increasingly being substituted for animal fats. More organic foods are expected to find their way onto supermarket shelves with certain brands of meat and poultry being advertised as free from hormones, antibiotics, and other animal drugs. Produce grown without chemicals will also begin to make inroads in the marketplace.

The following conclusions can be drawn from the dramatic changes occurring in consumer behavior and demand: (1) consumers are seeking variety in their diet; (2) there is a strong, sometimes fanatical, orientation toward "healthful" foods; and (3) the total acreage of cropland and pasture land needed to satisfy the emerging American appetite will be diminished from current levels. These changes in consumer behavior provide opportunities for those farm producers who are able to make the necessary adjustments.

THE ROLE OF PUBLIC INSTITUTIONS

The future progress and development of our nation requires that the basic tenets of a mixed capitalistic system be preserved and promoted. Those basic principles of our economic system involve close and mutual cooperation of private entities and public institutions, plus the willingness on the part of society to invest in technological and managerial innovations for an even better future. If we become complacent with the status quo or intensify conflicts between government and private industry, the common citizen in America will lose from a lowered standard of living over time.

This section of the paper is intended to provide a limited discussion of some appropriate roles of various public institutions in the area of alternative farming opportunities.

Local and State Government

As the South becomes more heavily populated over time, pressure will continue to mount for local and state governments to impose various restrictions upon the South's most basic industry, agriculture. Counter measures are needed to preserve the right to farming, maintain greenbelt or preferential farmland tax laws, and otherwise sanction any intensified agricultural production system that does not adversely affect the environment.

In addition to defensive measures, more positive initiatives are needed by state and local governments to assist the distressed farming community. For example, the Mississippi Senate is considering proposed state legislation that will create a public corporation to promote agriculture and mediate conflicts between debt-pressed farmers and their creditors. The bill, as I understand it, would give the state agriculture commissioner the primary responsibility to develop special programs to enhance the marketing of farm products. If enacted, new agencies would be established in Mississippi to encourage wood products industries and to attract companies to rural areas and small towns to process raw materials.

The Florida Commissioner of Agriculture, for example, attempts to expand markets for Florida's fruit and vegetable producers by conducting an annual Harvest Festival Tour in major markets. State officials and agricultural leaders have just returned from New York City and Cincinnati where they met with marketing executives and buyers. Among other program features, a video tape on Florida's exotic tropical fruits, such as carambola, atemoya, and papaya was presented. To stem the tide of foreign imports, the Florida Commissioner is seeking national support for proposed federal legislation that would require "country of origin" labeling on produce and closer checking of foreign imports for chemical residues not permitted by U.S. regulations. The Florida legislature passed a country of origin law in 1979.

State and local governments have the responsibility of assisting, where economically feasible, in the establishment of community and/or state markets. Most states in the South have already made considerable progress in providing these types of public facilities. What is usually lacking, however, is the development of public markets of sufficient scale to attract buyers with market contacts on the national scene. Community markets have an appropriate niche for small scale operators, but they do not solve the marketing dilemma for producers of, say, 100 acres of mixed vegetables.

Federal Agencies and Programs

While farmers tend to concentrate their attention upon the programs of the U.S. Department of Agriculture, there are many other federal programs that materially affect their economic welfare. The Departments of Commerce, Transportation, Treasury, Labor, and State operate a wide variety of programs that can either positively or adversely affect opportunities with alternative enterprises.

Since there is insufficient time to discuss each federal agency or program, let me concentrate on just one federal program area that will have a profound effect upon alternative farming opportunities in the South, i.e., international trade policy.

In the upcoming round of multilateral trade negotiations under the General Agreement on Tariffs and Trade (GATT), the United States is expected to support a reduction in international trade barriers and unfair trade practices for agricultural products. The Reagan Administration hopes to promote policies that help less developed economies expand their access to U.S. markets on the theory that these nations will become major buyers for U.S. agricultural products in the future. The key assumption here is that American farmers are competitive and efficient and can survive international market competition if the playing field is level.

It is expected that freer world trade in agriculture will not only expand trade in commodity markets, but will also increase trade in processed and manufactured foods. If we are not competitive and efficient, foreign goods will displace our current production in both areas. If we are competitive and efficient, the Southern region can possibly benefit from trade in value added products, such as fruit juices, meats, dry soups, canned vegetables and other products for export.

University Research and Extension

Land Grant and other universities in the South have the responsibility of developing new cost effective technology for improving the competitiveness and efficiency of the traditional, as well as nontraditional, agriculture of the region.

One example of a prototype project is the development of a "super fish" by the Alabama Experiment Station. Auburn University has released a group of genetically improved channel catfish. Not only do these fish produce approximately 15 percent more body weight per pound of feed, but Auburn University says that these new catfish are more catchable than their native cousins.

Another potentially useful and joint program is underway at the universities of Georgia, North Carolina State and Clemson on vegetable production and marketing. As I understand the project, the attempt is to develop a coordinated and continuous supply of vegetables from South Georgia to the northernmost area of North Carolina. The crops included in the research are broccoli, cauliflowers, collards, leaf lettuce, carrots, snap beans, Irish potatoes, cucumbers, muskmelons, bell peppers, and tomatoes. Whenever you can coordinate supplies, provide continuous supplies, and offer a product mix, you have gone a long way toward satisfying producer buyers representing chain stores and food service establishments.

While there is now increased attention by research and extension services in the South on alternative enterprises, only the surface of the problem area is being scratched. What is usually lacking is a systems framework for analysis that incorporates the production, processing, marketing, and consumption aspects. A systems framework requires involvement by several academic disciplines seeking solutions to commonly agreed upon problems.

One common mistake of universities is to promote a new enterprise on the assumption of fixed product prices. At the fixed price, the budget analysis may conclude that considerable profit per acre can be realized. However, if the analysis is extended further to include increased industry supplies from new entrants, the expected price and profit outcome could be lowered substantially. Along this line, economists need to estimate price flexibilities for new enterprises. These price flexibility estimates would identify the price responsiveness of new enterprises as marginal changes occur in quantities supplied. For many exotic and highly specialized commodities, a relatively small increase in production can devastate the prices received by farmers.

CONCLUDING REMARKS

The current and prospective economic environment provides a better than average opportunity to survive in agriculture. The cost of farm supplies has stabilized, land rents are low, and interest rates are not expected to increase. The challenge is for producers to give renewed attention to their optimum enterprise mix, labor and other resource productivity, operations management, and selling and marketing strategies. Unless alternative enterprises contribute positively to the bottomline of profits, they should be avoided. The cards, however, appear to be stacked in favor of increased diversification through new or alternative plant and animal enterprises in the future.

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A Survey Perspective on Alternative Farming Programs in the South

Edmund A. Estes and Dewayne L. Ingram

INTRODUCTION

In recent decades a complex set of conflicting forces and trends have interacted to cause significant changes in the Southeastern United States' agricultural economy. One dominant force at work historically (but more pronounced in recent times) has been the rapid cultural and technological advancements in the production of food and fiber. This is illustrated by the fact that real domestic total agricultural output has increased 25 percent since 1964 while real production input use has risen only by 6 percent over this period (5). This change, of course, has implications for the size and structure of the agricultural community as well as some distributional effects concerning the relative competitive positions of geographic areas within the U.S. Similarly, the relocation and geographic redistribution of consumers have combined with changing buying habits and preferences of consumers to result in a different mix and variety of food and fiber items offered for sale in domestic and world markets.

Since 1981 much of the concern in agriculture has focused on farmers who are in financial distress as heavy harvests combined with less foreign willingness or ability to pay for U.S. food products. These developments have increased grower reliance on government programs, reduced agricultural exports, increased farm program costs, and have spurred some to suggest that significant changes are needed in U.S. farm commodity programs. Some individuals have suggested that the transition taking place in the Southern and U.S. agricultural economies is divided between two extremes--the fears of farm families that a chosen way of life is being eliminated versus worship at the altar of the marketplace as the sole determinant of success or failure. However, more reasoned individuals argue that there are solutions which incorporate elements of both perspectives and have suggested that crop diversification and experimentation with new types of agriculture are two such approaches.

A number of researchers, extension specialists, state department of agriculture workers, and farmers have initiated investigations or enacted programs with the specific intention of providing additional impetus for economic growth in their communities. In order to identify promising ideas and programs, questionnaires were sent in the summer and fall of 1986 to researchers and state department of agriculture specialists in 12 Southern states asking them to briefly describe projects which they would categorize as "alternative farming opportunity" programs. In addition, a separate questionnaire was sent to 29 administrators of small farm extension programs at 1862 and 1890 land grant institutions in 14 Southern states in May 1986. Completed questionnaires were received from 26 of the 29 extension administrators. This paper reports on some of the findings obtained from these surveys.

Associate Professor, Department of Economics and Business, North Carolina State University, and Extension Ornamental Horticulture and Rural Development, Institute of Food and Agricultural Sciences, University of Florida.

EVIDENCE OF DIVERSITY

During the past thirty years diversification in Southern agriculture has been apparent (Figure 1). In the 1950s over \$60 of every \$100 in Southern farm income was obtained from the production of tobacco, peanuts, and cotton. By 1982, the predominance of crops (again particularly peanuts and cotton) was less apparent as revenues from livestock and poultry gained to nearly equal total crop revenues. A cursory examination of Figure 1 reveals three basic trends: (1) while tobacco remains an important source of revenue for Southern producers, revenues from soybeans and feed grains represent significant sources of income for producers; (2) expansion in cattle and poultry has been significant and represents important sources of gross income for Southern producers; and (3) there is more overall balance in the contributions of both crop and livestock activities as sources of farm income.

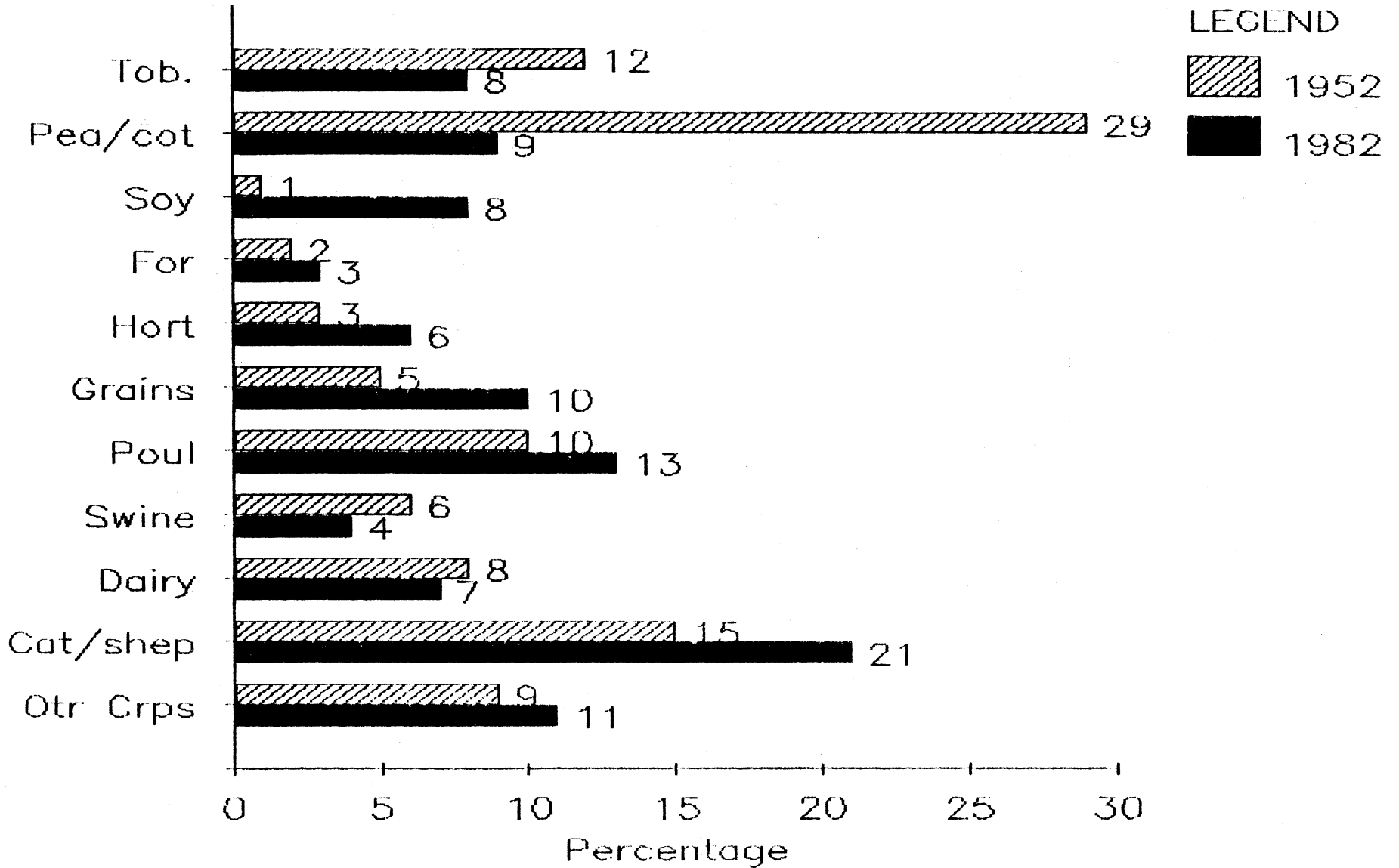
Within this pattern of general diversification, three points are worth noting. The first concerns the subtle but important difference between "reported gross farm income" and gross income retained by farmers. In terms of reported gross farm income, poultry far exceeds tobacco as a cash revenue source for producers in the South. However, in terms of gross income retained by farmers, one could argue that tobacco production remains a more important source of regional income than poultry farming. Although specific numbers will vary, in a typical situation where broilers or turkeys are grown under contract, a producer receives only 5 to 10 percent of the price used to estimate farm agricultural income. In this circumstance, the income gains realized from poultry production must be considerably larger to offset or replace income lost by quota owners and tobacco producers. Thus, despite the significant and important contributions of the poultry industry to the Southern agricultural economy, the net income lost by tobacco farm families and to land and tobacco quota owners is far from replaced by the increased earnings from poultry.

A second point to consider in evaluating Figure 1 is that tobacco, peanut, and dairy program elements principally determine the location and amount of production. Conversely, competitive market forces tend to dominate cattle, poultry, swine, and horticultural crop production decisions. Expansion in the "market competitive" industries of cattle, poultry, and horticultural crops may suggest that Southern productivity gains (i.e., efficiency) were greater than in competitive supply areas. This argument is supported further by the fact that the Southern share of the U.S. market for poultry increased 60 percent, the cattle share increased 32 percent, and horticultural crops share increased 30 percent during the 1952-82 period (5). For poultry and horticultural crops, these market share increases occurred during periods when aggregate consumption also was expanding, resulting in substantial gains to our producers and handlers. A final point to note from Figure 1 is the implication that the mix of production within the region has become more balanced in response to changes in opportunity cost levels. Opportunity costs for a producer are the income and the amount of production foregone by current production activities. In aggregate, producers tend to allocate resources (land, labor, management, and capital) across all possible commodities such that opportunity costs are equal at the margin. If perceived opportunity costs for producing cotton rises relative to opportunity costs for soybean production, then farmers will switch from cotton to soybean production. For some producers, the opportunity costs for remaining in farming (i.e., producing any commodity) are too high relative to off-farm employment opportunities, and then producers will exit voluntarily from farming. It is in this sense that recent or expected changes in farm programs (especially for tobacco, peanuts, and dairy) have tended to increase opportunity costs for individual farmers through reductions in net income streams and thus have heightened grower searches for alternative enterprises, particularly among the small and medium size farm owner-operators.

The search for alternatives or new crops in the South has been exacerbated by four years of declining domestic commodity prices, higher opportunity cost considerations, enacted commodity program changes, and by greater diversity in consumer tastes and preferences. The process of evaluation and change always has occurred in agriculture, but it seems reasonable to conclude that the rapid decline in profitability for many traditionally Southern commodities and the increased profitability of other minor crops has forced producers to rapidly reexamine their farm production decisions.

Figure 1

Sources of Farm Income in the South 1952 and 1982



DIVERSIFICATION AND SEARCH ACTIVITIES

Diversification may be defined as the production of nontraditional enterprises in an area or on a farm. The non-traditional activities could be new crops or simply crops which have not been grown in an area before. By recent tradition, the "alternatives" label has connoted a broader context than diversification, implying not only examination of nontraditional crops but also experimentation with new or alternative types and systems of agriculture ranging from organic production techniques to more intense production and marketing procedures.

In general, diversification activities in the South have concentrated on four principal targets: (1) large acreage field crops where costs of production, input usage, and net returns per acre are modest but markets may be available on a limited regional or national basis; (2) small acreage fruit, vegetable, or specialty crops where higher production risks, increased management and labor requirements, and more restricted market access opportunities dominate planting considerations; (3) intense livestock production such as swine or poultry production where moderate-to-high demand expansion, adequate marketing facilities and possible competitive advantages have created opportunities for some new entrants; and (4) establishment of aquacultural production systems such as catfish, striped bass, and crawfish in pond or impoundment areas permitting Southern producers to satisfy regional consumers.

FIELD AND GRAIN CROPS

For many large acreage crop enterprises such as grain sorghum or sunflowers, revenue and cost data suggest that returns are not much better--if as good--as those obtained from traditional agronomic crops. In addition, the year-to-year variability in returns from these crops may be greater than for traditional crops due to the absence of government programs, the unavailability of crop insurance, and greater demand uncertainty. During the last two years, several large acreage growers in Southeastern states have experimented in producing contract evening primrose. This crop offers the primary advantages of processors willing to sign contractual agreements with growers, and the crop can be harvested annually using modified soybean harvest equipment. Though evening primrose is often thought of as a weed, pharmaceutical and cosmetic companies do utilize primrose oil in the manufacture of selected products. However, it is unlikely that primrose or any other individual crop suitable for large acreage production will offer a viable alternative to a significant number of farmers in the foreseeable future. Instead, additional large acreage opportunities will occur only to the extent that changes in factor (input) prices and/or new technologies favor Southern producers over producers in competitive supply regions.

The continued expansion in local and national markets for sectors within the livestock industry does suggest, however, some modest feed grain expansion potential in the South. However, as Tweeten and others have pointed out, the South does not seem to have an absolute advantage in the production of feed grains and soybeans as compared to the Corn Belt or the Plains (6). The South will expand feed grain production only to the extent that local demand is not or cannot be met by Midwest producers. Thus, it would seem that expanded agronomic opportunities will depend heavily on linkages to export demand and local input demand situations.

In our surveys, many respondents indicated only moderate emphasis on examining agronomic alternatives. Identified alternatives included grain sorghum (Delaware, Tennessee), compressed wheat or hay straw logs for use in fireplaces (Oklahoma), double cropping soybeans or sorghum with small grain or rape (Alabama), rapeseed (Arkansas, Alabama), and alfalfa hay production (North Carolina, Tennessee, Arkansas). Administrators of small farm extension programs also perceived only moderate emphasis on field and grain crops and expected little change in importance by 1990 (Table 1). However, the lack of increased future emphasis on field and grain crop programs in extension does not mean that field and grain programs will be unimportant in the development of future programs (Table 2). Instead, Table 2 seems to suggest that overall attempts by many extension administrators to diversify programs will result in emphasis on other alternatives, particularly fruits and vegetables.

Figure 2
Crop and Livestock
Sources of Income in the South
1952 and 1982

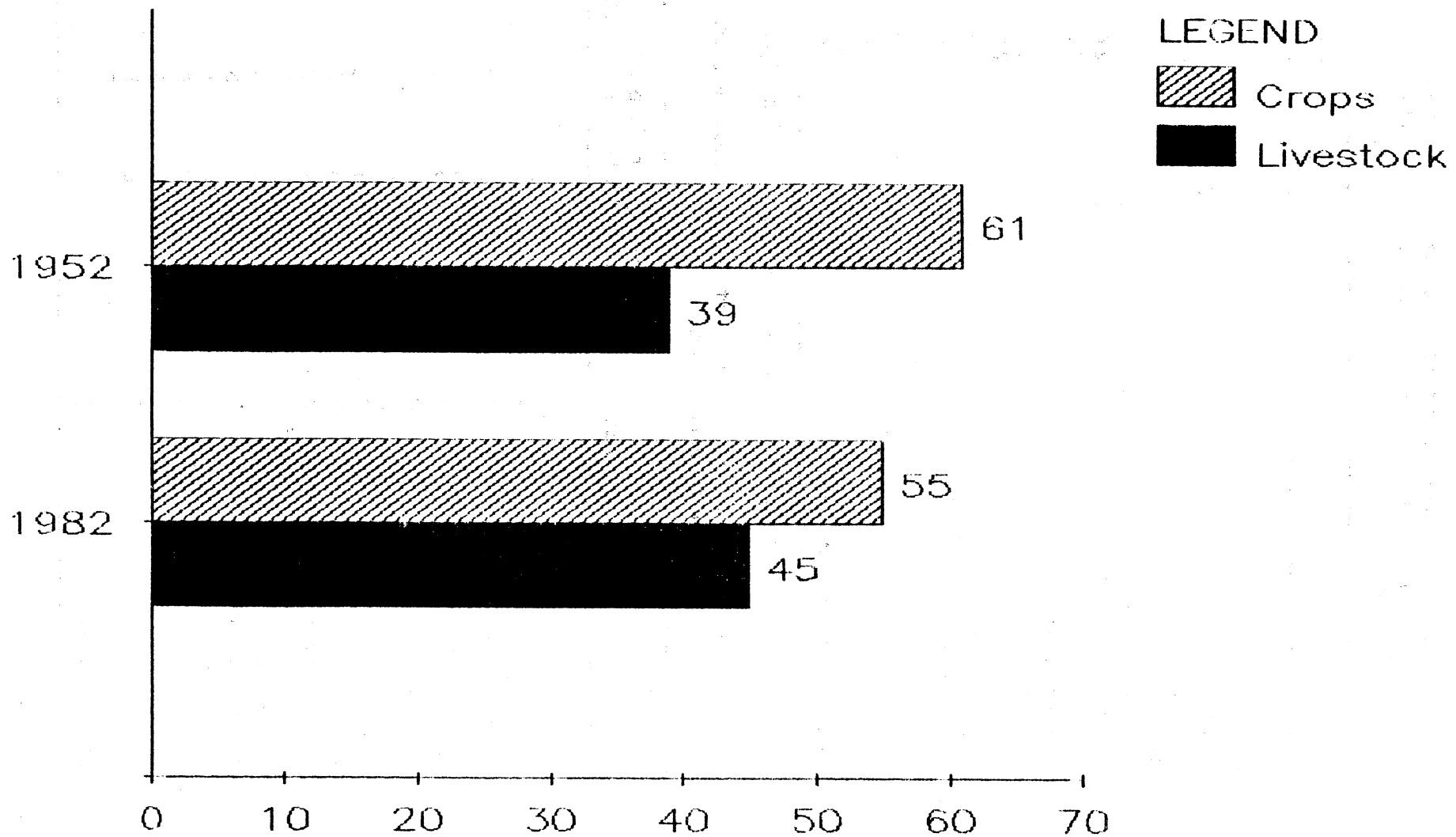


Table 1. Relative importance of selected commodities to small acreage farms in 1986 and predicted importance in 1990 as perceived by administrators of small farms extension programs.

Commodity	1986	1990
Vegetables	1.3 ¹	1.1
Swine	1.9	1.8
Tree fruits and nuts	2.0	1.9
Forestry	2.2	2.1
Cattle	2.2	1.9
Berry production	2.4	2.1
Field and grain crops	2.4	2.4
Nursery crops	2.6	2.3
Poultry and eggs	2.7	2.4
Goats and sheep	2.7	2.2
Aquaculture	2.6	2.0
Christmas trees	2.9	2.4
Flowering and foliage plants	2.9	2.6
Beekeeping	3.0	3.0
Dairy	3.0	3.0
Horses	3.2	3.0
Citrus	3.6	3.7
Other (tobacco, 3 institutions)	1.7	1.4

¹Mean rating; 1=very important, 2=important, 3=neutral; and 4=not important.

Table 2. The degree of emphasis placed on selected commodities by extension programs as assessed by program administrators.

	-----Degree of Emphasis-----				
	Strong	Moderate	Little	No	Discouraged
Vegetables	22	3			
Swine	11	12	3		
Tree fruits and nuts	7	14	5		
Forestry	5	7	12	2	
Cattle	6	13	6	1	
Berry production	8	9	8	1	
Field crops	10	9	3	4	
Grain crops	6	11	6	3	
Nursery crops	3	9	11	3	
Poultry and eggs	2	11	6	6	
Goats and sheep	7	6	11	2	
Aquaculture	9	8	5	4	
Christmas trees	3	10	9	3	
Flowers and foliage plants	2	4	14	5	1
Beekeeping	1	2	19	4	
Dairy	3	3	9	10	1
Horses	1	4	7	12	2
Citrus	2	2	16	5	
Rabbits	3	10	7	5	1
Other (tobacco)	1	2			

FRUITS AND VEGETABLES

In our survey it was apparent that a majority of states are examining possible high income per acre advantages offered by the production of horticultural crops. Reasons for the popularity of fruits and vegetables as targeted alternatives include: (1) consumer health and diet considerations which have increased per capita consumption levels for many fruits and vegetables; (2) opportunities to preserve farm family income levels through small acreage production; and (3) favorable climate and soil conditions as well as producer familiarity with labor intensive crop production systems. However, the theme of "expand fruit and vegetable production" must be balanced with the knowledge that unstable farm prices, extreme perishability for most items, and an inability to secure assured, reliable market outlets will limit profit potential. Oftentimes, the willingness and capability to grow fruits and vegetables are confused with the ability to successfully market the crop at a price sufficient to cover operating costs.

While substantive acreage increases in commercial fruit and vegetable production in the South are unlikely and unwarranted, several alternative techniques have met with some success. The first involves utilization of "niche" marketing procedures. In niche marketing the farmer produces a specialty item, typically one in short supply but highly desired by consumers in a limited market. In our survey, individuals reported niche markets for miniature (baby) vegetables, for greenhouse grown Bibb lettuce or cucumbers, for mountain-grown nursery stock items, for local herbs, jams, and jellies, and for more exotic items such as goat meat, rabbits, ginseng, and Shiitake mushrooms. In each case, production involves utilization of intensive management practices and the likelihood that a market can be easily saturated.

Another apparent result obtained from the surveys was the extensive number of different horticultural crop programs on-going in the South. In total, there were 40 active research, extension, and state department of agriculture programs reported by 14 different institutions in nine different states. Oklahoma researchers and specialists are examining asparagus, green pepper, broccoli, strawberry, and peach production and marketing practices while producers in White County, Arkansas, organized the Ozark Table Grape Growers Association in 1985. In northern Alabama, a study of apple, pear, and kiwi production potential is under investigation. While some states have targeted specific fruit and/or vegetable crops with potential in their area, a greater number of states seem to be addressing the viability of fruit and vegetable production from another perspective, i. e., concentrating on achieving productivity gains in the cultural and/or marketing areas in order to gain a competitive production advantage.

A three state research project involving investigators from North Carolina, South Carolina, and Georgia is examining sequence cropping (the production of two or more crops in sequence on the same piece of land) as one method to improve efficiency. The Maryland Department of Agriculture is considering construction of a regional vegetable "conditioning" center to assist producers with commodity specific packaging and handling requirements. In Georgia and Virginia, state departments of agriculture have established special crop diversification programs with particular emphasis on vegetables. South Carolina and Florida have established limited financial incentives to encourage the location of food processing facilities in their states, and North Carolina is also considering such an action. Virginia, North Carolina, Florida and Alabama have committed financial resources to construct state-sponsored farmers' market facilities in their states. Similar programs outside the South are also underway, and these projects will influence Southern producers. The appropriation of \$5 million by the Nebraska legislature and \$200,000 by the Iowa legislature to establish food processing centers in their respective states indicate a clear commitment to provide additional technical assistance in the production and marketing of new enterprises. Utah and Iowa are sponsoring advertising campaigns educating produce buyers in their states to the advantages of buying locally grown fruits and vegetables. In Minnesota, private contributions and public money jointly financed the establishment of the Center for Alternative Crops and Products on January 1, 1987. Particular emphasis of the Minnesota Center will be on fresh and processed fruits and vegetables.

In most instances, survey respondents indicated that they were not seeking to become a major fruit or vegetable production state but rather were seeking to identify any competitive market advantages due to lower production or transportation costs. They want to discover the potential for providing one or more perishable items in a more timely manner through market window analysis of opportunities. Thus, while researchers and specialists recognize that demand expansion for most fruits and vegetables has been rather modest during the past decade, considerations of spatial and temporal demand factors suggest brighter prospects for selected expansion of produce items in the South (Tables 3-7). In several instances, respondents cited the example of expanded local broccoli production as an example of this point. The primary challenges faced by new growers of fruits and vegetables are to acquire new managerial and marketing skills and then to take advantage of expanding demand for selected commodities, but not to produce quantities large enough to cause dramatic price declines and industry disruption.

Other horticultural crops receiving some emphasis in our survey included nursery items and Christmas trees. Extension administrators believed there was little to moderate emphasis in current programs but that by 1990 these programs would be more important, particularly for small acreage farms (Table 1). Six states (Alabama, Arkansas, Florida, Mississippi, Texas, and Oklahoma) are working on genetic, cultural, or marketing improvements for white pine Christmas trees. North Carolina and Tennessee extension workers are developing an inventory of nursery stock items available for sale in their states.

ANIMALS

Survey responses indicated that 10 research or extension programs were identified as "alternative" enterprise investigations for livestock and poultry. However, seven of the 10 programs were located in just two states, Oklahoma and Arkansas. In Oklahoma, electronic communication systems are being used to trade cattle embryos and semen. In Arkansas, researchers are evaluating grain amaranth (high in protein and lysine) as an alternative crop for growers in northwest Arkansas. Local amaranth cultivation could benefit the poultry industry in Arkansas by reducing feed transportation costs (a majority of poultry feed is imported) while providing a more cost effective feed protein source. In Louisiana, rabbit meat production systems are under investigation while the Delmarva Rabbit Growers Association (in cooperation with the Maryland Department of Agriculture) is evaluating ready-to-cook rabbit meat products such as rabbit sausage. In West Virginia, an interdisciplinary research team is examining several innovative, alternative beef and sheep production systems such as "natural" beef.

From survey responses, there is little to suggest that small animal alternatives are being considered as major income replacement alternatives for current commodities. During the last 30 years, the cattle industry in the South has maintained its role as a major income source for producers while the poultry industry has increased in importance to become a major source of revenue. However, declining per capita consumption of red meat and substantial investments in capital needed to operate commercial broiler and turkey operations suggest that these industries will not offer substantial income replacement opportunities for a large number of commercial farmers. But rather, like the rabbit, goat, and sheep industries, poultry and beef cattle in the future will serve as valuable sources of supplemental income for many small or part-time operators in selective areas throughout the South.

AQUACULTURE

Aquacultural related programs ranked second behind horticultural programs in terms of alternatives being investigated by researchers, extension specialists, and state departments of agriculture personnel in the South. Respondents indicated that a total of 18 different projects in seven states were operational in 1986, with additional program emphasis likely to occur between

Table 3. Changes in vegetable Per Capita Consumption (PCC) levels over the 1976-85 period.

Vegetable	1976 PCC (lbs)	1985 PCC (lbs)	1976-85 Change %
Broccoli	1.1	2.9	+162
Mushrooms	.7	1.8	+157
Cauliflower	1.0	2.2	+120
Honeydew/Cantaloupe	1.1	2.1	+ 91
Onions (dry)	15.2	19.4	+ 28
Tomatoes	12.5	15.8	+ 26
Asparagus	.4	.5	+ 25
Carrots	6.4	7.7	+ 20
White potatoes	49.2	52.1	+ 6
Lettuce	24.2	25.5	+ 5
Celery	7.4	7.4	0
Sweet potatoes	6.4	6.3	- 2
Sweet corn	8.1	7.7	- 5
Total*	133.5	150.8	13

Table 4. Linear extrapolations of the 1976-85 changes in PCC for vegetable items discontinued in the USDA data collection series (in 1981), extrapolations based on 1976-81 trends.

Vegetable	1976 PCC (lbs)	1985 PCC (lbs)	1976-85 Change %
Spinach	.5	1.2	+140
Peppers	2.8	4.0	+ 43
Cucumbers	3.6	5.0	+ 39
Cabbage	8.8	8.4	- 5
Watermelons	19.0	15.0	- 21
Snap beans	1.6	1.2	- 25
Total*	43.7	47.2	8

* Totals include other miscellaneous crop PCC totals which are not listed individually. Thus, total sums are not equal to the sum of listed crops.

Table 5. Change in Per Capita Consumption (PCC) levels for processed vegetables over the 1976-85 period.

Vegetable	1976 PCC (lbs)	1985 PCC (lbs)	1976-85 Change %
Snap beans (canned)	2.9	4.5	+ 55
Sweet corn (frozen)	6.2	9.2	+ 48
Snap beans (frozen)	1.5	1.9	+ 27
Sweet peas (canned)	2.4	3.0	+ 25
Mushrooms (canned)	1.4	1.7	+ 21
Tomatoes (canned)	63.4	62.0	- 2
Sweet corn (canned)	13.9	11.5	- 17
Sweet peas (frozen)	2.0	1.6	- 20
Total*	93.7	95.4	+ 1.8

Table 6. Changes in fruit Per Capita Consumption (PCC) for selected fresh fruit commodities, 1976-1985.

Noncitrus, fresh	1976 PCC (lbs)	1985 PCC (lbs)	1976-85 Change %
Grapes	3.3	6.8	+ 106
Strawberries	1.7	3.1	+ 82
Bananas	19.3	25.6	+ 33
Pears	2.6	2.8	+ 8
Apples	17.1	18.1	+ 6
Peaches	5.2	4.0	- 23
Cranberries	.2	.15	- 25
Cherries	.8	.4	- 50
Total*	55.0	68.8	+ 25
Citrus			
Oranges	14.7	12.4	- 16
Total*	29.0	22.5	- 22

* Totals include other miscellaneous crop PCC totals which are not listed individually. Thus, total sums are not equal to the sum of listed crops.

Table 7. Changes in Per Capita Consumption (PCC) for selected frozen fruit commodities, 1976-85.

Noncitrus, frozen	1976 PCC (lbs)	1985 PCC (lbs)	1976-85 Change %
Blueberries	.13	.25	+92
Peaches	.25	.32	+28
Strawberries	1.3	1.3	0
Apples	.4	.4	0
Cherries	.7	.6	-14
Blackberries	.12	.06	-50
Total *	3.0	3.3	+10

* Totals include other miscellaneous crop PCC totals which are not listed individually. Thus, total sums are not equal to the sum of listed crops.

now and 1990. Among respondents citing specific aquacultural commodities under investigation, commercial scale catfish production was the most popular target of emphasis. Louisiana, Mississippi, Alabama, South Carolina, Florida, and Georgia researchers and extension specialists indicated that there were active catfish programs in existence. Florida Department of Agriculture specialists indicated that they were in the first year of a new multiyear state aquaculture program which encompassed catfish, crayfish, fresh water shrimp, shellfish, alligator, and other marine species as alternative commercial enterprises. The Maryland Department of Agriculture has obtained supplemental funding from USDA to investigate the establishment of pond or impoundment systems for the production of hybrid striped bass. This project has also allocated some funds for promotion and market development work. North Carolina specialists are examining the expansion potential of the mountain trout and striped bass industries in western North Carolina. Louisiana and South Carolina are examining the feasibility of crayfish production, with Louisiana researchers investigating the potential of culturing channel catfish or buffalo fish in the same pond with crayfish. General aquacultural investigations (without a particular species emphasis) are also underway in Tennessee, Texas, and South Carolina. Specific details of the Tennessee and Texas projects were not provided.

CONCLUSIONS

The interest in diversifying state and farm economies has increased in recent years as technological advances have offered producers the capability of growing more products than the U. S. and world markets can take. The number and type of programs under consideration in the South is large, and as agricultural financial pressures continue it seems certain that the number of alternative enterprises considered by states will increase. For most enterprises discussed in this paper, the new skills needed to increase income are marketing and organizational management talents rather than technical operational skills. The utilization of nontraditional techniques and the production of innovative commodities will increase in the near future because of the dynamic nature of agriculture. While it is certain that the number of items offered in produce departments and food stores will increase, it is more uncertain what type of items will be included in the offerings. Whatever happens, the products will reflect the tastes and preferences of consumers and the competitive ability of suppliers to satisfy these wants.

In general, diversification programs initiated by states have the dual purposes of developing a portfolio of commodities available to their producers to protect against price and income declines while at the same time improving economic growth prospects for the state. Most state initiatives are aimed at providing supplemental income sources for producers rather than offering programs or commodities which will substitute for current production. The extent to which alternative enterprises are successful in diversifying an individual's or a state's agricultural economy will depend on differential cost shares between regions, states, or areas within states. While it is clear that states or individuals should not produce specific commodities on the basis of what other states are doing, researchers, state department of agriculture specialists, and extension workers must and should always evaluate technological and economic changes to help their growers remain competitive in agricultural markets.

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The Tri-State Vegetable Project: A Multistate Team Approach to Research on Alternative Farming Opportunities

Larry L. Bauer

ABSTRACT

As part of the effort to address the severe financial crisis faced by farmers, a research grant was obtained through the Special Grants program of USDA. The project is entitled "Agricultural Adjustment in the Southeast through Alternative Cropping Systems" and involves the Departments of Horticulture and Agricultural Economics at Clemson University, North Carolina State University, and the University of Georgia. The project is truly regional in that six departments in three states are working on one project with the same objectives. The background, objectives, coordination, and current results of the project are discussed.

INTRODUCTION

The problems facing farmers in the Southeast are well documented, widely discussed, and a source of concern for those working in the land grant system. Possible solutions lend themselves to interdisciplinary research, an often discussed concept in colleges of agriculture. In a paper discussing interdisciplinary research, Wells and Rathwell¹ point out:

Sir John Hicks, Nobel Laureate, refers to scientific study as "... that great systematic study of the world we live in which we call Science with a capital S." He further states, "The division of Science into sciences--physics, chemistry, biology, physiology, and so on--is largely a matter of convenience; we group together in a science those particular special studies which are conveniently pursued together and pursued by the same people." But dividing the world into sciences does not mean that the world's problems do not sometimes, if not often, spill over from one science into another. One science operating in a vacuum most generally will find a less than ideal solution to such problems. This is particularly true when there is little room for error. And, with the current farm crisis, there is no room for error.

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¹Wells, Gary J. and P. James Rathwell. "Lessons in Interdisciplinary Research--Ag Econ," presented at 1986 Annual Meetings of the Southern Agricultural Economics Association, Orlando, Florida, February 1986.

The tri-state vegetable project is an effort to address the problems faced by the farmers of today. The project is interdisciplinary not only in the involvement of more than one discipline, but in the involvement of three universities. The project directly involves the Departments of Horticulture at Clemson University, the University of Georgia, and North Carolina State University; the Departments of Agricultural Economics at Clemson University and the University of Georgia; and the Department of Economics and Business at North Carolina State University.

HISTORY AND BACKGROUND

In 1984, Clemson researchers Ed Loomis of the Department of Horticulture, and Larry Bauer of the Department of Agricultural Economics, discussed common interests in vegetable research. The climate and soils in South Carolina and the Southeast are favorable for vegetable production. The area is located in a favorable position relative to the large markets in the Northeast. Vegetables are and have been produced in the area. At one time South Carolina was the leading producer of asparagus in the United States, but the feeling was that there is considerable potential for expansion of current crops and for the addition of new crops. Vegetables seem to be a logical choice for consideration as an alternative enterprise.

Research on vegetables was being conducted at Clemson, but on a relatively small scale. There were no large scale varietal studies and essentially no vegetable marketing research being conducted. Much of the research in horticulture was related to plant breeding. Funds were not available for a program of adequate scale; therefore discussions on obtaining possible grant funds were begun. As the matter was considered, the thought occurred that the states adjoining South Carolina--North Carolina and Georgia--had similar problems and most likely similar interests. The agricultural economists and horticulturists at the University of Georgia and North Carolina State University were included in the discussions and participated in the development of a grant proposal for submission to the Special Grants program of the United States Department of Agriculture.

The proposal was approved in the spring of 1985 with funds allocated for expenditure 1985-87. The proposal for renewal, submitted in 1986, was approved for expenditure in 1986-88. The next proposal is in the process of being prepared. The grant is officially funded through Clemson University with the other two universities receiving funds through a contractual arrangement. Each year, the congressional delegations of the three states are made aware of the effort and they in turn have been supportive of the project. Last year, a presentation was made before the Subcommittee on Agriculture of the Senate Appropriations Committee.

OBJECTIVES OF THE PROJECT

The intent of the initial phase of the research is to analyze the feasibility of producing vegetables in the Carolinas and Georgia in a manner and scale that would provide farmers the possibility of alternative enterprises as a partial solution to their financial problems. In other words, the early analysis is production oriented. Questions to be addressed include the most basic one: what vegetables can be grown? What varieties are best in terms of yield levels and related management considerations, and what flexibility is there on the planting dates? An advantage of the three state area is that there are climatic differences. The area includes such climatically diverse areas as the coastal plains of South Georgia, the coastal areas of the Carolinas, the piedmont and mountainous areas of the western Carolinas. One hypothesis is that the climatic variability within the three state area is favorable for the production of marketable quantities of particular vegetables over extended periods of time, a necessity in penetrating meaningful market channels. The first priority of the research is to accomplish basic production or "field plot" analysis.

There is little question that vegetables can be grown in the three state area. The question is where they can be economically and competitively produced. The quantity and quality of production needs to be such that the area can be competitive in existing markets, and capable of developing new markets. An appropriate market outlet is essential for perishable, high value crops like vegetables. Yields and costs are important in the production of vegetables. However, they matter little if the product cannot be sold. Vegetable marketing is very specialized and complex. Buyers want a high quality product over an extended period of time. To justify the effort involved, the buyer wants a reliable source. A current market restriction in the area is the lack of sufficient volume, if any, in the case of particular commodities. Some commodities are being produced in such small quantities that market contacts have not been established. An initial concern is the determination of structure and current market channels in order to assess market potential.

A more detailed marketing analysis, including the possibility of market development, would appear to be appropriate in the next phase of the research. Future consideration will also need to be given to the development of an implementation program. If evidence indicates the area can be an economically viable producer of particular vegetable commodities, how can knowledge be transferred and an industry developed in such a way that viable quantities of high quality vegetables will be produced and satisfactory markets developed?

With the above considerations in mind, the specific objectives as currently specified are:

- A. Identify commodities which have the most potential for expansion.
 1. For the Carolinas and Georgia identify commodities for which a "market window" exists, i.e., a time period when production can be sold at a profitable price.
 2. Determine the sequence for selected vegetable crops throughout the production season in the three state region.
- B. Develop production practices and determine the feasibility of competitively producing specific vegetable crops on family farms in the three state region.
 1. Evaluate seasonal succession of vegetable production using planting dates and different varieties to lengthen the potential marketing season. Improve cultural practices for currently produced and new horticultural crops which show potential for commercial production in the Southeast. This would include the development of production budgets.
 2. Investigate alternative cropping systems to more efficiently utilize land resources during the total growing season. Implications relative to risk management will be considered.
 3. Determine optimum economic yield that can be consistently maintained for specific vegetable crops in intensive cultural systems.
 4. Delineate geographic areas within the region where economic production of specific vegetable crops can be profitable.
- C. Evaluate alternative markets for new and expanded production of selected horticultural crops, including international markets.
 1. Identify existing market channels and institutions involved with horticultural commodities.
 2. Determine the structural and institutional requirements for expansion of existing markets and for gaining entry into new markets, regardless of magnitude of production. Cooperative arrangements will be studied.
- D. Develop and disseminate specific recommendations on expanded production of vegetable crops.
 1. Develop detailed literature, including programs for micro computers, regarding what to produce, when and where to market, and expected returns.
 2. Conduct workshops and symposia to inform interested persons and groups of the research findings and implications.

COMMODITIES

The commodities currently being studied are broccoli, cauliflower, cantaloupe, carrots, cucumber, lettuce, Irish potatoes, collards, snap beans, tomatoes, and pepper. This list is subject to change as influenced by research findings.

COORDINATION AND RESEARCH ACTIVITIES

This project is truly regional, i.e., three states are cooperating on a single research project. By necessity, therefore, substantial coordination is required. This is especially true for the plot work, a significant portion of the early effort. The economists and horticulturists jointly discussed the initial list of commodities that should be considered as well as the general practices to be used on the plots. Once the entire group established broad guidelines, the horticulturists established specific plans and practices for all seven locations at which the plots are located. The horticulturists meet as a group at least twice each year and communicate frequently by phone and mail. The primary analyses on the plots deal with varieties, planting dates, and yields.

Whereas the horticulturists tend to be involved with a location within a particular state, each of the economists is, in general, dealing with a problem that applies to the total three state area. For example, Ed Estes at North Carolina State is working on a computer model to analyze how vegetable enterprises might be included in an individual farm cropping system. Jim Epperson at the University of Georgia is working on a regional quadratic programming model that analyzes the potential of vegetable crops in relation to agronomic crops. He has also done a survey of possible international market outlets for vegetables produced in the Southeast.

The economists at Clemson are involved in the estimation of market windows, i.e., if and when a commodity can be sold in a particular market at a profitable price. Preliminary analysis has begun on the estimation of demand elasticities or price flexibilities to determine how sensitive markets would be to substantial increases in volume. Analysis is beginning on modeling pack houses to determine if facilities can be constructed that will be suitable for different commodities over extended periods of time. As a first step in identifying the structure of current markets, a survey of first handlers has been completed.

The entire group has met on a semi-annual basis during the first two years of the project. These meetings have been held at a location near the experimental plots. The format has been to view the plots for a half day, and then spend a half day in a meeting where progress is reported and general discussions held. Interested visitors have been included. The format will change for the next meeting, to be held in May 1987. By that time, we will be far enough into the research that considerable discussion about the possible revision of objectives will be necessary.

RESEARCH RESULTS

The field work is being conducted at seven plots throughout the three state area: near Tifton and Attapulgus in Georgia; near Clemson, Florence, and Charleston in South Carolina; and near Fletcher and Lewiston in North Carolina (Figure 1). Data from all seven plots are sent to Clemson University for storage and compilation. Information from the first year is "in the computer" and that for the second year is being "entered." Preliminary analysis of data from the first year indicates that particular commodities have potential in some locations. It is obvious that not all crops will have great potential at all locations. The objective is to find selected crops with harvest dates suitable to supply produce over an extended time throughout the region.

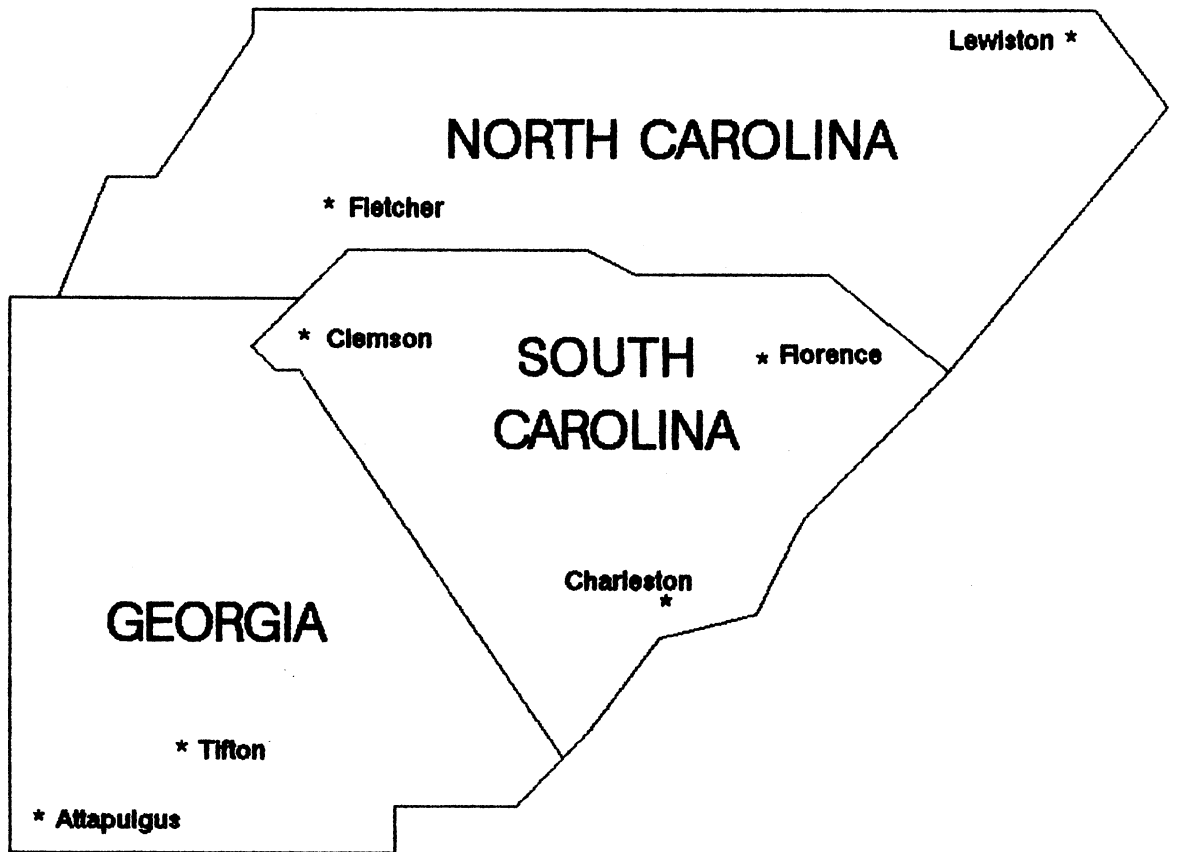


Figure 1. Location of Experimental Plots for Vegetable Research.

A bulletin on market windows is in the final stages of preparation at Clemson University. The results indicate selected commodities can potentially be marketed at a profitable price. However, the impact of increased volume needs to be assessed. Preliminary results on market flexibilities are available, but more analysis is necessary before publication. Production budgets have been developed that are differentiated by areas within the region. Most of the economic analysis is in the early stages of development because a significant portion depends on the plot work being conducted by the horticulturists.

SUMMARY

The Tri-State Vegetable project is truly a regional effort. Six academic departments in three universities are cooperating on the same research project. The three states have many similarities geographically and are faced with identical economic problems in the agricultural sector. It is logical, therefore, for such a cooperative regional project to exist.

Farmers in the three states are facing financial difficulties. Vegetable crops are reasonable and logical enterprises to be considered as alternatives. Such crops are already being produced, and the area is close to the northeastern markets. The three state area is sufficiently diverse climatically that a particular commodity could be produced over a period of time sufficient to satisfy the needs of large scale buyers. It is reasonable to expect that vegetables can have a positive economic impact on the three state area to the benefit of economically troubled farmers. However, those of us involved with the project are not naive enough to believe that this effort will result in the solution of all problems for all farmers.

A consideration that will need to be addressed in the future is implementation. The knowledge and information developed in production and management techniques will need to be transferred to producers. Farmers with no previous experience in vegetable production are likely to enter the industry. In order to produce a high quality marketable product, farmers will need considerable management and marketing assistance as the industry is developed. It is likely that the universities, or the state departments of agriculture and offices of development, will have to be active in the development and transfer of marketing information, as well as in the actual development of adequate marketing channels.

Current results are preliminary and inconclusive, but there is reason for optimism. Those involved with the project are excited about the long term prospects, and pleased with the cooperative research effort that has been forthcoming.

The Horticultural Producers Federated Association, Inc. — A Multiple Agency Team Approach to Introducing Alternative Enterprises

Larry Snell

Cooperatives will play a major role in the marketing of commercial vegetables grown by family size farms in the Eastern half of the United States during the next ten to fifteen years.

The small commercial vegetable grower will find it very difficult in the coming years to compete with large scale commercial vegetable operations. The larger growers are usually better capitalized and can afford better facilities, more modern equipment, cold storage, etc. They also have larger volumes of produce and more variety of product to offer their customers than the small grower. The larger grower, with his stronger capital position, can afford customers that pay every 30 to 45 days. Unfortunately, some of the better customers also look for shippers that can provide them with this payment schedule. The small grower cannot afford this luxury and as a result cannot sell to some of these customers.

The small commercial vegetable grower is aware of the marketing problems that he faces. This is evident from the many local vegetable marketing Cooperatives formed in the last year or two in several states. More are being formed each year.

The formation of a vegetable marketing Cooperative in a local area can address many of the problems of the small growers. By pooling their resources, small growers can afford good facilities, equipment, cold storage, etc., to properly grade, size, package, and ship their produce from. Their Cooperative can offer customers larger volumes of produce and, in many cases, greater variety of produce.

The formation of a local Cooperative can be a valuable asset to small vegetable growers in the immediate area. However, to be successful, a local Cooperative must have adequate finances, strong support, competent management, and an experienced sales staff. A let down in any one of these areas can be disastrous to the local Cooperative. Many local Cooperatives fail (approximately eight out of ten) because of insufficient capital and inexperienced management.

In many instances a common cause of new Cooperatives failing to be successful can be traced to lack of experience or understanding of how a Cooperative should be managed in a business sense and to lack of experienced sales personnel.

Several local Cooperatives from six states joined together to form the Horticultural Producers Federated Association, a "Cooperative of Cooperatives," in 1983. At the initial meetings of the individual Cooperative representatives, they realized they had many common strengths and weaknesses. Most had adequate to excellent facilities and member support. They were located close to several large potential markets. Some of the member Cooperatives have had problems obtaining adequate finances, competent management and experienced sales personnel. Many of the member Cooperatives have major problems competing in the market place with larger shippers from Florida, California and the East coast. They cannot compete because of the small acreage of crops and the short seasonal duration of the crops. They are at a disadvantage in purchasing containers for their produce because of the small quantities that they buy. They cannot afford a

permanent sales staff, and they have to hire brokers or seasonal sales personnel on leave from a permanent position elsewhere.

The Horticultural Producers Federated Association, Inc. has worked to establish a central office with personnel to work with the member Cooperatives to address the problems that confront them annually. With the assistance of the Agricultural Cooperative Service, Agriculture Marketing Service, Cooperative Extension Service, Tennessee Valley Authority Agricultural Institute, and State Departments of Agriculture, the Federation is currently working closely with the individual member Cooperatives to enable them to compete on a large scale in the market place. By working together and pooling their resources the Federation members can centralize their marketing efforts at one location with a staff of permanent experienced sales personnel. By marketing together they can provide customers with larger volumes of produce over an extended market period of several months. They can offer buyers a quality product based on industry standards for grade, size, uniformity, etc. With more consistent supplies of a quality product over an extended market season, the Federation can approach and secure better markets than what the individual Cooperatives have been able to attract in the past.

The basic underlying problem of most local vegetable Cooperatives is marketing. The Federation plans to expend considerable effort to alleviate this problem. Better, more stable markets will result in higher returns to growers. Growers will then provide more support in the form of capital, volume of product, etc.

As the individual Cooperatives grow, the Federation can expand its services to meet their needs. Without the Federation, many existing local vegetable Cooperatives will cease operations in the next few years because they cannot compete in the market place as it becomes even more competitive.

Multiagency

W. Joe Free

While the South has always had a number of farmers that produced vegetables for the summer market, the needs of buyers for the major food distribution systems have changed. The region has lost market shares because the infrastructure did not keep pace with buyer needs.

Efforts were initiated in the 1960s to develop shipping point packing facilities. These programs were targeted to small farmers, and the largest thrust came from startup capital made available through the Office of Economic Opportunity (OEO). A survey conducted in 1984 suggested that many of the co-ops started in the 1960s had disbanded or were inactive because of lack of grower commitment, inadequate volume, and lack of leadership and aggressive management. The Tennessee Valley Authority (TVA) also assisted the North Carolina State University staff in establishing several tomato packing co-ops during the late 1960s and early 1970s.

In the late 1970s, several of the co-ops in North Carolina, Tennessee, Virginia, and Kentucky began to realize the need to cooperate as a way to be more effective in serving the needs of the members and the needs of buyers. With the help of several state and federal agencies, these needs started the activities that led to the establishment of the Horticultural Producers Federated Association, Inc. (HPF).

Early Developments

According to research findings of the Southern Regional Fruit and Vegetable Market Research Committee, most large food distribution and institutional buyers want to buy from packing-houses that can deliver a large volume of a consistent quality over as long a period of time as possible, and they want that time period specified in advance. Most co-ops, let alone individual growers in this region, have difficulty meeting these requirements.

In the late 1970s, TVA and the Agricultural Cooperative Service (ACS) staffs began working with co-op managers to develop a unified approach in marketing and recordkeeping. Most managers felt that they had unique problems and secret information. After a few meetings sponsored by TVA, ACS, and the land-grant universities, managers realized that the buyers were very knowledgeable about each operation and that the managers needed to know more about each other's situation in order to do a better job bargaining for growers. In 1980, these agencies began talking with the co-op managers about a vision of coordinated selling.

After much discussion, it was agreed that we needed to work together on a plan that would improve communications and recordkeeping as the first step. The first effort was undertaken as a joint venture between TVA, USDA, Virginia Polytechnic Institute and State University (VPI), and the Eastern Electronic Marketing Association, Inc. (EMA). TVA and ACS reviewed the record system used in the co-ops and recommended the records and system that might be adapted for electronic analysis. The data and the records would be transmitted by phone to a central computer for analysis and the reports sent back via phone. After two years of frustration because of glitches in the phone system that resulted in lost data or garbled signals and imperfections in the procedures, that effort was abandoned. The benefit gained was that managers started talking to one another by phone and at meetings sponsored to review the plan and status of the venture.

Microcomputers appeared to offer an alternative for the recordkeeping system and could be used as a communication tool. In 1983, ACS and TVA started working with the co-ops that had participated in the EMA project to restate the record needs and design a system that could be kept with microcomputers. Agricultural Marketing Service (AMS) and VPI soon joined the other two agencies in this effort.

In October 1983, five fresh vegetable marketing cooperatives¹ organized the HPF. The purpose of HPF is to provide services to member cooperatives that will help them solve common problems and improve marketing operations. These services will enable each participating cooperative to better serve their farmer-members.

The HPF members solicited the continued support, advice, and assistance from agencies that had assisted them prior to their incorporation. A formal advisory committee was established. This committee consisted of staff, from TVA, ACS, AMS, and Extension specialists from VPI, University of Tennessee, University of Kentucky, and North Carolina State University. The advisory committee was asked to serve in an advisory capacity to the board of directors, assist in market feasibility studies, and assist in development of services that would be offered to member co-ops. Since then, others such as representatives from State Departments of Agriculture have also provided assistance in this program.

Progress from 1983-1986

Computerized recordkeeping has been an objective since before HPF was actually chartered. This effort was the first project. The local co-ops worked with the multiple agency team in defining each of their record systems and in testing the system developed.

TVA, USDA, and VPI provided leadership in specifying a record system, developing the software for computerizing, and acquiring microcomputers. Both central training and onsite assistance were provided to assist managers and bookkeepers in implementing the recordkeeping systems and interpreting the records for the individual co-ops. The software package is being upgraded again in 1987, and many of the co-ops are adding software so that the total financial statement can be prepared with the microcomputer. HPF has become the distributor of Red Wing software and makes their programs available to members at cost. Today many of the co-ops have software capable of maintaining grower accounts, buyer accounts, payroll, accounts receivable, accounts payable, and a general ledger system.

The agencies are continuing to provide technical assistance to assist co-op members with problems and to implement a new phase of the record system. HPF is assuming responsibility for these efforts as members acquire skills and as HPF moves toward financial independence. The transfer of this responsibility is a planned process and is taking place with the assistance of the advisory committee.

¹Cumberland Farm Products, Inc., Monticello, Kentucky, Southwestern North Carolina Farmers Co-op Inc., Murphy, North Carolina, Tri-State Growers Cooperative, Tazewell, Tennessee, Smith County Growers Association, Inc., Marion, Virginia, and Highland Rim Vegetable Growers Association, Inc., Celina, Tennessee.

Centralized Selling

Centralized selling has been identified as one of the most needed programs, but probably will be one of the most challenging and difficult to implement. Centralized selling has the potential to provide significant benefits to the member cooperatives and to the farmer members of these cooperatives. Centralized selling has been discussed, evaluated, and closely scrutinized for three years with the result that the HPF membership and the HPF advisory committee (Extension, TVA, ACS, and AMS) feel that the Federation should implement this program in 1987.

The advisory committee worked with the HPF board to develop plans and a proposed budget. The group concluded that a minimum of \$200,000 to \$225,000 would be required the first year to implement centralized sales service. Securing funds of this magnitude for an organization with no capital assets was recognized as a major constraint. The decision was made to seek funding assistance to cover anticipated shortfalls during the initial phase. A commitment has been consummated with AMS to provide \$150,000 and with TVA for \$65,000 to support the first year's operation. The HPF members will pay on a percentage of sales basis for the services. Budget estimates are for HPF becoming self-sufficient as a sales organization by 1990 from fees collected for market services rendered to its members. Larry Snell agreed to be the general manager if he could continue his work with Cumberland Farm Products, particularly during the formative years.

A number of activities are under way. One is the search for a full-time employee to work in market development and for seasonal employees to participate in sales. Contracts are being developed with the member co-ops for tomatoes and bell peppers, the primary crops that will be sold by the HPF staff in 1987. Potential buyers are also being contacted to let them know about the development that is under way.

TVA is providing a staff person-equivalent in addition to the \$65,000 to work with HPF staff to help monitor the local situation and to help ensure quality through the use of irrigation and other production technology. Plans are to expand the sales service from tomatoes and bell peppers in 1987 to a wide range of vegetable crops in the future as HPF develops its staff and refines operating procedures. Through the local co-ops, State Department of Agriculture assistance is being solicited to ensure availability of qualified graders and to assist in promoting our vegetable industry. With the continued support of state, local, and federal agencies, I believe that we can establish the infrastructure required to be a major wholesale supplier of vegetables in the national market.

Summary and Future Direction

Membership increased from five charter members in October 1983 to 16 today. Thirteen of these are using microcomputers for bookkeeping and information on which to base management decisions. Most are receiving market information sponsored by HPF and are participating in the market information and price analysis program. Under the guidance of the advisory committee, HPF plans to continue to improve and support these services. Centralized purchasing will be implemented as opportunities and needs are identified. Most of the efforts in 1987 will be concentrated on successfully introducing the centralized sales service.

Feedback to HPF from wholesale vegetable buyers is positive. Most feel that this movement is a step in the right direction if we are to regain market share for the region. Producer members of the local co-ops that plan to sell through the Federation feel that this is a new opportunity. With continued interagency support, continued strong grower commitment, and hard work, HPF can truly make vegetables an alternative crop for many farmers in the region.

A Market Information System

The multiple agency team has been an integral part of this development. In 1983, TVA worked with the Market News Service, USDA, to download the fruit and vegetable market news to a microcomputer located at TVA. Each co-op submitted a list of vegetables and markets for which they wanted market news and price data. TVA selected this data from the material acquired from the Market News Service and called each co-op on a daily basis to give them the current market report. The advisory team was always searching for a better and more efficient way. In 1984, VPI, working with Market News Service and AMS, tested a system where the market information was downloaded on a microcomputer, and with an "800" number, the co-ops could access the microcomputer for the latest market news. This system also proved costly, time consuming, and less timely than was desired. In 1985, the advisory committee suggested to the HPF Board that they acquire the Pro Net services for market information since they were in the business of providing information and supplemented the federal market news service information with weather and current status of major vegetable growing areas. The participating agencies provided partial funding for this test. This service was successful and less costly than the other approaches. In 1986, the services of Pro Net were continued, and HPF established a market analysis and pricing committee that called member co-ops to determine weather conditions, harvest conditions, and prices received in the region. This data was used to supplement the Pro Net data, and the market and price analysis committee agreed upon market trends. These trends were made available to each participating co-op on a daily basis. This effort was a multiple agency effort. The plan was discussed with the advisory committee and funded by TVA, USDA, VPI, and from a per box checkoff from the participating co-ops. The information was helpful to the co-ops in establishing their respective negotiating position. Plans for market news and for sharing market information in 1987 are being developed.

Membership Development

Membership in HPF has increased from five in October 1983 when chartered, to 16 members today. These co-ops represent about 1,300 farmers. From the beginning, it was recognized that sustaining and increasing membership were dependent upon services that could benefit members. In order to better understand the services that potential members were seeking, the advisory committee assisted with a study. ACS contracted with VPI to conduct a feasibility study of the services that could be provided by the Federation to potential member marketing cooperatives. Under this project, VPI identified and surveyed 30 fresh vegetable marketing cooperatives in the South to determine needs that may be met through services offered by a federation. One finding of the study was that the operating and management efficiency of the cooperatives could be improved through the introduction and use of microcomputers. This find verified the fact that HPF was on target in supporting and implementing a microcomputer application system for fresh vegetable marketing co-ops. Other services identified in the survey included purchasing services, centralized selling, and managerial assistance. Survey results were made available to HPF members and the advisory committee for use in planning.

The survey also generated interest among the co-ops contacted. It contributed to the interest and in a number of cases, the co-op's joining HPF.

Centralized Purchasing

During the fall of 1985 a program to investigate centralized purchasing of packing supplies was initiated by HPF with assistance from the AMS/Virginia Tech project. Five container vendors participated and attended the annual meeting of the Federation to discuss the potential for centralized purchasing by HPF members. Although centralized purchasing was not conducted in 1985, several cooperative members indicated they improved their individual purchasing positions. Centralized purchasing remains a goal of the Federation.

Within State Team Approach — Postharvest Handling

Charles W. Laughlin

The challenges facing American agriculture as it goes into the 21st century are complex and convoluted. Issues and problems confronting agricultural research are not contained neatly in any one academic discipline. Conventional, single disciplinary approaches are often confined to specific objectives and may solve the identified problems, but not be able to demonstrate linkages to the entire system. The major breakthroughs in agricultural research in the next decades will likely result from interdisciplinary research. Webster defines teamwork as a joint action by a group of people in which individual interests are subordinated to group unity and efficiency. However, just the bringing together of a group of individuals doesn't constitute a team. It does provide a resource pool with different backgrounds and perspectives. But once it can function as a group of people in which individual interests are subordinated to group unity and efficiency, you have a team.

What is the real difference between interdisciplinary research, multi-disciplinary research or other types of collaborative research? How does it come about? Much of what passes for interdisciplinary research involves a researcher in one discipline asking for some assistance in data interpretation or analysis. While crossing disciplinary boundaries, this type of work only involves a "service function" by the researcher. Both multi-disciplinary and interdisciplinary research involve the broadening of the research effort by recognizing the need for input and expertise from scientists in more than one discipline. The real difference lies in the level and extent of joint planning of a research effort. Interdisciplinary work requires the involvement of all scientists in the total planning of a project contrasted with passive participation as is evident in multi-disciplinary research. Interdisciplinary research requires that all participants be involved in field work associated with the project. This means that each researcher must learn the technical aspects of other disciplines as well as teaching colleagues their own discipline. Therefore, the key to effective interdisciplinary research is the involvement of all researchers from the conception of the project through the dissemination of its results. During the planning sessions, each researcher must explain to the others the kind of work that can be published in their own disciplinary journals. The research is then designed to have components which will provide publication outlets for each of the participants.

As one might perceive, there are both positives and negatives associated with interdisciplinary research. An interdisciplinary team provides a greater base of expertise for the identification of problems and challenges. With technically competent co-principal investigators, researchers know what is really needed, what is happening, what might be and therefore, how to ask the right kind of research questions. For many of the disciplines, interdisciplinary research provides the opportunity for the acquisition of real primary data. Such data help the researchers focus their attention on the real problems and provide sound information for making appropriate conclusions. Each participant has his intellectual horizons broadened significantly by involvement with interdisciplinary research. For example, when did an economist ever think about plant disease or storage rot when talking only with fellow economists?

Interdisciplinary research has some down sides. First, interdisciplinary research requires significantly more time commitment to planning...planning every facet of the research rather than focusing on "one's own little world." Intensive planning requires a great time commitment. If this kind of commitment is not made to the planning effort, then true interdisciplinary efforts can not be achieved. Communications are greatly complicated with interdisciplinary research. If you're having one-on-one discussions, it's relatively easy to work toward consensus compared to a system that requires working with a number of participants. And if they lack a common vocabulary, communications breakdowns are likely to occur. Certain up-front agreements must be made when entering into interdisciplinary research such as "Who will be the senior author on publications" and "How are funding resources to be allocated and managed within the research team?" The guild problem is also a significant deterrent to interdisciplinary research. By this I mean that all agronomists are expected to walk and talk like all other agronomists! If one is viewed as different from the other members of the guild when promotion and tenure decisions come along, there may be adverse effects. Success will overcome disciplinary parochialism. What was first thought of as wasting time by interdisciplinary researchers is viewed as success once recognition is gained.

Interdisciplinary research is similar to a jigsaw puzzle. The only problem is that the pieces of an interdisciplinary puzzle are in a dynamic state and as an interdisciplinary researcher, you must watch more than one piece at a time. If one has trouble chewing gum and walking down the street, perhaps interdisciplinary research is not for him.

We've talked about the difference between interdisciplinary and multi-disciplinary research and the up and down sides of interdisciplinary research. Now, I would like to address what makes an interdisciplinary research team work. The first criterion is that each participant must have flexibility of thought. They must be able to think "What if". . ." "What might be," rather than "What is" or "What must be." Each participant must also feel he needs the other participants' areas of expertise. You are looking for a complementarity of strengths on an interdisciplinary team, not a duplication of expertise. Each participant must be willing to earn the respect of all the other members of the team based upon an individual's integrity and ability. If a person joins an interdisciplinary team and feels he/she should automatically be given respect and trust for his/her commitment to and knowledge of the project based on previous efforts, this individual will soon be the weakest link of the interdisciplinary research team.

Each member must also expect the unexpected. It may be as simple as understanding the meaning of "quality." What quality means to a horticulturist is markedly different from what quality means to a food scientist.

Each member of the team must make a commitment to the team to actively participate in the entire planning process and in each component of subsequent activities. Up-front decisions may need to be made on crucial issues such as authorship and funding support.

The acceptance of new members into an existing interdisciplinary team is not easy. First, the "new kid on the block" must demonstrate his commitment to interdisciplinary research and specifically the underlying goal encompassed in the research. The new colleague must demonstrate his allegiance to the total effort by buying into the agenda that the existing team members have established. Should the individual seeking membership on the interdisciplinary team not meet one of these criteria, no permanent linkage will develop.

If one accepts the definition that I have used of interdisciplinary research, then the post harvest research team at the University of Georgia is truly an interdisciplinary team. This team is composed of an agricultural engineer, food scientist, agricultural economist, and horticulturist. The bringing together of these individuals was at the initiative of the researchers, not the administrators. The agricultural engineer, Stan Prussia, and the food scientist, Rob Shewfelt, following the encouragement of their respective department heads, looked at how a research plan might be brought together. Through their discussions, they identified that economics was the unifying concept for their research interests. But who had ever heard of an economist willing to work so closely with a food scientist and an agricultural engineer? Fortunately, a new agricultural economist, Jeff Jordan, had recently joined the faculty at the Georgia station. As part of his orienta-

tion, he visited each of the departments talking with scientists about how an agricultural economist might interact with them in their research efforts. After his initial visitation, Dr. Jordan really wasn't sure he wanted to get involved with this post harvest group. Dr. Jordan felt that Drs. Prussia and Shewfelt thought he was more important to the total research project than he, Dr. Jordan, felt he was. But finally they did initiate a dialogue which led to subsequent planning efforts. Two things were necessary to make this happen. First, the administrators provided an encouraging environment for the scientists to step outside their traditional disciplinary boundaries, and secondly, the administrators recognized the need for "get acquainted time" for the development of professional relationships before real progress could be accomplished.

A leadership study of this interdisciplinary team shows that situational leadership is a role with which each of the participants is comfortable. For example, when questions of scheduling or logistics of research are needed, Dr. Prussia takes the lead. When it comes to data collecting, Rob Shewfelt is the on-field quarterback. When it comes time for a redefinition of the agenda or stretching the research agenda and its associated activities, Jeff Jordan is the leader. Reuben Beverly, assistant professor in horticulture, is the newest member of the team and his exact role is still being defined. As I stated earlier, it is difficult for a scientist to enter into an existing interdisciplinary team.

When you enter an interdisciplinary team, each participant brings variability into what is observed under a given set of circumstances or conditions. I frequently use the example of when a group of faculty members take students to a farm. The ag engineer focuses on the physical systems, the agronomist looks at soil fertility, planting rates and crop variety, while the plant pathologist and entomologist look for diseases and insects which inhibit plant production. However, as a part of an interdisciplinary team you have made a commitment to learn the technical aspects of the other disciplines and teach your discipline to the other members of the team. Once you have this exposure, it is impossible for anyone to view things as previously viewed.

The mobile laboratory trips in which this group has participated have done more to help each of the members understand the others' disciplines as well as break down any preconceptions which one might bring into the research activity. It has helped each team discipline when doing research. In the initial sampling of tomatoes, the economists wanted a minimum of 500 samples. The immediate response of the food scientists was, "Well, I can only do 50 in a day!" They found that the economists and food scientists were looking at optimal qualities to define product while the horticulturist was viewing quality as a maximal value. The agricultural engineer and economist soon learned that a peach is not a peach, while the economist and horticulturist soon learned that a packing line is not just a packing line.

When asked what were the highs from this interdisciplinary effort, members stated that the critique of all activities was most exciting so that the research can continually be redefined and improved. The acceptance of research team members by their respective disciplinary peers let them know that they had made it.

When asked what were the low points, they indicated that the lack of understanding of time commitment by each of the members almost resulted in a dissolution of the research team about two years ago. They indicated that in the initial stages of research, there was a lack of the same intensity of interest by all members of the group. In some cases, an animosity by their peers for stepping outside the traditional disciplinary boundaries caused much soul searching.

If interdisciplinary research is to be successful, then the evaluation and award systems must facilitate cross-functional and cross-divisional teamwork. The efforts of the post harvest research team have been recognized in many ways by a broad group of professional disciplines. For example, for his research focusing on the transportation of perishable commodities across the country, Jeff Jordan was awarded transportation awards by the transportation research forum. The mobile laboratory used by this research team was given an honorable mention in a recent competition of research facilities. It should be noted that approximately \$25,000 was expended to develop this research laboratory. The facility which gained recognition immediately before this

laboratory had cost in excess of five million dollars. Last year, when the American Society of Agricultural Engineers evaluated papers published in their professional journal, two of the top ten were Dr. Prussia's papers relating to the post harvest research activities. In student paper competition over the last three years, students associated with the post harvest team collected two first place and one second place awards. Recently, the University of California at Davis asked members of this research team to jointly submit a grant proposal to the California Lettuce Commission. This is a source of funds that is unavailable to scientists outside of the state of California. But because of the recognition that the University of Georgia research team has acquired, it was asked to submit a program and be co-investigators with scientists from the University of California at Davis. In perhaps the most significant recognition, one team member has been granted promotion and tenure, and the two others are successfully completing the process. In all three cases, the postharvest research effort was singled out by the promotion and tenure committees throughout the university as "a source of excellence" in making their decisions.

In summary, for interdisciplinary teams to work, the individuals must be willing to be risk takers, to have the courage to step beyond the traditional boundaries identified by their professional disciplines. It is essential that administrators understand that time is needed for the team to develop and earn mutual trust and respect. Once this has been accomplished, the interdisciplinary research team is well on its way toward establishment. Participants must remember that as a part of an interdisciplinary research team, they must make a commitment to participate in all aspects of the interdisciplinary effort, a commitment to their "new" colleagues, and a commitment to the unifying concept of the project. To nurture the enriched environment required for interdisciplinary programs, administrators must be readily available, be good listeners, encourage honest feedback and be willing to provide an environment which asks "in what ways might we" accomplish this set of goals. Just as the question was asked "How are we going to keep them down on the farm once they've seen Paree," administrators will ask, "How are we going to be satisfied with research efforts which are not interdisciplinary once we have seen the success, enthusiasm, and excitement associated with a successful interdisciplinary research team?"

How Producers can Respond to Changing Opportunities

H. L. Goodwin

The South has historically been an area plagued by below average income. Employment opportunities for the majority of residents were somewhat limited, consisting primarily of factory employment and farming small acreages of sometimes marginally productive land. Over the past couple of decades, greater employment opportunities developed as the economy grew and diversified. Many small farmers have sold out or quit farming to become off-farm workers. Those remaining did well through the 1970s as commodity prices increased with inflation. Income from mineral leasing also contributed positively.

At the present, economic growth, particularly in the South, has slowed and in many instances reversed. Farm operators who were financially stable before have seen their farm income decrease by as much as 65 percent since 1979 (Goodwin and Jones). Prices for traditional commodities have declined. Overproduction and lack of foreign trade have been contributory factors. For other operators, drought, flood, freeze, or other uncontrolled natural factors have caused hardships in unprecedented proportions.

These and other factors have forced many farm operators and/or their spouses to seek off-farm employment for an income supplement. In 1979, over 90 percent of all American farm families received some income from off-farm sources (Carlin and Ghelfi). By 1982, 36.4 percent of all farm operators in the U.S. worked off the farm 200 days or more per year (USDC). Admittedly, a large percentage of Southern farm operators are actually off-farm workers dabbling in agricultural production. For many of these, however, the added income from agriculture is important. Neither these part-time nor the full-time operators are well served by declining commodity prices nor encouraged by the prospect that prices will remain low or decline further.

An estimated 15 percent of all producers are in financial crisis, the number varying dependent upon the region in which they produce (AFBF). Of the six states losing the most farms between 1985 and 1986, four were in the South, with Texas losing 15,000 of an estimated 60,000 U.S. farms that went out of business. Virginia lost 4,000, and Arkansas and North Carolina lost 3,000 each (SRDC). The declines are heavily concentrated in small, mid-sized farms with gross sales between \$40,000 and \$100,000 per year, according to Don Reimund, USDA. Reimund says these farms are "too small to yield sufficient income from agriculture and too large to operate part-time while the owner holds an off-farm job" (SRDC).

Whether foreclosures, farm debt and financial instability have been precipitants of high real interest, high land prices, inefficient use of capital, low commodity prices, weather, or some combination of these factors, limited net cash flows to operators are the result--often so limited that many go out of business. Large numbers of producers are turning their attention to high value specialty crops such as vegetables, fruits, and nursery stock as a partial solution to their

problems. Others are diversifying into production of specialty livestock. However, production of such specialty items is intricate and the markets often precariously balanced and quite volatile. Despite this, diversification into such alternative opportunities¹ appears to be gaining popularity as a way of boosting farm income, just as off-farm income has done for some time.

CHANGING OPPORTUNITIES, CHANGING RESPONSES

A profile of the U.S. population indicates that America is becoming older, less white, and more affluent than in previous decades (USDC). Demographers and sociologists concur that such changes in the face of America are now directly impacting buying patterns. These changes, coupled with our evolution into an advanced information society provide many exciting opportunities for response. Let us briefly examine some of these, beginning with food consumption.

Eating habits in America are changing, largely as a result of the increasing age of our society, the large influxes of Hispanic, Asian, and Indian immigrants into the country, and the health consciousness of society as a whole. Consumption of fruits is strong, and vegetable and melon consumption continues to increase, up to 82.4 pounds per capita in 1984 (PMA). Within this classification, fresh and frozen increased while canned decreased. New residents coming from other cultural backgrounds in Asia and Latin America are more dependent on fruits and vegetables and less dependent on red meats and dairy products for their nutrition. They are bringing with them new foods and new ways to prepare old foods, with many of these "catching on" particularly in urban centers. Awareness of health and concern over weight and fat and cholesterol in the diet have precipitated a decrease in the per capita consumption of red meat and an increase in the consumption of non-red meats. With some thought, the changing opportunities brought about by changes in food consumption patterns can be readily identified.

Less easily identified but more rewarding and satisfying if responded to are the changing opportunities provided by the type of society America has evolved into, a secondary information and service society. In 1985, there were more jobs in secondary information and service industries than in primary producing industries such as manufacturing, agriculture, forestry, fishing, and mining, a phenomenon highlighted in the John Naisbitt book, *Megatrends*. Characteristic of such a society are the demands for quality, convenience, consistency and dependability in the products it purchases. In addition, novelty is important. Increased demand for entertainment and diversion (included is electronic entertainment) are also features of this advanced

Inspection of the program for this conference on "Alternative Farming Opportunities in the South" gives an indication of how some producers are responding to the changes previously mentioned. These responses range from decisions on marketing and financing options available to selection and management of enterprises. Enterprises under consideration run the gamut from alternative ways to produce, manage, or market traditional livestock and crops (such as poultry, beef cattle and familiar fruits and vegetables) to introduction of "exotic" alternatives in the U.S. (milk goats, herbs, mushrooms). They include capitalizing on native crops and plants (muscadine, landscape materials) as well as recreational use of the farm itself in addition to its production value.

¹"Alternative" as used throughout this paper will be defined as any agriculturally based activity not traditionally considered as a predominant activity, such as production of field or row crops and cattle, hog, poultry or dairy operations. For most farm operators, then, production of horticultural specialty crops in quantities larger than those for home use would be considered an alternative opportunity, as would production and management of various types of small livestock. It is important to distinguish "alternative" in this sense from alternative farming systems (organic, natural, etc.) although they certainly may be a limited subset of the alternative opportunities available.

Four broad groups of potential producers can be classified as respondents to alternative farming opportunities: (1) full-time farm operators who wish to expand current fruit, vegetable, or small livestock production; (2) full-time farm operators who wish to diversify from traditional field and row crops and livestock into fruit, vegetable or small livestock; (3) part-time farm operators who wish to become full-time operators; and (4) part-time farm operators who wish to increase supplemental farm income, choosing alternative farming as their means of entry. Excluding the first classification above, full-time operators currently involved in production of traditional row crops would have easiest access into fruit and vegetable production. Their machinery complements would most nearly approximate those needed for larger scale operations and their familiarity with necessary management practices would probably be greatest in comparison to livestock or part-time operators.

Part-time farm operators face the greatest limitations. Limited management exposure is a definite constraint, as are knowledge of cultural practices necessary for producing quality products and available hours for operation and management of the enterprise. Lack of adequate machinery is an additional constraint. Recent research indicates that the vast majority of part-time operators derive most of their income from off-farm sources, generally salary and/or wages (Goodwin and Jones; Goodwin and Pope; Thomas, Albrecht and Goodwin). Therefore, it is probable that a part-time operator who wished to increase off-farm income substantially through alternative opportunities would by necessity become more nearly a full-time operator, growing into such an enterprise slowly and methodically.

Response Alternatives

Having briefly outlined some of the enterprise choices available as alternative opportunities and identified the most likely respondents to these opportunities, a logical consequence is speculation as to how producers may respond to the alternatives. In an effort to reflect the extent to which producers were already responding to alternative opportunities, data for selected fruits and small livestock were collected from three Censuses of Agriculture (USDC 1974-1982). Vegetables, although generally thought of as the primary alternative, and nursery products were omitted due to clouding of the data by large commercial industries in Florida and Texas. In addition, the data are presented for illustrative purposes only, as the major thrust of the remaining discussion will be to provoke thought, not to prove a point.

Tables 1 through 6 summarize trends from 1974 through 1982 in number, production, and sales of various alternative enterprises in the South. Table 1 indicates that the number of farms producing and harvesting non-citrus tree or vine fruits has declined or remained relatively stable and that overall yields have fallen. In contrast, Table 2, Miscellaneous Berries, shows increases for harvested acreage and quantity over the same period for blackberries, blueberries, raspberries, and strawberries. Table 3 indicates an increase in the sales of milk from goats, and Table 4 reflects increases in sales from chinchillas, and large increases from rabbits and other miscellaneous small livestock. Miscellaneous poultry production is generally down except for pigeons and squabs, pheasants, and ducks. Table 6 relates the large increases in sales from honey and from catfish (nearly triple from 1978 to 1982).

More interesting, and perhaps more pertinent than documentation of response through numbers, is exploration of "new" alternatives--specifically, special marketing and recreational value of the alternative enterprise itself. The majority of those operators responding to alternative opportunities will be small or medium sized. (This follows from the fact that most financially troubled farmers are in the \$40,000 to \$100,000 gross sales categories). They lack economies of size and the transportation and marketing infrastructure possessed by large operators. They have typically relied upon U-pick, roadside, or farm markets for sale of their products. Volume production may not be present to supply outlets beyond the local area. With these and other obstacles to overcome, special marketing and recreational value of the operation can become integral parts of their process.

Special marketing refers to adding value to the product produced. This could take on many forms, but generally consists of some type of product identification, either through labelling, concentrated sales to end-users of the product, or processing of some type. Baked goods, jams and preserves, pickled vegetables/sauces, smoked small livestock and poultry, and specially shipped "gift packs" are just a few examples of special marketing techniques which have proved successful.

Table 1. Summary of Characteristics of Selected Tree and Vine Fruits, Southern States, 1974-1982

TREE AND VINE FRUITS		TOTAL			HARVESTED	
Total South		Farms	Acres	Trees or Vines	Farms	Quantity
Apples	**1974	4570	92333	6130244	3155	864,299,675
	78	13969	102145	7106958	6924	3,768,727,917
	82	11495	97098	7057120	3995	830,748,568
Peaches	**1974	3893	95050	8823238	2451	432,688,003
	78	13323	110758	9605183	6508	576,760,241
	82	11035	109002	9888291	3505	378,157,228
Pears	**1974	790	1449	88338	273	4,141,436
	78	6973	3663	200618	2812	4,047,915
	82	2769	2131	108571	1036	2,018,692
Cherries	**1974	352	482	30636	127	1,265,733*
	78	2612	948	49527*	855	781,553*
	82	1738	883*	44419*	310	473,921*
Grapes	**1974	1014	7794	3256297	544	13,914,386*
	78	7179	11858	4860201	3661	33,914,386
	82	4884	10709	4435209	2197	35,689,829
Plums & Prunes	**1974	695	874	76195	144	704**
	78	4898	3192	142060	1741	3,034,589*
	82	2626	1500	106131	976	932,255*
Figs	**1974	30	17	826	17	2,487
	78	335	127*	5769	148	15,298
	82	419	129*	5291*	124	16,126
Nectarines	**1974	31	417	33245	15	2,364,145*
	78	249	328*	32913	76	495,667*
	82	564	995	88789*	115	505,068*

Source: U.S. Census of Agriculture, 1974-1982

*Data not available for all states in theregion.

**May include limited double-counting due to categorization.

Table 2. Summary of Characteristics of Selected Berries, Southern States, 1974-1982.

Miscellaneous Berries		Farms	Harvested Acres	Quantity
Black Berries	1974	169	1387	1699700
	78	623	715	642599
	82	576	791	1011948
Blue Berries	1974	202	2902	4191448
	78	605	4360	8899918
	82	669	5218	7962605
Raspberries	1974	59	82	120752
	78	274	170	187422
	82	242	179	250510
Strawberries	1974	1534	4443	18508962
	78	3810	7345	43569135
	82	2752	9370	76234907

Source: U. S. Census of Agriculture, 1974-1982

**Table 3. Summary of Characteristics for Selected Miscellaneous Livestock,
Southern States, 1974-1982**

Miscellaneous Livestock		Total South		Sales (\$1000)
		Inventory Farms	Number	
Mules, Burros, Donkeys, of all ages	1974	8654	15004	305
	78	20920	36069	858
	82	5032	11888	589
Chinchillas	1974	37	7669	96
	78	100	12131	170
	82	83	16751	175
Rabbits	1974	477	57033	1014
	78	3637	140620	1349
	82	2896	206178	2458
Other	1974	1873	170563	915
	78	8115	187118	1678
	82	18487	1383085	9171

Source: U.S. Census of Agriculture, 1974-1982

Table 4. Summary of Characteristics for Angora and Milk Goats, Southern States, 1974 - 1982

TOTAL SOUTH				
	Inventory		Sales	
	FARMS	NUMBER	Gts (\$1,000)	Mohair (\$1,000)
Angora Gts				
1974	1393	776339	1777	8635
78	1537	807526	3530	26089
82	2588	1059963	5391	24259
Milk Gts				
1974	244	3733	103	Milk (\$1,000) 482
78	2774	31961	812	387
82	12233	56171	912	1085

Source: U.S. Census of Agriculture, 1974 - 1982.

**Table 5. Summary of Characteristics for Selected
Miscellaneous Poultry, Southern States,
1974-1982**

	Total South	
	Farms	Number
Ducks		
1974	2439	96513
78	20742	189247
82	11695	1349925
Geese		
1974	1220	12526
78	9523	60409
82	6021	45931
Pigeons & Squabs		
1974	114	109340
78	1323	32497
82	781	114569
Pheasants		
1974	137	25557
78	1011	30151
82	661	35003
Quail		
1974	161	260279
78	1109	1142192
82	822	792621
Other		
1974	1004	39756
78	8125	326935
82	3358	249318

Source: U. S. Census of Agriculture, 1974-1982

Table 6. Summary of Characteristics for Bees and Catfish, Southern States, 1974-1982

Colonies of Bees and Honey				
	Inventories of Bee Colonies		Total South	
	Farms	Number	Sales(\$1,000)	Sales(\$1,000)
1974	2155	325961	2828	8691
1987	11172	582720	4994	15695
1982	21449	681389	4668	20736
Catfish				
	Total		Total South	
	Farms	Acres in Production	Total Sales (\$1,000)	
1974	605	24722	11425	
1978	1012	25815	25248	
1982	1240	61508	66494	

Source: U. S. Cnesus of Agriculture, 1974-1982.

Recall the earlier identification of our society as a secondary information society, keenly aware of aesthetics and recreation/entertainment opportunities. In this rapidly urbanizing way of life are ever increasing numbers of people who may only romanticize of the carefree or independent, relaxed rural lifestyle (Martin). Kelly suggests that four basic types of psychological experiences--environmental, social, developmental, and health--are derived from the consumptive use of resource based activities. These may include participation in production of an agricultural enterprise, or in more traditional recreational pursuits of fishing, nature trails, hiking, and photography. Benefits of such consumptive (recreational) use are found irrespective of regional origin of the participants and have been shown to be consistently high-valued (Pope, Goodwin, and Albrecht).

The Integrated Approach: Two Examples

Two examples from Texas illustrate exactly what is meant by capitalizing on special marketing and recreational or consumptive value. The first example is a sort of "Vegetable Country Club" roughly 30 miles from Dallas. Members pay an "initiation fee" which gives them access to a plot of ground on which to plant and harvest their produce. Counseling, if desired, is provided to assist in vegetable type and variety. The ground is prepared for planting by employees of the club. The members and their families may choose to participate in planting, but routine maintenance is performed by the club. When the vegetables are ready for harvest, the members may either harvest the vegetables or have them harvested by the club; in either case some price per pound is charged for the produce. This innovative operation has 20 acres under "membership" now and is considering expansion to other sites.

A classic example of an integrated approach is that of Finncastle Nursery and Farms near LaRue, Texas. LaRue isn't exactly on the beaten path (and road access to the farm isn't that great either) but lies roughly halfway between Dallas and Shreveport, Louisiana. Finncastle began growing in 1980 when John Schoellkopf hired Dr. Don Cawthon to manage the initial blueberry plantings and nursery cuttings of blueberries. The operation grew to include blackberries, raspberries, strawberries and muscadines by 1983. Then Finncastle opened to the public. The farm now includes peaches, apples, nectarines, pecans, vegetables, peanuts, sugarcane and a six-acre stocked fishing lake. Their new Gift House offers hanging plants, gift items, jams and jellies, plus food, cool drinks and desserts featuring garden-fresh berries. All this has been properly done on an average-sized farm while maintaining the natural atmosphere of a rural setting. People come from all over East Texas to participate. Owner Schoellkopf summarizes by saying, "It seems more and more people want to get back to the soil to recapture an elemental side of our nature that has gotten away from us. We want Finncastle to be a spot where people can come for a few hours to make that experience come true (Texas Highways).

CONSIDERATIONS

Many producers have come and gone in the multitude of alternative opportunities available; large numbers remain and are entering even now. What separates the successful, prosperous operators from the not so successful or totally unsuccessful operators is, to a large degree, based upon factors within the control of the operators themselves. Paramount among these is a well conceived plan of operation. The plan should be thorough and specific, but not rigid. This will enable the operator to have a clear idea of what path to take to meet certain goals but permits a change of course along the way if necessary.

A whole array of factors should be included in this plan. Enterprises should be chosen which the operator likes in order for a successful, fulfilling business to evolve. The operator should be knowledgeable about the enterprise and have developed the skills and technology necessary to produce consistent, high quality products. If a larger scaled, more nearly full-time operation is desired, growth into the desired size should be gradual and controlled. Location may to a degree

help determine the type of business which will develop. For instance, small operators depending upon more retail sales would need better access than a larger, wholesale type operation, although Finncastle has shown that poor location can be overcome with proper marketing.

Marketing is a key component, perhaps the key component, in establishing a successful alternative opportunity business. Markets for the product must be explored and secured before the crop or livestock is raised. In today's environment, producers must grow what they can sell, not sell everything they can grow. Knowing the buyer, particularly in the case of wholesale producers, is very important. A recent survey I conducted of terminal market buyers, brokers, and chain store produce procurement managers revealed that from their perspective, knowing that the seller is reputable and supplies a consistently high quality product often determines whether or not they buy from that producer. Examples of special kinds of marketing were given earlier in this paper. It appears that the greatest potential for establishing commercial production lies in developing markets for certain crops through some sort of mutual agreement--joint partnership, cooperative, or market coalition. Quality and uniformity of crops and livestock could be monitored. Volume selected would be increased to wholesale threshold levels. The probability of a longer term supply for wholesalers or processors would be increased, as would the ability to supply in the frequency desired by the buyers. While such arrangements are not Utopian, they would be a first step in developing commercial threshold levels of products where none currently exist. And a concerted effort at follow-up to ensure customer satisfaction is a must if the developing industry is to remain viable.

The "alternative opportunities" in agriculture are generally labor intensive operations. A major obstacle to expansion of alternatives to commercial levels in the South is the availability of adequate supplies of labor to perform the manpower-intensive tasks associated with such enterprises. Lack of such labor has diminished production in recent decades in many areas of the South outside of South Texas and Florida and has eventually led to the near elimination of the processing industry in fruits and vegetables in the South. Although large numbers of unemployed or underemployed workers reside in the area, they choose to remain as such rather than participate in this type of agricultural work. It would appear that since the majority of this work is performed during the summer months, high school youth could be acquired for the jobs. Such is not the case.

The remaining source of agricultural labor for the vegetable industry is therefore migrant, emanating largely from the Lower Rio Grande Valley and Mexico. The South is not on the migrant path to the Northeast and Midwest, and insufficient employment opportunities currently exist for these migrant workers to warrant extended stop-overs in the area. No large nucleus of acreage is present to provide long-term employment for the substantial numbers of workers required to develop a commercial industry. Lack of acreage limits worker numbers, but worker numbers limit acreage; both restrict the volume of production necessary to support wholesale fresh market activities and processing operations.

Over-production and over-expansion are potential threats to viability of alternative enterprises. By definition, alternative opportunities are not mainstream in nature. Markets are generally limited and can absorb small to moderate volumes of these products. Acceptance/familiarity with alternatives will take time, and care should be taken not to "shatter" the market with over-production. Particularly susceptible is vegetable production, where yield and hopefully returns can be realized in just one season on relatively small acreages.

Despite these problems and potential limitations, opportunities are present for profitable operation in this area. Enterprise selection must be judicious, identifying alternatives or alternative forms for which demand surpasses supply. Deliberate planning to remain in business over the "long haul" is essential. Controlled growth to allow the operators to learn their way into the alternative is a key. The innovative, diligent, enthusiastic, and forward-thinking operators who satisfy a broad spectrum of consumer desires appear to be economically viable. Detailed, specific economic analyses should and must be conducted, either formally or informally, before deciding whether to attempt development of enterprises to capitalize on the changing farming opportunities in the South.

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Adoption of and Adaptation to a Marketing Cooperative

Cathy Sabota

In times of low market prices and high costs, some farmers consider alternative enterprises. Sometimes they watch their neighbor and copy successful techniques or activities, and occasionally a group of producers will get together to help themselves and each other. Growers of the Ala-Tenn Fruit and Vegetables Association, Inc. were interviewed about their opinions and feelings about the creation, success and future of the co-op. The following are their responses and the story of the co-op.

Initially, one producer indicated that she wanted to grow asparagus or some other vegetable crop that would complement the pimiento peppers currently being grown on the farm and keep the migrant labor busy over a longer period of time. Her interest and contacts led to a few more growers that had considered vegetables, and eventually a mailing was made to other pimiento pepper growers to determine the actual extent of local interest in other vegetables. About 30 producers showed initial interest and the first year membership totalled 35 farmers.

The initial reaction of the growers to producing vegetables for the wholesale market was that it seemed to be a viable alternative worth pursuing, and it wasn't something that everyone was doing--yet. "I thought it was a good thing because row crops had been so bad for farmers. I felt this was a way to take some small acreages and get profits from them."

About the production of different vegetables and establishment of a cooperative, producers felt that "we didn't do nearly enough or know that nearly enough was available to us. I think we were really deficient. We went to the experts ... tried to attend meetings and read everything we could get our hands on. I guess I thought of it in terms of a group of people [who] could just get together and just ... do this, and I didn't think of the formalities of a co-op ... and [the] necessary state involvement and papers."

Growers decided to produce for the wholesale market because "we were looking at alternatives, and producing for the fresh market looked like a good alternative. It was just what would make use of our land and ... realize profits. It was sort of an extension of [our] existing contract vegetables. The vegetables were not completely new to us, having grown the pimientos so many years, but it was a new part as far as the marketing was concerned Also, we had some of the ... [needed] equipment already on the farm."

Assistant Professor and Horticulture Specialist, Department of Plant and Soil Science, Alabama A&M University

"We originally went into it [co-op] on an experimental basis. We realized [that] maybe we didn't have the growing ability to make ... very much profit. The goal or the reason for getting into fresh market vegetables was that we thought we could do better than on the contract pimientos which we were making a profit at anyhow. We didn't go into it with the idea of making huge profits or getting rich quick. I didn't think [the co-op] would do well the first few years at all, and as it's turned out that's been the case, unfortunately. I know there's supposed to be the bad years and then there are a few good ones. But I felt like if everybody would just try to hang in there for a while the problems would work themselves out. I wasn't really concerned about the problems. I was concerned with how to deal with the crop."

Growers did not want to wait to start up the co-op. They said, "I think enthusiasm at that point was the highest it's ever been. I think we were ready. As far as the group we started with waiting another year to learn more, I don't think that would have been necessary. Everybody was enthusiastic about it to begin with. The problems of the co-op were going to come along regardless. Maybe it was good at that time that the folks didn't know all the problems. I could see two sides of the coin. There [was] beginner enthusiasm, [and] maybe it was just as well we didn't know everything that was facing us. If we spent a year finding out a whole lot more, we may never have gone ahead. With the core of growers that we had right at the very beginning, I think we could have just pursued it at a small scale and grown from there, and then we could increase the membership the next year. I have felt all along that we tried to get too many people involved with too many different crops the first year."

"It rather quickly became apparent [that] the lack of expertise in management was one of our first big problems, and then [came] having to start small and generate the income it takes ... to operate and to pay a manager. Looking back ... I think everybody's primal concern when they were forming this thing was number one--can we get enough acres--and number two--can we do a good job on production? I think there was very little thought given to management, sales, and so forth. There was more or less a broker waiting in the wings, and everybody kind of figures that if you've got a broker you've got the problem licked. Probably one of the biggest mistakes [was that] we were thinking as producing farmers and not as farmers who depend on other sources to market our product. The packing and marketing and so forth were really a secondary consideration. And that came to us" quickly "because shortly after this ... was when we attended the first Tennessee Vegetable meeting in Nashville and were point blank told, 'don't bother to plant it if you don't know where you're going to market it.' I think we began to realize that this was the deficient end of it. The primary concern, I think, was can we find enough growers, can we sign up enough acreage--be big enough quick enough, and consequently then you get the wrong source of acres signing up. There were too many that went into a rose garden rather than into a high tech learning venture. Lack of understanding from the newer growers who signed up who didn't realize what all was involved" was another problem.

Growers spent a lot of volunteer time the first year trying to make a success of the co-op. When asked how much, they said "Every time we took something in, we stayed and helped ... unload, we helped grade, and pack, and just stayed around until" the product was packed. "We all agreed in the forming of the co-op that we would help with the labor situation in the packing shed until people could be employed and trained to help defer the cost. We were placing some of our own labor in packing our own product which we found maybe was a little bit of a mistake in that ... as a grower I tended to overlook some of my product" problems. Another grower personally "paid over \$3,000" for expenses such as phone calls, transportation, gas, postage, envelopes, computer time and paper, labor, and a small petty cash fund.

In the second year a bookkeeper was hired. A grower who served in this capacity in 1985 was asked, "Was it worth it?" "Yes, definitely. The manager needs that person right there as an extension of himself. It needs to be someone ... who can handle all aspects of it. I think a bookkeeper and treasurer should be one and the same person." The secretary/treasurer [board of directors position] "could work together as well"--writing the checks, payroll, and working with the financial reports.

The co-op started with little equipment. "It was all we had. It was no shining example of what we wanted, but it was just about all that was available, and probably the thing that decided it was the fact that being an old egg room, it did have coolers that were already up. That was the only thing in its favor." The equipment "was inadequate, [but] for cabbage it worked pretty good. But then we got on the bell peppers [and] we got caught ... We didn't have our washer set up and we literally hand washed and dried bell peppers ... for a long time before we did" get other equipment.

The first year, "yields were pretty decent and yields probably as a whole in the co-op were fairly decent ... Of all those who carried through and brought to the shed the per acre yields were probably pretty good. That first year we didn't have irrigation. I wasn't displeased with it all, but I do think if we had irrigation we would have done much better. The thing that hurt us was the prices that first year really were not the best that they could have been, and that discouraged a lot of people."

There were many internal problems with the co-op. "I think the same problem that would exist with any growers that are cranking up from day one is the realization of the quality. We as farmers tend to think that a product is worth something. Regardless of its condition, it's still worth something. This is one of the things that really hurt the co-op. As far as producers were concerned they just didn't understand this. They tried to produce a crop they knew nothing about and didn't understand quality. Something we had to learn and didn't realize well enough that first year [was that] vegetables don't store. The market might be bad this week and good next week, and it's a gamble that you just make. Maybe we were a little bit used to that, being hog producers. When they're ready, they've got to go. You can't park them out here like cars on a lot and wait for somebody to want to buy them when the price goes up. So maybe that wasn't as strange for us as it was for some of the growers involved. A lot of the people that signed up in that first year were part-time people. They weren't total time committed like ... a few of our growers were. But there were many the first year who thought that a few acres of this is gravy: something to be done Saturdays and after they got off in Huntsville, and it didn't always work out that way."

"We had problems within the board because ... we set it all up originally in kind of a loose organization, and then we got down to certain decisions being made that some people didn't like. Then they wanted to tighten it up quite a bit. I don't think everybody had a real clear understanding of how things were going to be done. Like when it was time to cut off cabbage, there were a lot of hard feelings about that. We should have all had a much clearer understanding of how we were going to do that. There were a lot of misunderstandings, even though we tried to make everything clear. All of the advisors gave us ground rules ... spelled out by the letter ... [the growers felt] it did not apply to them. They just did things the way they wanted to do it. Board members in a position of leadership did not offer any leadership. They often disagreed with advisors and really hindered the whole organization by not acting as they should. They shed a bad light on the remaining board members. Of course that caused problems with the growers who felt that some of the board members were not doing their job as they should or ... not getting the money to the growers as quickly as they should. The division of the board members ... cast suspicion on the whole co-op. As a result the entire co-op suffered. There was a substantial amount of lack of trust. We had a broker, and there was some distrust about the broker. To sum it up in a nutshell, it all goes down to dollars and cents. If they get a lot of money back, they are happy. If they don't get much back, they're going to be mad, and they figure somebody has messed up somewhere."

Representatives from one farm felt "We had real good luck the first year as far as ... what we delivered to shed." But we also "delivered some products to the shed that should have never been delivered, and it incurred the cost of grading and trying to pack a product that should have never been transported or processed at all. We learned what the quality was, what not to transport, and what to."

After the first year growers were "a little more cautious" and "apprehensive." We weren't discouraged to the point of not wanting to produce it. We still looked at it from a critical standpoint, but we solved some of our farm problems and some of our co-op problems. I felt encouraged because we had a good man in there to manage this time. I still felt discouraged because our being close to the packing shed [meant] we picked up on all the store gossip. So there is still a lot of ill will being spread around."

Compared to 1985, 1986 "was a much more profitable year because of better management of the co-op shed and the packing, and just different phases of it we learned to do better."

In 1987, "hopefully [there will be] better packing facilities, equipment ... and more acreage, [and] time to talk with people that we feel would be good growers. I think there are people that may raise one or two acres and do an excellent job, and they shouldn't be ruled out. But there is a type that is going to do a good job. And I think as farmers we need to look at maybe ... [taking a] closer [look at] the processing of the vegetables on the farm itself before they are taken into the packing shed. [It's] not that we're trying to bypass the packing shed. It's just ... doing some throwing away of bad products and so on, and getting it in a position that we can take it to the shed and spend less time on the product by checking the quality."

"We have received help from the Extension Service, TVA, and the States' Departments of Agriculture. Without this outside help, it would have never come even to a point of being an organized co-op. I think [an] important part of the co-op is getting enough group help from the community."

"We need ... some help in identifying potential vendors: a survey type of thing or maybe an educational process through extension or through some of the existing organizations. A co-op can't do everything in terms of public relations that maybe an outside group could help with Particularly at the size and stage we're at, we're always strapped for money to make these contacts and the time to do it. We definitely need some help finding potential members." To accomplish this "we are hoping to put together a certain type of survey with extension and possibly the state departments of agriculture to do ... an impact study on what a co-op can do for the area. This is probably a study that we should have done in the first place ... but it's one of those things that didn't happen that way, so now we not only need the information, but now we have to overcome ... a lot of bad press that preceded us out into the farming community.

As a director of the co-op in 1985 and 1986 I "certainly have been exposed to a lot more information. I've learned a tremendous amount ... that I didn't dream of when we started. Attending the seminars ... involving the responsibilities and the legal responsibilities and ramifications.... I guess it's just been an eye opener. There were some excellent things shown in those seminars and [it would be good] to keep in mind the film that Auburn University showed called 'What is a co-op?'. I would like to figure out a way that we could show that to all prospective members. We need to figure out a way to have a good membership drive ... and expose them to a whole lot of things we have learned before. I don't think it will discourage good farmers, but it's only fair to present everything that you can for them to see. You've got to profit by the other guy's mistakes, because you can't possibly live long enough to make them all happen. If you really want to learn to know people, go into business with them. You may be friends for years, but you also may find out you can't be in business together."

"We've had some real strong conflicts on the board. We've had some pretty ragged meetings. I believe also that the board of directors is the place to thrash out problems. But I also believe that as a director, I accept the responsibility of taking part in that board meeting and expressing my opinion there rather than saying nothing in the board meeting and then expressing my opinion down at the corner store. I think that caused a lot of trouble among our board."

"Basically we are pleased with what we did. I think we can safely say that we are going to be me way in the vegetable business. It's not that the problems are solved, ... because right now ... I can see some bigger ones ahead of us than we have crossed over yet. We are very much in a transition period. The next year is going to tell a lot of the tale for the longevity of our co-op. I think as farmers we've got to look at the whole picture, and we need information that lets us know what the market wants, what we need to be producing, and how much volume that our marketing area or where we reach the market can stand. The biggest things this co-op needs right now are volume of production and a full-time manager to do all the things a manager does--to define the market, ... the size of it, the scope of it, the pack of it, and just do all those year-around jobs that have got to be done. A part-time management or a split management between a broker doing the sales and shed manager running the operation ... just doesn't fly. There's got to be a central man coordinating it and doing all of those things in season and out. And that out-of-season [employment] is a hard thing to make a lot of growers see, and that's where the information of what is necessary comes into bearing before they get into it and then say 'Well, I didn't know we were going to have to pay him this and that.' Some of these people you're going to sell to, you don't just pick up the phone and sell to them. You may court them. You go to see them. There are travel expenses, telephone expenses and a lot of things people just don't realize. It's not pure profit. And the hard part from the co-op's point of view, particularly a struggling one, that has a small membership and small acreage, is justifying the expense of that man. Yet without him you may never get out of your rut."

Some members of the co-op understood that problems might exist and that this was not a get-rich-quick operation. They realized that vegetable markets can be as fickle as any other, that it would take time to establish themselves in the marketplace, and that not all vegetable crops are profitable all years.

Risk Assessment

John Holt

A gun can put meat on a farmer's table or blow a hole in it, and in a business sense, so can alternative enterprises. So the risk management trick for both guns and alternatives is to be careful; not to pull the trigger unawares.

Farmers, spurred on by inadequate incomes from traditional enterprises, are searching desperately for alternatives. Being unaware of the precise timing, exacting product quality standards, and possible limits on volume in many of the "new" markets, some farmers may fatally underestimate the risks associated with alternatives.

To help awareness along, we discuss some sources of risk, give an easy way to help assess profitability in risky enterprises, and conclude with a decision checklist that helps defend against risks associated with adding new enterprises.

SOURCES OF RISK

An alternative is anything other than what we are now doing, and alternatives in agriculture usually mean some enterprise new to the area, or a product with a limited market. Unfamiliarity increases risk; decision makers lose the advantage of time-tested strategies for coping with problems.

Risk is the chance of undesired outcomes. Business risks arise because we must invest today, but the payoff is affected by an uncertain future. Nature can, and does, louse up agricultural payoffs, but towering above nature's risks, especially for atypical crops, are those associated with markets. Besides the two giants, yield and price, there is financial risk; there can be various legal entanglements; and there is management risk.

Risk awareness is the better part of risk assessment, and continual efforts at risk assessment are the better part of risk management. If decision makers keep in mind that their carefully laid plans can fail--and many start-ups fail precisely because there have been no carefully laid plans--they are well started on strategies for managing the risks they must face in any agricultural activity.

Marketing

On his death-bed, an old cattleman left this legacy: "Son, you gotta watch out for three things: markets, markets, markets." For generations, cattlemen have been selling the same product, in much the same way, and if market risk concerns them and producers of other traditional enterprises, then producers considering atypical enterprises should increase their concerns by a factor of five.

Competition: In most atypical enterprises, there are competitors to consider. It matters not a whit to price that another 5,000 acres of soybeans are grown somewhere, but even .5 extra acres of elephant garlic may stink up a local market for that specialized product. The price for one producer may have been very profitable; for two producers breakeven; three producers could drop price enough to ruin the market for everybody.

Quality: Quality standards are very rigorous for some products. There is a market for wet corn, for weevily corn, and for corn damaged in handling. But there is no market for a fresh tomato with a fresh worm hole.

Timing: Timing can be critical in some markets. Some years, calves born late by mistake make for more than those born earlier and sold according to plan. But flowers grown for the Mother's Day market make a very poor green manure crop, which is their fate if they miss Mother's Day.

Volume: A pick-up load of pigs may fetch a competitive price at a local auction, but many markets require minimum volumes. Selling peaches to Publix supermarkets means supplying all their needs for part of the marketing season. No large retail outlet has any need for a few pick-up loads of produce: much of the low price they pass on to consumers comes from efficiency in procurement and distribution. The ideal market niche is just big enough to absorb all the farmer's output at a profitable price, but not big enough to attract the attention of the large integrated production-marketing firms. There are, of course, some small niches: a roadside stand might easily absorb one pick-up load of produce, but not two.

Information: Marketing advisory services abound. Abound, that is, for commodities which have futures markets. In corn, soybeans, cattle, hogs and a few others, the morning paper can reveal what those commodities are worth next year.

All sorts of experts can be hired to help market those enterprises. But for most new or atypical crops? Forget it. There are no advisors with a track record; no futures market; there may not even be any publicly recorded price information. The three marketing allies of bankruptcy--hunch, myth, and hope--still guide price expectations for many thin-market alternatives.

Production

An early frost, hail, drought; these production risks are much better understood by farmers than other sources of risk. Probably there is not much difference in production risk between typical and alternative enterprises. However, a producer who was not doing well in traditional enterprises and shifted to some alternative is not apt to have much cushion for financial risk.

An agonizing decision for many producers is whether or not they can afford an irrigation system to protect against drought. This, and similar investment questions, bring up financial risk.

Leverage

Production decisions affect yields, marketing affects prices, and financial decisions affect input costs and fixed costs. Variability in net income arises from changes in prices, yields, input costs, levels of input use, overhead costs and, of course, taxes. Expressing net farm income as a percentage of total farm assets would show the rate of return on total farm capital. Since total assets can be expanded by both savings and borrowings, the return on equity capital is a function of the interest rate on outstanding debt and the firm's debt-to-equity (leverage) ratio.

Suppose a farm makes 7 percent on total capital and only pays 5 percent interest. If the farmer owed 60 percent as much as he owned, or had a debt-to-equity, or leverage, ratio of .6, his return on equity would be 10 percent (Table 1). Recent events make it hard to remember, but returns on total capital were higher than interest rates in the 1960's, and reading down the 5 percent column in Table 1 shows that the rise of return on equity grows rapidly as more money is borrowed.

But leverage also increases financial risks. Financial risk is the possibility of losing equity capital, and that possibility increases as interest and leverage rates rise. Turning again to Table 1, suppose that interest rates are 15 percent rather than 5. A firm still earning 7 percent on total capital, with a leverage rate of .6 would then be losing 5 percent of its equity per year, and losses accelerate as leverage increases. If return on total capital drops, matters get worse, and this happened in the early 1980's.

In the Eighties, interest rates have been in the mid-teens, and return on total capital fell to around 3 percent. So financial risk has increased, production risk has not abated, and alternatives usually have more marketing risk than traditional enterprises.

Table 1. Effects of variations in interest rates and leverage on returns to equity capital.

Debt/Asset (Leverage) Ratio	Interest Rate on Outstanding Debt		
	5%	7%	15%
	— Return to equity capital (Percent) * —		
0.0	7	7	7
.2	7.5	7	5.0
.4	8.33	7	1.67
.6	10.0	7	— 5.0
.8	15.0	7	— 25.0
.9	25.0	7	— 65.0

*Calculation based on a 7 percent return to total capital.

Institutions

Institutional risk arises when the rules of the game change, and change they have in the 80's. Farm policy, tax law, water rights legislation, all can play a major role in some enterprises; and coming from the fertile minds of politicians bent either on improving things or (take your choice) getting reelected, there is no way to predict what form those changes will take. Nor when. But when a housing addition moves in downwind from hog houses, you can bet it won't be the people who move.

Lease agreements, informal arrangements with neighbors; any relationship vital to business health is a potential source of risk. When the old neighborhood bank is bought out, the new loan officers will require loan documentation and will likely tighten lending policy: that type of change has initiated a few bankruptcies.

At the same time annual operating plans are made, old relationships involving important people and institutions should be reexamined. And strategies for coping with various new regulations are an increasingly necessary part of operating plans.

Management

Back in the good old days, the saying was that if you couldn't make it in business you could always farm. Maybe the reverse is nearer true today. Complexity abounds in agriculture. Varieties can, and should, be selected for local conditions; fertilizer is tailored to individual fields; herbicides are selected for specific weeds; pesticides must be applied precisely at the right stage of insect growth; cows can be made to produce litters of embryos; all this change and more confronts the modern manager.

The seeker of alternatives must make choices from a dizzying array of alternatives; if he relies on study, he must sometimes plow through a blizzard of conflicting information, and in other cases, there will be no information at all.

Complexity and rapid change in production, marketing, finance, and institutions all add difficulty to decision making. That difficulty does create opportunity for those managers whom time proves to be wiser, or luckier, than others, and adds to the down-side risk of making the wrong decisions.

PROFITABILITY AND RISK

In the movies, Indiana Jones takes great risks because there is great wealth to be had. But in most agricultural alternatives, there can be great risks without great wealth to be gained. Decision trees can help sort the possibly profitable from the purely risky.

Suppose a client was considering growing broccoli next year. What yields could he expect to make? He thinks he can expect about 350 boxes per acre, but hasn't grown the crop before, and is worried that his yields might be as low as 250 boxes per acre, and figures that 400 boxes is as good as he is likely to do.

Prices? Beforehand, nobody ever has more than an educated guess, but a reasonable range appears to be between \$5.50 and \$7.00 with a most likely price of \$6.00 per box.

So far, so good. We have yield and price projections, but we need an estimate of how likely these different yields and prices are. We can use probabilities; historical probabilities on yields if the crop has been grown in the area for any length of time; adjustments from other areas' history if the crop is new to the area. Frequently, of course, not much information of any sort is available, and the common sense approach is to be conservative on yield expectations, and maybe weight the lower yield possibilities a little heavier.

This grower believes he could produce 400 boxes in two years out of ten; 350 boxes five out of 10 times; and maybe a drop to 250 boxes as often as three years in ten. These probabilities are based on as much information as possible, but in many cases, even yield probabilities will involve a good deal of subjectivity.

Prices are more subjective yet, but the analyst can get an estimate of the consequences of some "what if" situations without a great deal of extra work. This approach is similar to the intuition that seems to guide a good many of the better managers' decision-making processes. This grower expects prices to be about \$6.00 per box 60 percent of the time (maybe he is 60 percent confident it will be \$6.00 per box), with a 20 percent chance of price being as low as \$5.50, or as high as \$7.00 per box.

If the estimated cost for growing broccoli is \$2,280 per acre, we can estimate the chances of making a return above these costs. Placing this information into a decision tree would resemble:

Figure 1. Estimating profitability with a decision tree.

Cost \$/A	Yield Bx/A	Yield Prob	Price \$/box	Price Prob	Net. Inc. \$/A	Inc. Prob %
-2,280	400	.2	7.00	.2	520	4
			6.00	.6	120	12
			5.50	.2	-80	4
	350	.5	7.00	.2	170	10
			6.00	.6	-180	30
			5.50	.2	-355	10
	250	.3	7.00	.2	-530	6
			6.00	.6	-780	18
			5.50	.2	-905	6

Expected Value (-\$267) per acre

An adage for alternatives is that "It costs more not to harvest than not to plant," and a corollary is, "If you can't pencil a profit, you ain't likely to plow one." The beauty of this approach lies in its simplicity, and in the ability to defuse the common farmer argument that so many things can change there is no use in figuring. These disciples of the "Plant it and pray" school will be getting scarcer every year.

The first branches of the tree contain our yield estimates, weighted by the chances (probabilities) of making those yields. We all know that the crop can bring a wide range of prices: our best estimate was a range of \$5.50 to \$7.00, and we weighted those price levels with subjective probabilities. Some say this is just attaching weight to a guess, and that is true. Yet people have to make planting decisions every year in this kind of risky environment, and some of them might be better off to try and describe that environment before they cranked up their tractors.

In the "net income" column, the calculations were yield times price minus cost per acre (netting per box harvesting costs out of price per box).

If yield turned out to be 400 boxes per acre, and the crop sold at an average of \$7.00 per box, the grower nets a tidy \$520 per acre. How likely is that income? On the assumption that yields and prices are independent, yield and price probabilities can be multiplied together to get an estimate of the likelihood of both events occurring. With our assumptions, there would be a 4 percent chance of making the \$520 per acre. And, by adding the probabilities of the positive returns, we deduce that there is a 26 percent chance of making a return above total costs.

The expected value--what gamblers call the fair value of the bet--is the income that could be expected from producing broccoli over several years with the yield and price ranges indicated here. The expected value is calculated by multiplying the net incomes by their respective probabilities and summing. Under these conditions, broccoli production would be expected to lose \$267 per acre, even though there is a 16 percent chance of making \$120 or more per acre.

Some important questions are ignored by considering only one enterprise, but total farm questions can be examined with other techniques. Working through a decision tree forces the decision maker to ask: What will it cost to grow this crop? What are the yield possibilities and the likely price ranges? Then simple arithmetic summarizes the consequences of things being better or worse than planned. The really important thing is that the production and marketing parts of the planting decision are tied together **before** any money is spent.

A CAUTIONARY CHECKLIST

Test pilots probably face more risk than any other occupation: to save lives, they worked out checklists to help assure that everything possible had been done to circumvent risk.

Our checklist won't save any lives, but it can help circumvent some of the common risks associated with adopting agricultural alternatives.

A statement of objectives is the starting point. There likely will be an income objective. If the potential producer needs to add \$10,000 to net income, that helps define the necessary number of acres or head, and may help in deciding on facilities and equipment necessary. Priorities need to be set: if Sundays off are more important than income, many alternatives are passe.

Before any consideration of alternatives and what they may cost, establish investment guidelines: How much will/can be invested upfront? How much annually? How long can a negative cash flow be maintained? What are the quit claim conditions; in other words what will it take to trigger abandonment of this alternative?

One way or the other, the necessary skill levels need to be assured. The question must be answered: "Do I know enough to make it work?" Or it can be turned around: "What do I need to learn in order to make a success of this enterprise?" "Have I the time/money to invest in acquiring the necessary skills?" "Can they be hired?"

Marketing questions are the cure for miracle crop fever. Ask: "Just how will this product be sold?" "To whom?" "When?" "For how long?" "How much of it can be sold?" "What quality requirements are there for various markets?" "What are the price patterns? Is there seasonality? Trends?" "Are brokers necessary? Are any available?"

What will it cost to produce per unit of output?

Is a profit likely?

How sensitive is that profit to the likely yield variability? How sensitive to cost increases of, say, 10 percent? Can the cash flow stand a 15 percent drop in prices, and how likely is that kind of drop?

CONCLUSION

The prevailing approach to managing businesses is "Management by Objectives," and Peter Drucker, who invented M.B.O., put the search for alternatives into perspective:

"There are no 'solutions' with respect to the future. There are only choices between courses of action, each imperfect, each risky, each uncertain and each requiring different efforts and involving different costs. But nothing can help the manager more than to realize what alternatives are available to him and what they imply."

How a Lender Analyzes Alternatives

Frank E. Meigs, III

I would like to thank the sponsors of this conference and especially Doss Brodnax for inviting me to speak today. To me, in the context of this conference, alternative farming means a change from traditional farming. Change creates opportunities, but it also creates new risks. While a banker may think that he understands the risks present in traditional agriculture, he probably will be the first to admit that he doesn't know or understand the risks present in the alternatives. Alternatives for farmers present the banker with a new set of risks. The analysis of these risks is what my presentation is about since bankers are risk managers.

There are two levels of risk that the lender will be concerned with. On one hand is the industry risk. The banker will want to determine whether a certain market, this particular agricultural alternative, should be entered into by the financial institution. This is important because some of lendings' more serious credit problems can be traced to poor market decisions. Examples of this are lending to the oil field service industry and to less developed countries.

On the other hand, there is the individual loan risk. Here the lender uses traditional credit analysis to understand this risk. Of these two types of risk, the risk of the individual loans is the one best understood by lenders. Lenders are more comfortable in analyzing and explaining the risk of individual loans than the risk of an industry. This is unfortunate, because the farmer looking for alternatives needs to understand how each risk is analyzed and what is needed to bring forth a favorable response from the lender for his loan request.

At this point, I would like to explore the industry analysis, because I feel that it is the least understood and least documented of the two analytical processes. Dr. Michael Porter of the Harvard Business School states that an understanding of an industry can be obtained by looking at four competitive factors. These factors are:

1. The bargaining power of customers
2. The bargaining power of suppliers
3. The threat of new entrants
4. The threat of substitute products

The collective strength of these factors determines the ultimate profit potential of an industry.

The first of the factors, the bargaining power of customers, relates to the extent to which buyers can exert power to force prices downward, increase quality or play producers against one another. When looking at the customers or the buyer group for the farming alternative's production, consideration should be given to the following characteristics:

The buyer group is particularly powerful if it purchases in large volume or has high fixed costs which motivate it to keep capacity filled. If there are few buyers and many producers, then there is power flowing to the buyers. Also, if the buyers earn low profits then they will

be increasingly price sensitive and have more incentive to shop purchases, especially if they are buying an undifferentiated product.

Buyers can also be more powerful if they pose a threat to integrate backwards toward their input supply. Sometimes, though, producers can become a threat to their buyers by integrating forward and becoming processors to add value to their product. This has occurred in the catfish and fruit juice industries.

It has also been determined that consumer buying groups tend to be more price sensitive if they are purchasing products that are undifferentiated, expensive relative to their income level or of a type where quality is not particularly important.

The second competitive factor is the bargaining power of suppliers. Suppliers to an industry can affect profitability by raising prices or reducing the quality of its product. If an industry is unable to raise the prices of the products it sells, then suppliers can squeeze the profitability from it. When looking at this aspect, some questions that should be asked are:

First, are supply industries dominated by a few companies and are they more concentrated than the industry they are supplying?

Second, do the suppliers provide a unique or differentiated production or service that is difficult to switch from? Other difficult or unprofitable.

Third, do the suppliers have the ability to integrate forward into production? This provides a limit to the power of the buyers of the supplies.

Lastly, how important is the industry we are analyzing to the suppliers? If it is very important, then the suppliers' fortunes will be closely tied to those of the industry. This will cause the suppliers to protect the industry through reasonable pricing, product development and lobbying.

The third competitive factor is the threat of new entrants. New entrants to an industry bring additional capacity, the desire to gain market share and often substantial resources. High entrance barriers and the expectation of a pointed retaliation by existing competitors will cause a potential new entrant to seriously consider not entering a market. Some items to be considered when looking at the threat of new entrants are:

Is brand identification or product differentiation sufficiently high enough to be an entrance barrier? This can cause new entrants to have to spend heavily to overcome customer loyalty so that market share can be obtained. A determination of the comparative advantages of the geographic region versus possible competing regions needs to be done. This should consider both the production and marketing aspects. The barriers to entry for other regions need to be examined and measured to determine any comparative advantages. These comparative advantages could be weather patterns, attributes such as soil types/quality or water quality/availability, the transportation availability and cost or the region's location relative to markets. Also barriers to increased production in this region need to be understood.

Next, the access to market channels needs to be examined to see if they provide a barrier to new entrants. Limited wholesale and retail channels that existing producers have tied up increases the difficulty in entering an industry.

Another item to be considered is government policy. Government policy can limit entrance into an alternative industry through water use restrictions or licenses, rural zoning or wetland restrictions. Pesticide restrictions and air and water pollution standards can also limit entrance.

It needs to be remembered that low entry barriers can produce rapid expansion of production without corresponding increases in demand. Also, if exit barriers are high, all the producers suffer as a result of the increase in production.

The last competitive factor is the threat of substitute products. Substitute products for the new alternative product place a ceiling on the price that can be charged for the alternative. This limits the potential for profits and growth in the alternative industry. When looking at substitute products, consideration should be given to:

First, the price/performance of the substitute versus the alternative under analysis should be considered. The more favorable the substitute is, the more limited our alternative industry is for profits and growth. Additionally, the trend in this comparison should be noted. If the substitute is gaining on the alternative, then profitability may only be short term.

Also, substitute products deserve attention when they are produced by high profit industries. This gives substitutes leeway to cut prices, mount strong marketing campaigns aimed at alternative industries or fund research and development programs to improve their substitutes.

By using an analytical framework similar to the one that I have described, a lender can become familiar with the technical aspects and the strengths and weaknesses of a new industry. This allows an evaluation of the risk that the alternative to traditional farming presents. Then a market entry decision can be made by the lender.

Now at this point, let's assume that the industry analysis has produced a favorable response from the lender. We are now ready to move to the analysis of the individual loans.

One common method of analysis used by lenders is called the five C's of credit. This method requires that we consider five major areas when looking at the loan application and the applicant. These are character, capacity, collateral, capital and conditions. These credit factors work together as a system where one can lend strength to make up for weaknesses in another. While there are textbook definitions for each of these, I want to tailor my discussion to how each of these might be looked at when considering a loan application for an alternative to traditional agriculture.

The first of these C's is character. In lending there is one absolute, and that is that the character of the borrower must be above reproach where the repayment of debt is concerned. Notice, I said "the repayment of debt." This applies in any lending situation. Strength in the other credit factors can not make up for a lack of this C of credit. You just can't have enough collateral or capital to make up for a borrower you can't trust.

Character also has a second part to it and this is management ability. Since this is managing an alternative, the borrower probably doesn't have much experience with this venture, or not on the scale envisioned. A resume provided by the borrower with the request will help the lender. Also, if the lender sees that the borrower is organized with his request and is not treating it like an expansion of a hobby or his financial salvation, then the lender will be more comfortable.

Our next C is capacity and this refers to repayment capacity. A sound loan isn't just repaid, it is repaid in the manner originally expected by the lender. This means that the farmer needs a plan that shows why he needs to borrow, how much he needs to borrow and how it will be repaid. This repayment may come from profits, the sale of assets, or refinancing. Every good loan has at least one secondary source of repayment to lessen the risk of the loan not being repaid in an orderly manner. Cash budgets with verifiable documentation to substantiate them are needed at this point. Also, repayment capacity from non-farm sources can be important to support the operation during start-up or off-seasons.

Our third C is collateral. The purpose of collateral is to lessen the risk that the borrower and the lender have misjudged the source of repayment. Consequently, strong repayment capacity can make up some for a lack of collateral, while collateral to a certain extent can make up for weak repayment. At this time, I need to note that collateral alone is not a reason to make a loan. No loan should be made whose sole basis was that "it had good collateral." Numerous examples in current agriculture illustrate this truth.

In discussing collateral, so far I have talked about what collateral does and doesn't do for the lender, but I haven't talked about what makes good collateral. Good collateral has some specific characteristics. It should be easily valued, have a ready market and be able to be sold at near its appraised value. So a lender is looking for the borrower's most liquid assets to be used for collateral. The assets in non-traditional or alternative farming may be difficult to appraise, have limited markets and require large discounts from appraised values to be sold in distressed circumstances. This may then require that assets unrelated to the alternative farming venture be pledged as collateral. When a borrower is hesitant to freely offer collateral, the loan officer may question the confidence the borrower has in the project. A willingness to provide collateral by a borrower is a demonstration that the borrower has faith in his success.

Our next C of credit is capital. Capital refers to the borrower's balance sheet with an emphasis on solvency. This is very important when analyzing a loan to a non-traditional operation. The lender recognizes that this is a farming alternative and is to some extent untried by the borrower.

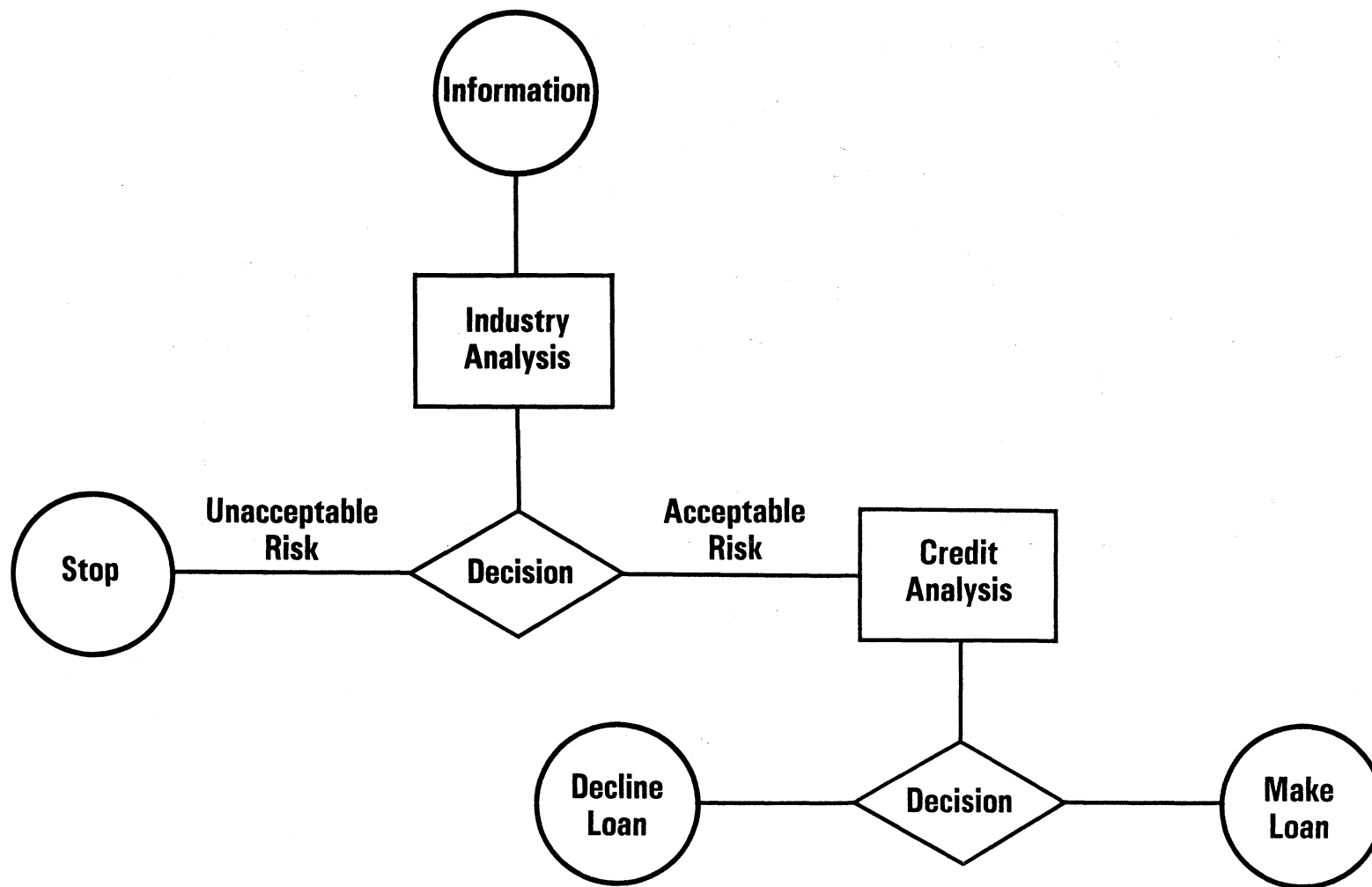
A well capitalized borrower presents less risk to the lender if plans go awry, which they may well do with a new venture. By having a strong net worth relative to debt, the borrower is in a better position to obtain additional borrowings if needed, pledge more collateral or obtain long term financing to pay off the bank. The borrower needs to realize that if his assets are primarily agricultural in nature, the bank may discount his net worth. This is due to the continuing decline in agricultural asset values and their increasing illiquidity.

Our final C is conditions. Here the lender is looking at business conditions. Some of this will come from the industry analysis, but it will be more specific in nature. It will look not so much at the national conditions but at regional conditions and how they will immediately impact the venture during the life of the loan. The lender will try to forecast the future of the business and what could influence it both positively and negatively.

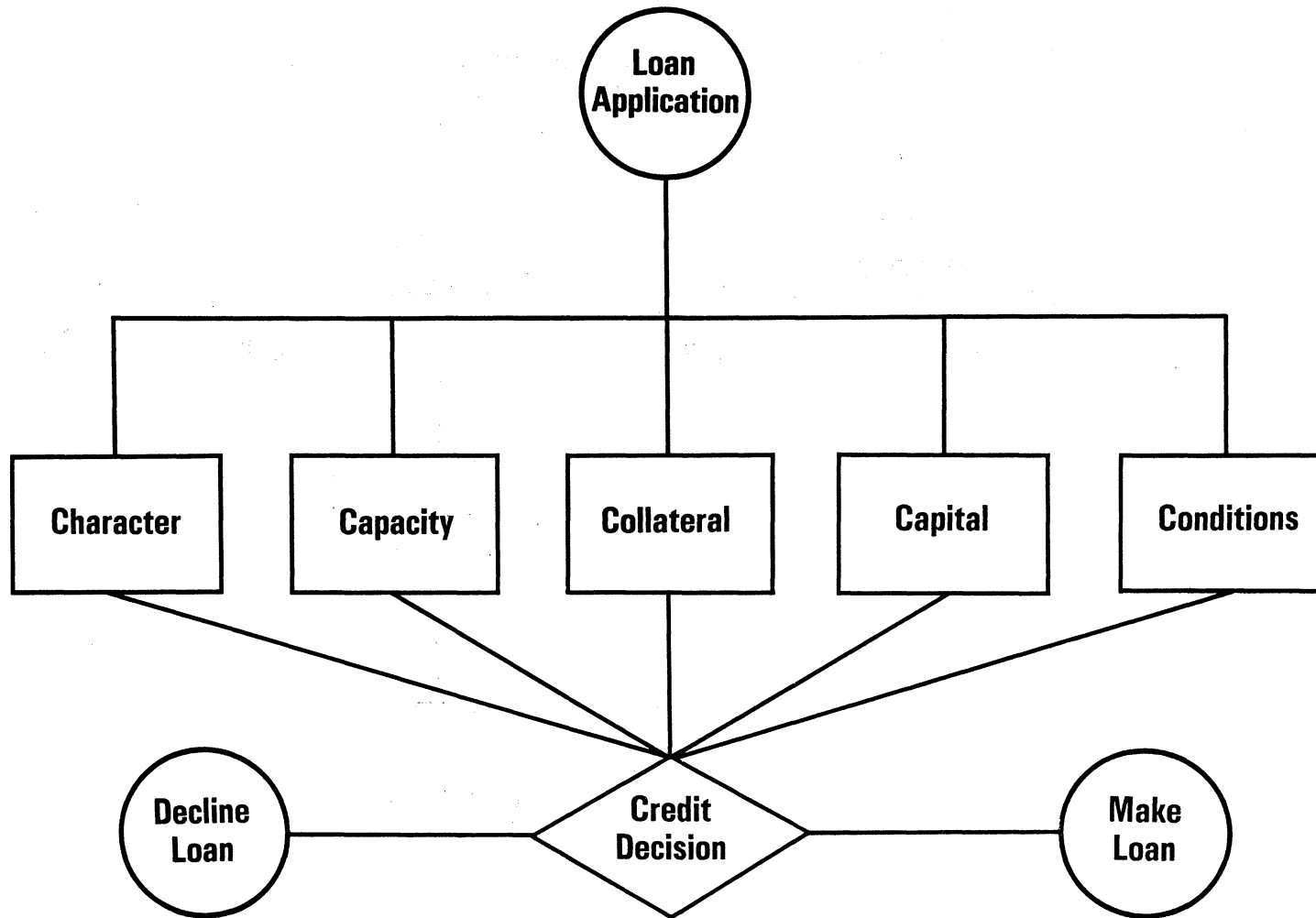
After looking at these five C's, the lender will have a good feel for the credit worthiness of the loan request. He then will be in a position to make a recommendation to his loan committee which hopefully will be a positive one.

Marshal Foch is quoted as saying, "Whatever the activity under consideration...nobody can approach it without a body of knowledge." My intent today has been to quantify a lender's analysis of alternative farming opportunities on two levels--as an industry and as an individual's loan request. By doing this, I hope that I have provided you with a small body of knowledge.

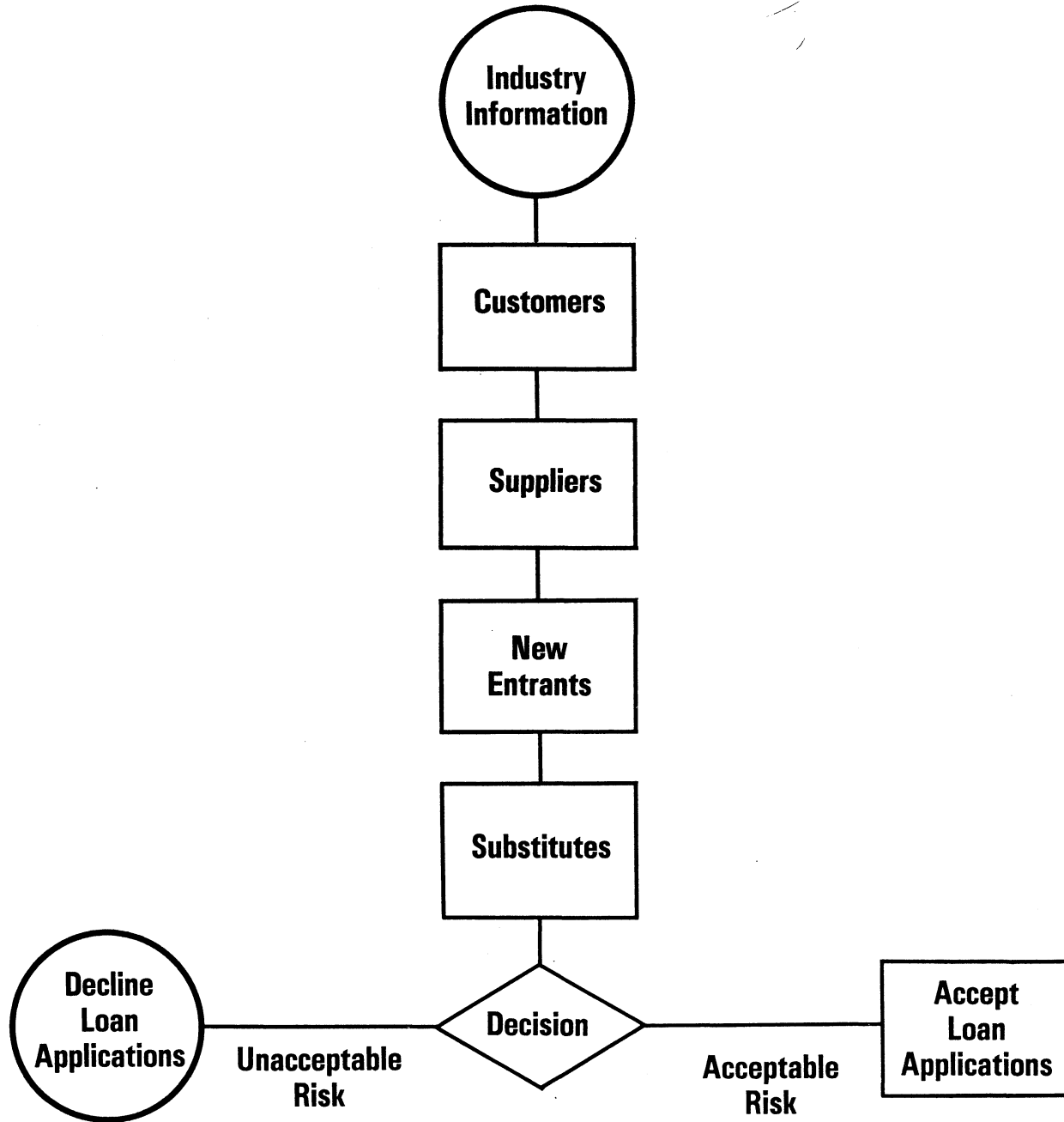
How A Lender Analyzes Alternatives



Credit Analysis Process



Industry Analysis Process



Blueberries: More than a Sideline

Bob Coffey

There may be some of you here that do not know anything about blueberries. So, before I discuss how we got into the business and financed it, I would like to explain this rewarding enterprise.

We now have eight and a half acres of blueberries located in Rogers, Arkansas. I have also been designing and drawing residential homes for 27 years. While blueberries require a lot of work, it is obvious that the business can be handled efficiently while accompanying another job. We will view a few slides of our operation as we discuss blueberry culture.

We believe more profit can be realized from business per acre than any other crop that is "legal." If you do not have land already, then you should look for property that is close to town, preferably in or close to the city limits. This provides two advantages: 1) City water for irrigation. City water is a dependable water source for blueberries. This is extremely important for blueberries as their root systems are shallow with no tap roots. They must have water during dry spells. 2) You will be located in a good spot for "pick your own" customers. You will also be in a good location for picker help to harvest the fruit. Try to find land without any johnson or bermuda grass on it.

A family of four can expect to make a living from 10 to 12 acres of mature blueberries. It is not advisable to go more than 20 acres. We believe that 15 acres well kept is better than 30 acres out of control.

Blueberries exist in two strains: 1) Highbush varieties are grown from Arkansas north. 2) Rabbiteye varieties are grown in the South. All varieties will grow to eight feet plus if they are not pruned properly. Blueberries will last indefinitely if no disease occurs as they are renewing themselves with new canes each year.

Blueberries require very little fertilizer compared to other crops. The fertilizer most used with blueberries is nitrogen. The soil must be kept at a pH of 5 to 5.8 in Arkansas and will need to be lower in sandy soils.

The blueberry plants are set in rows that are 10 to 12 feet apart. The plants within the row are four feet apart, allowing for approximately 1,000 plants per acre. Setting plants in the fall is best; however, they can also be set in the spring.

In our area of Arkansas, mature blueberries will produce about \$10,000 per acre gross income with a net income of approximately \$5,000 or more if they are properly taken care of. The actual harvest of the blueberries lasts about six weeks during the months of June and July. This occurs after the third year of planting.

We have also designed and built such equipment as: grading stands, three wheel soft tire trailers, mulch spreader, spraying equipment, etc. The grading stands may be purchased from the Arkansas Blueberry Growers Association, P.O. Box 167, Lowell, Arkansas 72745.

Blueberry plants are arranged in rows and planted on beds. They are mulched approximately three and a half feet wide with sawdust and chips. In between the rows, some type of grass (fescue in Arkansas) is planted and kept mowed like a lawn. To prevent any grass or weeds from going to seed, our plantings are free of all grass and weeds.

The selling of our blueberries is taken care of by the Arkansas Blueberry Growers Association located in Lowell, Arkansas. This association will be selling all the packed fruit of Arkansas, Missouri, Oklahoma, Mississippi, Louisiana, and Alabama in the coming season. With the hard work of the association this past year, we averaged over \$12.00 per 12-pint flat of fruit. For more information I have written a small booklet entitled, **How We Grow Blueberries in Arkansas**. You may obtain one by writing: Bob Coffey, 1201 Longview Dr., Rogers, Arkansas 72756.

We began the blueberry business with 14 plants in my garden and expanded it to 100 plants the second year. The third year I planted half an acre for my daughters to sell to stores for spending money. (So I thought.) By the fourth year I realized that blueberries would be a great crop for my few acres. Originally I had thought of planting Christmas trees or even nursery stock such as fruit trees. We realized we had to do something to be able to send our daughters to college. So, the fourth year we put in three more acres of blueberries.

Blueberry plantings cost about \$2,500 per acre to establish. Financing began to rear its costly head about this time. To come up with sufficient financing we decided that financing our real estate would be the best way. We borrowed \$25,000 at 9 percent to pay off five additional acres plus sufficient money to set out five more acres of blueberries.

We have also expanded into blueberry nursery stock, setting out 43,000 plants a year. The whips for our plants are taken from our mother block that is inspected by the state plant board. This inspection insures as much as possible plants that are disease free. We grow our plants in nursery beds 36 inches off the ground to prevent any contamination from soil during heavy rains.

Nine years later we still owe about \$20,000 on the 13 acres which we would not sell for \$250,000.00

Market Development

William O. Mizelle, Jr.

Most people use the phrase "market development" to include any activity that is undertaken for the purpose of increasing sales. The dictionary definitions include (1) acts to promote the growth of, (2) acts to make available or usable, and (3) acts to evolve the possibilities of. These definitions agree with the idea of increasing sales.

For this paper, I will use fruit and vegetable examples of "market development." The concepts should apply to any product. They include (1) market acceptance, (2) market access, (3) market expansion, (4) market share, and (5) market facilities.

Market acceptance is concerned with new products. If research develops a new product such as "explosion puffed blueberries" or "muscadine juice," the question is: "Can the product be marketed successfully?" That is, "Are there reasons to think that market acceptance will be such that the new product will be economically viable?" Consumer acceptance (test market) studies are needed to determine if consumers are willing to purchase the product, at what price levels, and in what quantities. From this information, the economic feasibility of the new product can be more clearly evaluated.

Research has disclosed that serving convenience is becoming more popular with fresh vegetables. The Pillsbury Company used this information to test-market Jolly Green Giant branded value-added fresh vegetable products in two cities to determine if there is a market niche for Pillsbury in the fresh market. The test products vary in weight and price to determine the best package size and price if Pillsbury decides "to go national" with the products. The amount and method of advertising is also being tested. (Source: **The Packer**, December 20, 1986)

Market access is similar to market acceptance. It applies to currently marketed products but from new growers. New growers have to establish their reliability with buyers. Buyers are reluctant to drop proven suppliers (even those some distance away) to take a chance on new suppliers. The new producer should visit with potential buyers to determine their interest or willingness to buy from a new supplier. If there is an interest, then samples or small quantities may have to be produced to prove that the new producer can supply the quality and quantity of the product that meets the buyer's needs. If the producer can meet the requirements, then there is a chance to develop this market.

Often, individual producers do not have the quantity of product that is required for most buyers. Thus, the individual cannot "access the market" without more of the product. This is usually done through a group effort where many small producers pool their production to make enough volume to attract the interest of large volume buyers.

Accessing a distant market is different since it is costly to make the contacts and to provide the product samples. A sales representative who has the contacts and reputation in these markets can be used to gain market access. The sales representative should be familiar with the quality and quantity needs of the buyers in these distant markets.

Market expansion is an effort to increase demand. Advertising and/or promotion efforts are employed with the hopes of convincing consumers to buy, to buy more, or to resume buying a particular product. The more obvious of these attempts are in fruit crops, such as Washington apples, Florida citrus, and California grapes. Industry advertising and promotion of vegetables has been less successful for many reasons. The reasons include: (1) the vegetable industry is less organized; (2) there are few commodities that have a "check-off" for raising the funds; (3) the region of origin has not proven to differentiate the product (exceptions such as the Vidalia onion and Idaho potatoes); and (4) the ease of entry into vegetable production would allow non-contributors to reap the rewards if industry advertising was successful. The current success of some individual brand advertising has brought about an increased emphasis in brand advertising. When this proves successful, then the advertised brands command a higher price and/or a larger share of total sales.

For some products, market expansion may be as simple as making the product available. Some products are sold in some regions of the country and not in all regions. Some USDA data indicate that blueberry consumption is highly regional and close to production areas. Other USDA data show that blueberries are not available in many sections of the country. People cannot consume products that are not available; thus, the blueberry market might be expanded just by having blueberries available in more markets. If people are not buying the product when it is available, then advertising and promotion which incorporates product use information may convince them to try the product.

Market share is the portion of total sales that one production area (such as Georgia) or one brand (such as Campbell) has. Increasing market share means "take-aways." If one area increases its share in a stagnant or slow growing market (fresh vegetable sales are increasing about 3 percent annually), then increased sales must be done at the expense of other areas. The Southeast and much of the rest of the country are trying to increase their share of the broccoli market. If new areas are very successful, California, which now is the primary producing state, must lose. California's market share must decline. This has already happened. California's broccoli acreage in 1986 was two percent below 1985 and 11 percent below 1984. Arizona's broccoli acreage was up substantially in the fall of 1986.

Low market share for those items consumed in a state is one reason many people cite for looking at vegetables as alternatives. While looking at the potential alternatives, we must determine if we can produce and market the products cheaper than those who are currently supplying them. Many times the answer will be no. If we conclude that we can produce particular products cheaper, then why aren't we already producing them?

Market facilities may aid in market development. If market facilities are product preparation facilities, then certainly they help. Processing facilities for vegetables, catfish, quail, and all other food products are necessary for marketing the product. Most produce items need to be graded and packed, and a packing facility is needed. However, these are facilities and not markets. Too often producers want someone (government) to build them a market. Rarely can someone else "build a market." Producers and/or their agents have to establish and develop the market. The government can build a facility but not a market, since a market is not "bricks and mortar."

Conclusion

The success in market development is dependent on actions that emphasize selling and marketing. Growers and each commodity industry should study consumer demands, read the market signals, and "produce for the market." Dramatic growth will come to an individual or industry by "stealing" market shares from the competition.

There is a surprising lack of effort directed at increasing the level of sales through product promotions. There are very few specialized personnel assigned to vegetable marketing and promotional activities. Commodity commissions or individuals representing specific commodities or production areas could work more closely with the retailers in their advertisements, especially in the area of co-op ads.

The Small Farm Concept of Marketing Fresh Fruits and Vegetables

Bob West

The American agriculture industry is unique. For over 200 years it has continued to evolve, and today a small segment of our population not only provides food for the American citizenry, but food for millions of people throughout the world.

The American farmer has been, and remains, a vital part of a free economy, demonstrating what can be accomplished. The basic thread in the agricultural economy has been the individuality of the farmer.

The small acreage farms have been, and remain, an important segment of the American agriculture system. However, the shift in our population from rural to a predominantly urban population has greatly reduced the number of small acreage farms. Agriculture became big business to those remaining in the industry. True, the corporate farms have succeeded in producing an abundance of food. However, there appears to be something missing from the agriculture industry. That factor is the family owned or small farm. The greatness of America is due in part to the contribution of people engaged in agriculture (small scale farmers), not only for food production, but their contributions as solid citizens: examples of success in a free economy.

It appears the pendulum is swinging back, and today there are signs of returning to the small farm concept for many people. They are concerned not only about staple crops, but also about cash crops to supplement income. It is encouraging to see a revival of the farmer who farms on a small scale. America needs to retain the small acreage farms.

A major concern of the small farm industry is the inability to market products grown on a profitable basis. Most small farms operate independently and find it difficult to have a market when harvest time comes.

Answering a few questions will enable one to target some problems and develop solutions to them. Where can the growers market their products? What do the growers need to know about their products to ensure receiving the maximum movement and price?

Most fresh fruits and vegetables are sold through distribution centers, these being wholesale houses or warehouses that reship to groups of retail outlets. In order for these centers to function smoothly, they must have merchandise that they in turn can market to their customers.

How does the producer go about contacting prospective buyers? There are different means of contracts--written, telephone and in person. The best means of contact is in person. Find out where buying offices are located and make an appointment to visit with the buyer prior to the time your product will be ready for market. Furnish all the information available--the anticipated acreage, item to be grown, approximate volume of products and approximate harvest time.

WHAT ARE BUYERS LOOKING FOR FROM THE PRODUCERS?

1. **Quality**--Consistent quality is essential for a continuing marketing program.
2. **Packaging**--A consistent pack of product is necessary. Since the distribution center resell, the product must be of good quality, and each pack must be the same.
3. **Containers**--Products should be in containers that are universally accepted. Ascertain what type containers are desirable.
4. **Reliability**--Probably the most important characteristic to the buyer is the reliability of the grower. Can he fulfill his promises? Will he be consistent with his pack? Will deliveries be made at the agreed time?

Remember.....the merchandise the grower sells to the distribution centers will be resold. The final analysis will rest with the consumer at the retail outlet. If we deliver a satisfactory product, the customer will purchase it again and again.

Always keep the buying office informed of any deviations from the orders. There will be times when inclement weather or transportation breakdowns necessitate changes. Keep everyone informed as quickly as possible. This will be very helpful to buyers.

Buyers who purchase from growers have an obligation to represent themselves and their companies to the producer in a fair and courteous manner, pay a fair price for their product, assist in helping move their product and honor commitments.

There is no other industry that is built on mutual trust more than the agricultural industry. The growers and the buyers must continue to work in harmony so that our agricultural industry will continue to be strong.

Farmer's Markets

William Farrington and Larry Reese

Farmers' markets were born of a need in 1933 to help farmers in Florida.

While farmers could and can produce and consumers needed the products back in 1933 and still need the products, many small farmers lack the financial and managerial ability to construct and operate the assembly and distribution facilities necessary.

Our Bureau and agencies like ours in several other states have become partners with farmers to provide them this necessary link that enables them to access a much larger market.

Our first market in Florida opened in 1934 with \$518,625 in sales its first year.

We now operate 17 markets. Last year's total transactions exceeded \$518 million, and platform sales exceeded \$214 million.

We operate our markets with the same mission we began with--"to better serve Florida farmers."

Since our objective is to facilitate--not subsidize--we operate under the one cardinal principle that the state will not "go into business" in competition with private enterprise nor will the state pay the market's operational costs.

We recently calculated the amount of subsidy our efforts represented by calculating the number of packages handled across our markets since December 18, 1934. We calculated the total value of those hundreds of millions of packages and determined that our state program amounted to approximately an .08 percent subsidy, or about three-tenths of one cent per package.

We operate these 17 facilities with 61 employees. We have a new market in the design stage and two new packing facilities under construction, which will bring us to 123 buildings run by the state. We have accumulated approximately \$20 million worth of land, paving, and facilities over the past 52 years.

The facilities are constructed with state money. We lease them to farmers, buyers, grower agents or truck brokers. The funds generated pay the operational costs including salaries of the staff people. The funds also pay the Working Capital Trust Fund an amount equivalent to 5 percent of the total capital invested by the state.

Last year after paying all operational costs we returned over half a million dollars to the Trust Fund.

We have created a win-win situation for the state and for farmers of Florida.

The farmer wins. The consumer wins. The state wins.

Sounds easy!

Running these markets is something akin to running an 80 sow farrowing house. There's always someone squealing.

How do we know it is successful? Because we have a waiting list of farmers to get on most of the markets, **and** we have a waiting list of production areas wanting to build a market.

Many areas will not get one of these large assembly and distribution markets. I have begun to call our larger markets "Supply Centers". They are large enough to command the attention of buyers nationwide. Farmers may haul their products further to one of these facilities, but they can count on several buyers--not just one or two.

We have continually attempted to assist the smallest producers with facilities on our markets, but as of yet, with our volume-oriented mentality, we have not found a way to economically run a small roadside retail farm market with a state employee. The per box operational costs are prohibitive. On our wholesale facilities our operational costs run less than 1 percent of product value handled and less than one-third of a percent of total market transactions.

We have recently established a mixed loading operation for foliage plants that is moving 40 to 50 loads a week. While we ban the sale of competing foreign produce on our markets, we have recently established two **export** assembly and distribution operations: one that exports to the Caribbean countries and one that is exporting to Europe, Italy and Japan.

We have no qualms about the double standards involved. We are serving our farmers. U.S. apple growers have lost over 50 percent of their apple juice market to imports. U.S. flower growers have lost over 50 percent of their market of some flowers to imports. This past year, the U.S. became a net importer of food. Mexican vegetables flood and thereby ruin our markets every winter. So please look for the Mexican label, and avoid it. We understand that there are over 200 pesticides used in Mexico that are not registered for use on those crops in our country.

Nonetheless, we don't intend to lose anymore U.S. agricultural markets. It's time we turned to fight.

What is your philosophy of the proper role of government? Cut it out! Right? Cut out fraud, waste, overspending, military, FBI, food stamps, regulations, health benefits, social security, support for the homeless and the needy. Whoa, you say? Too far? In Japan, the government cooperates with business to capture certain international markets. Many other countries subsidize their agricultural exports into our markets, putting our producers out of business. In Washington, D.C., for 60 cents you can buy a card that will carry you around the city on a magic subsidized subway ride. That system will **never** pay for itself. It doesn't have to.

But somehow, some people believe that it is unfair for state governments to cooperate with farmers to rebuild an agricultural economy. For every dollar initially invested in our facilities, we annually create \$17 worth of gross agricultural sales. Add the typical local multiplier of 2.5 to that and see that on average we are adding over \$40 per year into the local economy for one dollar initially invested by our state. And that dollar is paid back.

We have a good deal. We like it even though we have our critics. This system works for Florida farmers.

If there are any questions that I can answer regarding our operation, I would be happy to answer them.

Agriculture Issues in Congress

Steve C. Grafton

To use an old but familiar expression, "The times, they are a-changin'."

Up until just a few years ago, a farmer would have to be crazy to consider making a living in the South by farming anything other than the basic commodities that have dominated our state economies for decades. However, the changes that have occurred in the past few years have caused us all to look for alternative methods for profitable farming in the South.

Agriculture remains the nation's largest industry and employer with 2.7 million workers on about two and one-quarter million farms. However, these workers produce over 80 percent more on an acre of land than did the previous generation. Today, one hour of farm labor produces 16 times as much food and other crops as it did in 1920. In 1976, the average farm worker supplied enough food and fiber for 59 people. Just 10 years later, that number has increased to 79.

As a result of these increases in efficiency, farmers in the United States now produce more of the basic commodities than are needed by consumers in this country. The problems associated with these surpluses are compounded by declining export sales, low prices, high cost of production and weather tragedies like last year's drought.

Congress has been involved in the search for solutions to these and other problems that have plagued agriculture in the 1980's. The most recent major legislation which was considered and passed by Congress was the Food Security Act of 1985, the Farm Bill. We discussed and debated that measure for almost two years--two years when the agricultural economy was ailing--and made no significant changes in the traditional farm programs.

There was the hope that the legislation which passed would provide income support to farmers through government payments and, at the same time, allow commodity prices to fall to a level that would strengthen the United States' position in foreign agriculture markets.

Last year, there was an attempt to adjust the Farm Bill, make changes in the Farm Credit System and enhance agricultural trade programs. However, because farm state legislators were afraid that major changes could cause even more difficulties for an already troubled farm sector, and because of the Administration's urging to give the 1985 law a chance, only minimal changes were made in the commodity and credit programs and no major agricultural trade legislation was passed.

There is a strong likelihood that agricultural legislation will be debated early in the 100th Congress. In fact, the new Majority Leader, Robert Byrd, has promised that farm legislation will be one of the first items of Senate business. The President took the first official shot at changing existing agriculture programs when he submitted his FY 1988 budget to Congress on January 6. In that proposal are several key items aimed at reducing the \$26 billion first-year cost of the Farm Bill:

Assistant to Senator John Stennis.

- 10 percent reduction in target prices;
- \$50,000 payment limitation, including marketing loans and Findley payments;
- Decoupling, or separating program benefits from planting requirements.

In addition to these changes in price support programs, the Administration's budget proposes to abolish farm ownership loans, reduce export guarantees by 40 percent, reduce cooperative research by 22 percent, and reduce the Agriculture Extension Service by 21 percent.

There will probably not be much support for these proposals in Congress, but they do serve as a catalyst for discussions on the overall agriculture program, and some changes are likely to be enacted.

There will be substantial debate on changing commodity programs to include mandatory production controls as a trade off for higher "government-supported" commodity prices. Also there will be attempts to target program payments to smaller farmers or those classified as "needy". Efforts will be made to expand the marketing loan to more commodities than just cotton and rice. And there will be some effort to expand the President's proposals by calling for a rapid reduction in all program benefits.

Because about one-third of all family size farms have serious debt problems, we can expect credit legislation to surface, either as a part of a general farm bill, or as separate legislation. The debate over this legislation will include revisions in the 1985 Farm Credit System act, establishment of a secondary market for farm real estate loans, debt restructuring proposals for farmers, assistance for rural commercial banks, and job retraining assistance for displaced farmers.

Agricultural trade will also be a focus of attention this year as a part of general farm legislation and as a part of omnibus trade legislation which will be considered. In addition, there will probably be legislation to allow full United States participation in the new round of multilateral trade talks about the General Agreement on Tariffs and Trade (GATT), in which agricultural trade rules will be a primary issue.

So what do these legislative issues have to do with alternative farming?

Agriculture in America is at a crossroads. The decisions we make in Congress this year will certainly have an impact on the direction that we take. But none of the decisions will "fix" agriculture in 1987. There will still be a great need for innovation on the part of farmers and those who advise farmers. There is now, and there will continue to be, a need to think of new ways to use the land that is now producing surpluses of most major commodities. This conference discusses some of those ways; more will have to be developed. We need more success stories like that of the catfish industry. There are about 20,000 known edible plant species around the world, and yet farmers currently grow less than 100 of them. Of course, all of them will not work here in the South, but some will, and we need to discover which ones can bring profitability back to our farmers.

I believe Congress is willing to support innovation in agriculture. New programs can and will be developed as they are needed. We can expand credit programs to make them available to farmers who are willing to risk their land and their livelihood on a new venture.

The boom year of the 1970s are gone, and we may never see that level of prosperity for agriculture again. But we can, and we must, see better years than we have had so far in the 1980s. With innovation and hard work, two key ingredients of a successful farmer, I expect better days ahead, because....

"The times, they are a-changin'."

The Muscadine Alternative

W. Lanny Bateman

Mississippi has not escaped the severe recession in agriculture. As with many other states, farmers and various support agencies have been examining alternative potential enterprises. As Professor Sollie has indicated, aggregate data from Southeastern states indicate the search is difficult. There have not been dramatic changes in the crops grown in the region over the past several years. Yet, there are crops that can be adopted or industries developed when proper conditions exist and with adequate planning. In this paper we will examine as a case study what we at Mississippi State now often refer to as the muscadine project.

The purpose of the following discussion is to examine the muscadine project from the initial interest to the approach that the Division of Agriculture followed in addressing the general question. The major phases of the project, specific questions that were examined and procedures for obtaining answers will be described. Finally, a perspective on where the industry is now will be presented.

PROCEDURES FOR EXAMINING COMMODITY POTENTIAL

Before getting specifics, a brief look at some general ideas on examining commodity potential is in order. There is no one recipe that works for all commodities or all places. Primarily, any possible standardization of analysis will come from the approach to a problem. In many ways, the study of market potential is not unlike the tried and true scientific method. The wording may be different, but the intent is the same.

For example, Criner, et. al recently suggested six steps to approach commodity analysis:

1. Establish objectives
2. Examine production and consumption trends
3. Describe production processes
4. Describe market characteristics
5. Construct initial production and marketing budgets
6. Decide whether to continue or stop.

The list should cover almost any questions that should be asked, and in spite of being non-specific, provide a sense of organization. A Georgia extension publication (Bulletin #899) on farm packing sheds for fresh produce provides an applied example. While their purpose was not

to describe a methodology, the list of considerations and planning guide would satisfy the six steps above. The problems addressed in the muscadine study could also fit under the concept of problem identification and a systematic approach to a solution.

THE MUSCADINE EXAMPLE

The Beginning

As far as being a major factor in the market in Mississippi, the muscadine was in a situation similar to the other Southeastern states. Interest in winemaking had generated activity in the 1970s, and several small wineries had developed. The fresh market was used but was limited primarily to pick your own and local sales to retail outlets. Success from these endeavors was limited to local markets and the ingenuity of individual entrepreneurs. The wine market was not growing, but proprietors capitalized on markets available and met with some success. The fresh market was accessed by some, but did not achieve the success of Georgia. Growth potential appeared to be limited. How the muscadine became a center of attention and the analysis behind it is "the rest of the story."

THE ORIGINAL QUESTION

In conjunction with research pertaining to wines, food scientists at Mississippi State experimented with food products from the muscadine. Among these was a white juice made from the bronze varieties. The staff had noticed that whenever samples of the juice were made available to visitors in the McKay lab, it was highly complimented and consumed readily. A private firm, Paul Broadhead Interests of Meridian, Mississippi, visited the lab looking for opportunities to invest in Mississippi and perhaps help the troubled farm sector in the process. The juice attracted their interest.

A group of Mississippi State scientists from both the Experiment Station and Cooperative Extension met with the Broadhead company to discuss the potential for the muscadine. Thus, the first step in an investigation, the objective, was stated for us: Can we grow muscadines in Mississippi, manufacture the juice and realize a profit?

The question seemed innocent enough, but it challenged the limits of what we thought we knew. There were several questions that needed to be addressed simultaneously to develop a comprehensive report that would allow us to respond to the question. Production and consumption trends for muscadine juice were not available. However, the market for juices and juice drinks appeared to be growing. The grape juice volume alone in 1983 was around 60 million gallons (USDA). Production data for muscadines were not reported, and as far as we knew, there was not a commercial juice plant for muscadines in existence.

Given the diversity of problems in addressing Mr. Broadhead's question, the scientists at the meeting prevailed upon the Agriculture Division administrators for guidance in how to handle the problem.

It was decided that a task force comprised of several areas of expertise would be given responsibility for developing the analysis. The original task force (Table 1) included food technologists from the Experiment Station and the Extension Service. There were horticulturists from both units and an agricultural economist from the Experiment Station. The cellar master from enology with experience in processing grapes for wine and juice was committed as well. Two graduate students, one in agricultural economics and one in horticulture food science, provided assistance in obtaining data.

The approach to the problem took three major directions: estimate juice manufacturing costs, cost of producing muscadines and consumer acceptance. The problem was to identify what we knew and to see what we could estimate beyond that.

Table 1. Task force established for developing the economic feasibility study for muscadines in Mississippi.

Member	Expertise
Dr. A. D. Seale, Jr.	Coordinator
Dr. Gale R. Ammerman	Food Technologist/Horticulture
Dr. W. Lanny Bateman	Agricultural Economist
Dr. C. P. Hegwood	Horticulture
Dr. Richard H. Mullenax	Extension Horticulturist
Dr. Charles W. Shannon	Extension Food Technologist
Dr. Richard P. Vine	Cellarmaster/Enology
Mr. J. L. Silva	Grad Assistant/Horticulture
Mr. Tony Garrard	Grad Assistant/Ag Economics

COST OF PRODUCTION

The original study was begun in January of 1984. At that time a study of the costs of producing muscadines had just been completed (Benoist) indicating that at a price of \$200 per ton a vineyard would yield an 11 to 12 percent internal rate of return over all costs including interest on operating capital. This study considered a 25 year planning horizon and was for relatively small vineyards with hand harvesting. It was obvious in the early stages that these budgets would need revision, but since they played a role in the initial study, a brief summary will be presented here. Later budgets are included in the appendix.

In Mississippi a harvestable yield of muscadines is not expected until the third growing season. Thus, the producer will incur heavy establishment costs before obtaining income. The first estimates of production costs are shown in Table 2. Our original estimates showed a first year cost of almost \$3,000 per acre and with carrying interest each year, by the end of the third year a producer could have almost \$5,000 per acre invested, not including land or a water source. At that time our yield estimate started at three tons per acre in the third year, reaching a maximum of 10 tons in the sixth year. The return indicated in the fourth year would cover growing expenses, but not the additional \$700 to pay off amortized establishment costs (25 years) at \$200 per ton.

By the sixth year, income above all costs was estimated to be \$375 per acre. This was projected through the twenty-fifth year. The costs included were for all labor and interest rates of 12 percent on operating capital, and 11 percent on establishment charges were used. Obviously, at this point, the potential for growers existed, but entry would be a problem.

Table 2. Estimated costs and returns from muscadines in Mississippi in 1984 with \$200 per ton price.

Year in Life	Cost per Acre	Yield Acre	Total Annual Returns/acre
1	\$2932	0	0
2	\$1089	0	0
3	\$1421	3 tons	\$600
4	\$1625	5 tons	\$1000
5	\$1625	8 tons	\$1600
6	\$1625	10 tons	\$2000

JUICE MANUFACTURING COSTS

Costs for the manufacturing plant were synthesized using new costs of equipment believed to be necessary for a plant of this type. One assumption was to use a plant volume of one million gallons of juice per year as capacity after becoming established. The equipment complement and facility for bottling 24-ounce glass bottles was configured for this volume. Equipment costs were obtained from manufacturers. Labor needs were estimated based on experience of the scientists involved and discussion with individuals in the food processing industry. Some data were available, particularly on the technical process, from the small volumes that had been processed in the McKay Food and Enology Lab.

A conversion factor of 130 gallons of juice per ton of muscadines was used to convert raw product cost to a per unit sold and to estimate the quantity muscadines needed for full scale operation. The estimated manufacturing costs are summarized in Table 3. The largest single item was the cost of the raw product at \$3.46 per case. The containers were the next largest item at \$2.53 per case. Thus, of a total cost of almost \$9.00, two-thirds was for raw product and containers. The estimated price received by the plant was \$10.52, leaving a margin of \$1.53 per case.

The point to remember in considering the numbers is that they were developed from a purely synthesized plant design. The production process for juice was described, and the corresponding equipment was developed. Labor needs for each step in the process were estimates for similar tasks in existing plants. Juice yield was projected from that obtained with a small press in the lab.

Table 3. Estimated costs of manufacturing muscadine grape juice, Mississippi, 1984.

	\$/case
Raw Product	\$3.46
Package	\$2.53
Equipment (amortized)	\$0.46
Other	\$2.54
Total	\$8.99

CONSUMPTION

Being an unknown commercial product, there was no direct data on consumption available. USDA statistics indicated increases in the volume of grapes crushed for juice in the early 1980s. While per capita consumption of canned juice had shown no growth, consumption of frozen juice was increasing. This did not give much help in discussing demand for muscadine juice. Even though those tasting the product on campus appeared to like it, the data were not totally unbiased.

A graduate student in horticulture food science had begun a mail survey in several cities nationwide in which families were sent samples of juice and asked to complete a questionnaire. Some of these results would be available. It was decided that taste tests comparing white grape juice to the muscadine product could be completed in a short time and provide some information at least on demand potential.

The taste test was performed in two supermarkets in Memphis, Tennessee. A display identifying the booths as product testing from Mississippi State University was set up in the entrance of each of the stores. Customers leaving the stores were offered one-ounce servings of each of the juices. The individual was told only that the juice was grape juice. The muscadine was labeled with a "1" and the white grape labeled as "A." They were then asked to complete an evaluation form.

The results of the consumer taste test are shown in Figure 1. The figure is a reproduction of the evaluation form, with the percentage responses filled in and the number of respondents for each question. For example, of 73 adults responding to question one, 89 percent indicated they bought bottled fruit juice.

The acceptability of taste was confirmed, with over half of the individuals indicating the muscadine juice was excellent compared to only 30 percent considering the white grape juice as excellent. Further, 88 percent of the respondents indicated a willingness to purchase the muscadine juice at competitive prices, compared to 74 percent for the grape.

The responses to the questionnaire with the mailed samples was similar (Bradway). Fifty-six percent of the respondents rated the muscadine juice as very good. There was no comparison of two different juices in this study. Over 60 percent of these respondents indicated they would purchase the muscadine juice.

The conclusion of the task force was that we could present this as an indication that there was a potential demand for muscadine juice. There were a number of questions that we could not answer or even ask at that time. The brand name, labeling, marketing strategy and how it would fare in competition were among them. However, it was time to present what we knew.

THE REPORT

The material was assembled in a mimeograph report (unnumbered) and presented to Mr. Broadhead. In the initial request for information, he had said that he wanted us to put our numbers together, explain them and then tell him what we thought the potential was--our "gut feeling." And that is what he asked at this meeting. The general agreement was that it had potential. We did feel that some sort of market test was needed before commitments became too heavy.

In addition to our data, the Broadhead company had taken samples to the far east and to other parts of the U.S. The response they had received was also very good. The decision was made to move along and determine the potential for farmers, possible assistance for them, see what it would take to get an industry started and in the meantime, attempt a sales test.

SALES TEST

The sales test was conducted in two supermarkets in each of two cities, Memphis, Tennessee, and Tuscaloosa, Alabama. The juice was bottled in clear glass 24-ounce bottles with a label that did not identify Mississippi State University. The agreement was that the juice would be priced at the same price per bottle as white grape juice. Alternatively, one store discontinued the 24-ounce white grape juice and priced according to the red. The stores did not have to pay for the juice and received all proceeds. There was no special promotion of the product by the individual stores.

One store in each city was selected for an initial introduction of the product by giving free one-ounce samples (plastic cup) during the first week. That was the extent of promotion.

The weekly sales data by store and week are detailed in Table 4. Since some stores depleted inventory before others, the 13 week period in which three of the four stores were in the market were selected for analysis. After the test had been committed to Tuscaloosa, it was learned these stores were not carrying the white grape juice. Thus a comparison of sales of the two products is only available from the Memphis stores.

Sales were begun in Memphis in one week and the following week in Tuscaloosa. The data will be reported by week, with week one being the first week in the market, week two the second week and so on. The limited scope of the test limits results to descriptive statistics.

Figure 1.

**MISSISSIPPI STATE UNIVERSITY
PRODUCT EVALUATION FORM
SUMMARIZED RESPONSES**

1. Do you purchase bottled fruit juice for home consumption? Yes 89% No 11%
If yes, please check below the kinds usually purchased. (of 73 responding)

Orange Juice 71.4% White Grape Juice 17.1% Apple Juice 51.4% Red Grape Juice 38.6%
Other _____ (of 70 responding)

How frequently is bottled juice purchased? (of 69 responding)
Weekly 63.8% Monthly 26.1% Special Occasions 13%
2. When do you normally consume bottled juice? (66 responding)
Breakfast 78.8% Lunch 22.7% Evening Meal 19.7% As a snack drink 51.5% Never 1.5%
3. You have just tasted two different types of white fruit juice: How do you rate each product in terms of its general taste and quality?

* Juice 1: Excellent 55.1% Good 30.3% Fair 14.6% Poor _____ (of 89)
* Juice A: Excellent 30.5% Good 42.7% Fair 18.3% Poor 8.5% (of 82)
4. If the two juices you have just sampled were available on the store shelf at competitive prices would you purchase:

Juice 1: Yes 88.1% No 11.9% (of 67)
Juice A: Yes 74.5% No 25.5% (of 55)

If yes, what container size do you prefer? (71 responding)
Small: 8 to 10 oz 15.5%
Medium: 20 to 24 oz. 19.7%
32 oz. (quart) 40.8%
Large: 64 oz. (half gallon) or larger 23.9%
5. Please indicate the number in your household. Number 76 Average
Number of Adults 2.1 Children over 12 years .32 Children under 12 years .51

* Juice 1: Muscadine Juice
* Juice A: White Grape Juice

Table 4. Weekly sales in number of bottles, Muscadine Juice and White Grape Juice, Memphis and Tuscaloosa

Store	-----Muscadine Juice-----				White Grape Juice	
	Memphis		Tusca		Memphis	
	Poplar	Winch	Univ.	N. Port	Poplar	Winch
	----- (number of bottles) -----					
Week No.						
1.00	396.00	14.00	384.00	24.00	16.00	17.00
2.00	120.00	16.00	120.00	60.00	23.00	30.00
3.00	108.00	18.00	117.00	24.00	36.00	9.00
4.00	78.00	21.00	51.00	34.00	24.00	16.00
5.00	102.00	15.00	108.00	26.00	36.00	24.00
6.00	88.00	25.00	54.00	33.00	48.00	15.00
7.00	81.00	20.00	42.00	29.00	31.00	13.00
8.00	72.00	28.00	34.00	11.00	30.00	16.00
9.00	64.00	33.00	50.00	10.00	25.00	35.00
10.00	55.00	23.00	36.00	12.00	24.00	11.00
11.00	37.00	16.00	17.00	26.00	18.00	14.00
12.00	81.00	17.00	67.00	26.00	36.00	15.00
13.00	60.00	13.00	NA	35.00	36.00	8.00
ave per sk	103.23	19.92	90.00	26.92	29.46	17.15

Na: Not available.

Several items of interest are worth noting. First, we will look at the muscadine juice. The juice samples were given in the Poplar store in Memphis and the University store in Tuscaloosa. (Note the Tuscaloosa store had data for only twelve weeks.) These stores moved considerably more product than those without the samples. In fact, the week in which samples were presented had more than three times the sales volume of any other week.

Looking at the entire period, the store in Memphis where samples were distributed averaged over 103 bottles per week compared to just over nine in the store with no promotion, a little over five times as much. In Tuscaloosa the ratio was over three to one.

Although the test could not clearly identify repeat sales, indications are that that is the case. If we examine the last 10 weeks of the period (to remove the effects of the promotion) the stores where samples were given still lead in product movement. In weeks four through 13, the Poplar store averaged selling almost 72 bottles per week compared to just over 21 for the Winchester store, or 3.4 to one. In Tuscaloosa the rate was over two to one. Note, however, that the North Port Store where no samples were given had higher sales than the comparable store (Winchester) in Memphis.

Comparing the data to white grape juice movement indicates favorable results. In the Poplar store the muscadine juice moved 3.5 bottles to one over the 13 weeks, and 2.3 to one for the last 10 weeks. In the Winchester store the ratio was 1.26 to one for the 13 weeks, and 2.3 to one for the last 10. Although not conclusive, this improvement at the Winchester store may indicate a developing taste for the muscadine juice.

In the two stores where taste samples of muscadine juice were presented to customers, sales averaged over 96 bottles (eight cases) per week over the test period. For the latter 10 weeks the average was over 61 bottles (five cases).

In the two stores where no promotion was done, sales averaged over 23 bottles per week for the sales period and over 22 bottles the last 10 weeks. This is almost two cases, comparing favorably to the one case per week considered marginal.

In the stores where comparable data were available, the muscadine juice moved in greater numbers than white grape juice.

The results of the sales test and further investigation by Mr. Broadhead encouraged him to continue. This did not complete the efforts from Mississippi State. The original team had now expanded to include an extension economist, other horticulturists, extension entomologists, plant pathologists and agricultural engineers providing information to county agents and lending agencies. The work is not complete yet.

The latest budgets illustrate the problems still ahead. The establishment costs limit entry for potential producers. However, this is being addressed and will be solved.

A company was formed called Southeastern Specialty Foods, which now has a plant in operation near Ellisville, Mississippi. They are offering contracts for muscadines and this past year purchased muscadines from Florida, Georgia, North Carolina and Mississippi. Not only do they make juice from the bronze varieties, but they make jams, jellies, preserves and pancake syrups from the red and bronze varieties.

SUMMARY

In many respects, this project was no different than a feasibility study for any project. What makes it a case study with examples for other similar endeavors is that it has been successful up to this point. It provides an example of what the land grant concept can do. A critical mass of knowledge was assembled to provide information. At other critical times, other agencies with different responsibilities became involved, such as the various Economic Development Authorities and the Mississippi Department of Agriculture. Of course, the primary reason the industry has made it this far today is that the private sector had the interest in the project and the entrepreneurship to take the risk.

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1A. ESTIMATED COSTS AND RETURNS FROM MUSCADINES IN
 Summary of estimated costs per ACRE,
 MISSISSIPPI, 1986, ESTABLISHMENT YEAR

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
		DOLLARS		DOLLARS	
DIRECT EXPENSES					
CUSTOM					
Subsoil	Acre	10.00	1.000	10.00	
FERTILIZER					
FERT 13-13-13	Cwt	8.99	0.450	4.05	
NITRATE (34% N)	Cwt	8.85	0.900	7.97	
FUNGICIDES					
Phaltan	Lb	2.63	10.000	26.30	
HERBICIDES					
Surflan	Lb	15.55	4.000	62.20	
INSECTICIDES					
Malathion	Lb	3.57	10.000	35.70	
OTHER					
Anchor Mat	Each	4.00	24.000	96.00	
End Posts	Each	5.00	24.000	120.00	
Trellis Arms	Each	3.15	181.000	570.15	
Wire 12	Roll	70.00	2.000	140.00	
Wire tools	Set	50.00	1.000	50.00	
poles	Hun	300.00	1.810	543.00	
IRRIGATION MATERIALS	ACRE	593.00	1.000	593.00	
Plants					
Muscadine	Hun	240.00	1.810	434.40	
OPERATOR LABOR					
Tractors	hour	4.45	3.876	17.25	
HAND LABOR					
Hand Labor	hour	4.45	88.000	391.60	
IRRIGATION LABOR					
Drip Irrigate	hour	4.45	8.400	37.38	
DIESEL FUEL					
Tractors	gal	0.94	5.557	5.22	
ELECTRICITY					
Drip Irrigate	kWh	0.15	58.800	8.82	
REPAIR & MAINTENANCE					
Tractors	ACRE	4.29	1.000	4.29	
Implements	ACRE	1.76	1.000	1.76	
Drip Irrigate	hour	0.78	21.000	16.38	
INTEREST ON OP. CAP.	ACRE	329.26	1.000	<u>329.26</u>	
TOTAL DIRECT EXPENSES				3504.73	
FIXED EXPENSES					
Tractors	ACRE	9.84	1.000	9.84	
Implements	ACRE	3.47	1.000	<u>3.47</u>	
TOTAL FIXED EXPENSES				<u>13.31</u>	
TOTAL SPECIFIED EXPENSES				3518.03	

2A. ESTIMATED COSTS AND RETURNS FROM MUSCADINES IN
 Summary of estimated costs per ACRE,
 MISSISSIPPI, 1986, SECOND YEAR

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
		DOLLARS		DOLLARS	
DIRECT EXPENSES					
FERTILIZER					
FERT 13-13-13	Cwt	8.99	0.600	5.39	
NITRATE (34% N)	Cwt	8.85	1.200	10.62	
FUNGICIDES					
Phaltan	Lb	2.63	10.000	26.30	
HERBICIDES					
Surflan	Lb	15.55	6.000	93.30	
INSECTICIDES					
Malathion	Lb	3.57	10.00	35.70	
OTHER					
Copper Sulfate	Lb	1.30	8.000	10.40	
Plants					
Muscadine	Hun	240.00	0.090	21.60	
OPERATOR LABOR					
Tractors	hour	4.45	2.640	11.75	
HAND LABOR					
Hand Labor	hour	4.45	45.800	203.81	
IRRIGATION LABOR					
Drip Irrigate	hour	4.45	8.400	37.38	
DIESEL FUEL					
Tractors	gal	0.94	3.894	3.66	
ELECTRICITY					
Drip Irrigate	kWh	0.15	58.800	8.82	
REPAIR & MAINTENANCE					
Tractors	ACRE	2.95	1.000	2.95	
Implements	ACRE	1.34	1.000	1.34	
Drip Irrigate	hour	0.78	21.000	16.38	
INTEREST ON OP. CAP.	ACRE	42.25	1.000	<u>42.25</u>	
TOTAL DIRECT EXPENSES				531.65	
FIXED EXPENSES					
Tractors	ACRE	6.76	1.000	6.76	
Implements	ACRE	2.58	1.000	<u>2.58</u>	
TOTAL FIXED EXPENSES				<u>9.34</u>	
TOTAL SPECIFIED EXPENSES				540.99	

3A. ESTIMATED COSTS AND RETURNS FROM MUSCADINES IN
 Summary of estimated costs and returns per ACRE,
 MISSISSIPPI, 1986, THIRD YEAR

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
		DOLLARS		DOLLARS	
INCOME					
PROC. MUSCADINES	Lb	0.10	6000.000	<u>600.00</u>	
TOTAL INCOME				600.00	
DIRECT EXPENSES					
FERTILIZER					
FERT 13-13-13	Cwt	8.99	4.000	35.96	
FUNGICIDES					
Phaltan	Lb	2.63	10.000	26.30	
HERBICIDES					
Simazine	Lb	3.38	6.000	20.28	
Surflan	Lb	15.55	6.000	93.30	
INSECTICIDES					
Malathion	Lb	3.57	10.000	35.70	
OTHER					
Copper Sulfate	Lb	1.30	8.000	10.40	
Plants					
Muscadine	Hun	240.00	0.090	21.60	
OPERATOR LABOR					
Tractors	hour	4.45	3.260	14.51	
HAND LABOR					
Hand Labor	hour	4.45	27.400	121.93	
Labor (grading)	hour	4.45	1.000	4.45	
Labor (harvest)	hour	4.45	15.000	66.75	
IRRIGATION LABOR					
Drip Irrigate	hour	4.45	8.400	37.38	
DIESEL FUEL					
Tractors	gal	0.94	4.547	4.27	
ELECTRICITY					
Drip Irrigate	kWh	0.15	58.800	8.82	
REPAIR & MAINTENANCE					
Tractors	ACRE	3.54	1.000	3.54	
Implements	ACRE	2.84	1.000	2.84	
Drip Irrigate	hour	0.78	21.000	16.38	
INTEREST ON OP. CAP.	ACRE	17.57	1.000	<u>17.57</u>	
TOTAL DIRECT EXPENSES				541.98	
RETURNS ABOVE DIRECT EXPENSES				58.02	
FIXED EXPENSES					
Tractors	ACRE	8.12	1.000	8.12	
Implements	ACRE	5.40	1.000	5.40	
Interest on 1st yr	ACRE	352.00	1.000	<u>352.00</u>	
TOTAL FIXED EXPENSES				<u>365.52</u>	
TOTAL SPECIFIED EXPENSES				907.51	
RETURNS ABOVE SPECIFIED EXPENSES				-307.51	

4A. ESTIMATED COSTS AND RETURNS FROM MUSCADINES IN
 Summary of estimated costs and returns per ACRE,
 MISSISSIPPI, 1986, FOURTH YEAR

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
		DOLLARS		DOLLARS	
INCOME					
PROC. MUSCADINES	Lb	0.10	%10000.000	<u>1000.00</u>	
TOTAL INCOME				1000.00	
DIRECT EXPENSES					
FERTILIZER					
FERT 13-13-13	Cwt	8.99	4.000	35.96	
FUNGICIDES					
Phaltan	Lb	2.63	10.000	26.30	
HERBICIDES					
Simazine	Lb	3.38	6.000	20.28	
Surflan	Lb	15.55	6.000	93.30	
INSECTICIDES					
Malathion	Lb	3.57	10.000	35.70	
OTHER					
Copper Sulfate	Lb	1.30	8.000	10.40	
OPERATOR LABOR					
Tractors	hour	4.45	3.260	14.51	
HAND LABOR					
Hand Labor	hour	4.45	40.000	178.00	
Labor (grading)	hour	4.45	1.000	4.45	
Labor (harvest)	hour	4.45	26.000	115.70	
IRRIGATION LABOR					
Drip Irrigate	hour	4.45	8.400	37.38	
DIESEL FUEL					
Tractors	gal	0.94	4.547	4.27	
ELECTRICITY					
Drip Irrigate	kWh	0.15	58.800	8.82	
REPAIR & MAINTENANCE					
Tractors	ACRE	3.54	1.000	3.54	
Implements	ACRE	2.84	1.000	2.84	
Drip Irrigate	hour	0.78	21.000	16.38	
INTEREST ON OP. CAP.	ACRE	20.44	1.000	<u>20.44</u>	
TOTAL DIRECT EXPENSES				628.28	
RETURNS ABOVE DIRECT EXPENSES				371.72	
FIXED EXPENSES					
Tractors	ACRE	8.12	1.000	8.12	
Implements	ACRE	5.40	1.000	5.40	
INTEREST, 1ST 2 YRS	ACRE	406.00	1.000	<u>406.00</u>	
TOTAL FIXED EXPENSES				<u>419.52</u>	
TOTAL SPECIFIED EXPENSES				1047.80	
RETURNS ABOVE SPECIFIED EXPENSES				-47.80	

5A. ESTIMATED COSTS AND RETURNS FROM MUSCADINES IN
 Summary of estimated costs and returns per ACRE,
 MISSISSIPPI, 1986, FIFTH YEAR

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
		DOLLARS		DOLLARS	
INCOME					
PROC. MUSCADINES	Lb	0.10	%16000.000	<u>1600.00</u>	
TOTAL INCOME				1600.00	
DIRECT EXPENSES					
FERTIZILER					
FERT 13-13-13	Cwt	8.99	4.000	35.96	
FUNGICIDES					
Phaltan	Lb	2.63	10.000	26.30	
HERBICIDES					
Simazine	Lb	3.38	6.000	20.28	
Surflan	Lb	15.55	6.000	93.30	
INSECTICIDES					
Malathion	Lb	3.57	10.000	35.70	
OTHER					
Copper Sulfate	Lb	1.30	8.000	10.40	
OPERATOR LABOR					
Tractors	hour	4.45	3.260	14.51	
HAND LABOR					
Hand Labor	hour	4.45	40.000	178.00	
Labor (grading)	hour	4.45	1.000	4.45	
Labor (harvest)	hour	4.45	40.000	178.00	
IRRIGATION LABOR					
Drip Irrigate	hour	4.45	8.400	37.38	
DIESEL FUEL					
Tractors	gal	0.94	4.547	4.27	
ELECTRICITY					
Drip Irrigate	kWh	0.15	58.800	8.82	
REPAIR & MAINTENANCE					
Tractors	ACRE	3.54	1.000	3.54	
Implements	ACRE	2.84	1.000	2.84	
Drip Irrigate	hour	0.78	21.000	16.38	
INTEREST ON OP. CAP.	ACRE	20.44	1.000	<u>20.44</u>	
TOTAL DIRECT EXPENSES				690.58	
RETURNS ABOVE DIRECT EXPENSES				909.42	
FIXED EXPENSES					
Tractors	ACRE	8.12	1.000	8.12	
Implements	ACRE	5.40	1.000	5.40	
Prorated Est. Cost	ACRE	718.00	1.000	<u>718.00</u>	
TOTAL FIXED EXPENSES				<u>731.52</u>	
TOTAL SPECIFIED EXPENSES				1422.10	
RETURNS ABOVE SPECIFIED EXPENSES				177.90	

6A. ESTIMATED COSTS AND RETURNS FROM MUSCADINES IN
 Summary of estimated costs and returns per ACRE,
 MISSISSIPPI, 1986, MATURE VINEYARD

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
		DOLLARS		DOLLARS	
INCOME					
PROC. MUSCADINES	Lb	0.10	%18000.000	<u>1800.00</u>	
TOTAL INCOME				1800.00	
DIRECT EXPENSES					
FERTILIZER					
FERT 13-13-13	Cwt	8.99	4.000	35.96	
FUNGICIDES					
Phaltan	Lb	2.63	10.000	26.30	
HERBICIDES					
Simazine	Lb	3.38	6.000	20.28	
Surflan	Lb	15.55	6.000	93.30	
INSECTICIDES					
Malathion	Lb	3.57	10.000	35.70	
OTHER					
Copper Sulfate	Lb	1.30	8.000	10.40	
OPERATOR LABOR					
Tractors	hour	4.45	3.260	14.51	
HAND LABOR					
Hand Labor	hour	4.45	40.000	178.00	
Labor (grading)	hour	4.45	1.000	4.45	
Labor (harvest)	hour	4.45	45.000	200.25	
IRRIGATION LABOR					
Drip Irrigate	hour	4.45	8.400	37.38	
DIESEL FUEL					
Tractors	gal	0.94	4.547	4.27	
ELECTRICITY					
Drip Irrigate	kWh	0.15	58.800	8.82	
REPAIR & MAINTENANCE					
Tractors	ACRE	3.54	1.000	3.54	
Implements	ACRE	2.84	1.000	2.84	
Drip Irrigate	hour	0.78	21.000	16.38	
INTEREST ON OP. CAP.	ACRE	20.44	1.000	<u>20.44</u>	
TOTAL DIRECT EXPENSES				712.83	
RETURNS ABOVE DIRECT EXPENSES				1087.17	
FIXED EXPENSES					
Tractors	ACRE	8.12	1.000	8.12	
Implements	ACRE	5.40	1.000	5.40	
Prorated Est. Cost	ACRE	718.00	1.000	<u>718.00</u>	
TOTAL FIXED EXPENSES				<u>731.52</u>	
TOTAL SPECIFIED EXPENSES				1444.35	
RETURNS ABOVE SPECIFIED EXPENSES				355.65	

Economic and Social Impacts of Emerging Farm Alternatives: The Muscadine Grape Study

C. Ray Sollie

Someone said, "If it ain't broke, don't fix it." I don't know who first uttered that sage bit of advice. Nor do I know what the person had in mind when these words were spoken. I am, however, fairly certain that what he or she referred to was not contemporary American agriculture. While American Agriculture might not be "broke," it can be described as being "bent out of shape," with some parts being more badly bent than others.

What American agriculture "collided" with to cause this condition seems fairly obvious to some, but less obvious to others. The search for causes, however, is of much less interest to many farmers than the search for remedies, for ways to survive. The hungry man is more interested in filling his belly than in spending time trying to understand the etiology of his hunger.

This conference was organized, as I understand it, for the purpose of exploring possible alternative farm enterprises as a means of helping to eliminate, or at least to ameliorate, some of the negatives that characterize contemporary American agriculture. Given the "out of shape" character of agriculture, including agriculture in the South, are there ways to remove the scars of that "collision?" That is, are there alternative enterprises that might offer some hope to farmers in trouble?

Serious consideration of farm enterprise alternatives calls for comprehensive and systematic feasibility studies, comprehensive because agriculture is an integral and important part of the socioeconomic structure of the South, and systematic because the workability of alternative enterprises for the benefit of farmers depends on an integrated set of variables. That's what this paper is about. It consists of two main parts, a general description of the socioeconomic context within which Southern farmers conduct their operations and a feasibility study of one particular alternative--muscadine grapes.

Muscadine grapes are endemic to the South. They grow prolifically in Southern forests, and many of us who grew up in the region have fond memories of climbing trees (muscadine vines in their natural state climb trees) to gather muscadines which would be used for making jelly and pies. Left in their natural environment, however, muscadines are not feasible as farm enterprise alternatives. They must be domesticated, and they can be domesticated. There are several vineyards now producing muscadines for commercial purposes. They are being used for making wine, and more recently they have been used for making juice, jelly, jam, preserves, syrup, and frozen fruit bars.

What we have then in the muscadine grape as a possible farm enterprise alternative is a raw product that can be converted to several different consumer items, specialty foods though they be. But, given consumer interest in food variety and in health foods (the muscadine grape juice presently being marketed is pure), and given the flexibility of the raw product (now being developed are frozen pies and a muscadine-based barbecue sauce), there seems to be reason to believe the muscadine offers a potential alternative for some farmers.

With one relatively small muscadine based industry already in place, a decision was made to compile a set of data relative to farm enterprise alternatives with the muscadine as a case study. The first part of this report contains information on the socio-economic context of Southern agriculture. Included in this first part is information on selected demographic characteristics (total population by race, sex, and place of residence; age and education; labor force, industry of employed persons, income, class of employed persons, sources of family income by major categories). The second part contains information about agriculture (farms, farmland, size of farms, harvested cropland, irrigated land, acreages of selected crops, market value of products sold, market value by crops and livestock, commercial vegetables, operator tenure, main occupation, off-farm work, use of hired farm labor, and other characteristics).

The data base for this report consists of six contiguous states comprising the southeasternmost part of the South--Alabama, Georgia, Florida, Mississippi, North Carolina, and South Carolina. Sources of data include Census of Population reports, Agricultural Census reports, and other reports.

PART 1

The Socioeconomic Milieu

Population - Table 1

Total population of the six-state area in 1970 was 24,712,495. By individual states the population ranged from a low of 2,216,850 in Mississippi to a high of 6,789,383 in Florida. By 1980 the total population has increased to 30,627,495, an increase of almost 24 percent. Again in 1980, however, there were differences among the states. Florida was the big gainer with a growth rate of 43.6 percent, while Alabama experienced the smallest gain, an increase of 13.1 percent.

As the data in Table 1 show, areas gaining the most in population were urban. Rural nonfarm population experienced about half the growth rate of urban areas, but rural farm population lost close to half of the people it claimed in 1970.

There was very little difference in population growth by racial categories, but when residential classification is controlled it is seen that population loss among rural farm blacks and other races was more than double the loss among rural farm whites.

It is apparent that there is a slight aging trend in the population of the South. Median age advanced from 27.8 in 1970 to 30.4 in 1980, and the number of persons in the six-state area age 65 and older grew by more than 50 percent. Even so, the age group increased its share of the total population by a very small percent--from 10.2 in 1970 to 12.5 in 1980.

Southerners are becoming better educated. The number of persons 25 years old and older reporting eight years or less of formal education dropped by a little more than one-third. There were increases in the remaining three education categories, with the largest increase occurring in the highest level--four or more years of college.

Labor Force - Table 2

While the total population of the six-state area grew by 23 percent, the labor force (16 years old and older) grew by 38 percent. The largest growth occurred, however, in the female segment of the labor force, a change reflecting a national trend. Of greater significance, perhaps, is the fact that more than 40 percent of the growth in the labor force grew from 2.6 million in 1970 to 4.2 million in 1980.

Unemployment rates ranged from a low of 2.3 percent for white males to a high of 8 percent for other-than-white females in 1970. Unemployment rates were higher in 1980 for all groups, ranging from a low of 4.2 percent for white males to a high of 11 percent for other-than-white females.

Income - Table 3

Per capita income for Southerners moved up to 88 percent of the national average during the 10-year period. This resulted largely from new jobs at higher pay that were claimed by educated, middle class, urban workers. However, mean income increased for all workers. As shown in Table 3, mean income for males (18 years old and older) increased by 112.9 percent from 1970 to 1980. Female workers experienced a much greater increase--up by 190.3 percent. Of greater significance than these increases were those experienced by other-than-white workers. Mean income for male workers in this group almost tripled during this period, and female workers experienced an increase of more than 120 percent. Data on mean income for families also showed large increases from 1970 to 1980, but the increases were not uniform across racial categories. Gains experienced by other-than-white families were greater than those experienced by white families, but mean family income for other-than-white families remained lower than that of white families.

Industry of Employed Persons - Table 4

Reflecting growth in the labor force are changes in industry of employed persons. Only two of the 14 classes shown in Table 4 showed decreases--personal service and agriculture. The largest percent increases occurred in industries that employed relatively low numbers of workers. The first four classes listed in Table 4 accounted for 56.7 percent of all employed persons in 1970 and 57.9 percent in 1980. Thus, while the total number of workers in these classes increased by 46.7 percent from 1970 to 1980, they increased their share of the total number of employed persons by only 1.2 percentage points.

Class of Employed Persons - Table 5

Somewhat similar to the data in Table 4 is that found in Table 5. That is, the largest increases (on a percentage basis) occurred in those classes where relatively few workers were employed. Those workers in the private wage and salary class were the most numerous by far, as one would expect. There was, however, a slight downward shift among other-than-white workers in this class, not in numbers but in the proportion of total workers in this racial group. This group also experienced larger percent gains in state and local government jobs than did whites.

Sources of Income - Table 6

Information in Table 6 is what one would expect to find; that is, the main source of income for families was wages and salaries. The sources of family income shown in Table 6 are not mutually exclusive; families could and did report more than one source of income. Even so, wages and salaries constituted the main source by a large margin, 84.3 percent in 1970 and 81.9 percent in 1980. The largest percent increase occurred in the public assistance class (79.7 percent), but families reporting this as a source of income accounted for only 6.3 percent of all reported sources in 1970 and 8.6 percent in 1980.

Summary

In a region that is particularly suited to agriculture in terms of soil, water, climate and growing seasons, there is a growing population. This growth is not occurring in a uniform fashion; that is, the largest growth is in urban areas and in Florida. Rural farm population is decreasing. The population is also growing somewhat older and the people are becoming better educated. Females are increasing their participation in the labor force, and other-than-white racial groups are improving their economic condition, at least in terms of mean income. All of these changes reflect a shift in the socioeconomic milieu of agriculture, but the significance of these changes in terms of their impact on farm enterprise alternatives is not clear.

PART 2**Agriculture****Farms, Farmland, Size - Table 7**

The number of farms in the six-state area decreased 5.6 percent from 1978 to 1982, dropping from almost 291,000 to about 274,000. North Carolina, with close to 82,000 farms in 1978, experienced the largest loss, almost 11 percent. There was a very small increase in Florida, with the of farms moving up from 36,109 in 1978 to 36,352 in 1982.

Along with the decrease in the number of farms, there was a similar decrease in farmland acres, down from about 68 million in 1978 to 63.6 million in 1982. These changes meant that the average size of farms remained stable. However, average size increased in North Carolina where there was a relatively large loss in numbers.

Harvested Cropland and Irrigated Land - Table 8

Farms reporting harvested cropland during this period declined by about 11 percent, but total acres harvested showed a slight increase. There was also a reduction in the number of farms reporting irrigated farmland as well as total acres irrigated. These changes occurred primarily in Florida and North Carolina.

Farms and Acreage of Selected Crops - Table 9

There are indications in the agricultural census data that farmers in the region have been unwilling or unable to adjust into other crops from the traditional grains, cotton and soybeans. Shown in Table 9 are figures for commodities or commodity groups that would likely be alternative enterprises for some farmers. There were sizeable increases in sweet potato acreage, berries, and nursery/greenhouse products, crops that tend to be intensively managed and require only a small part of total cropland. Acres devoted to vegetable production declined by about 16 percent, more than offsetting acreage increases in the three crops listed above.

Market Value of Farm Products Sold - Table 10

Data in Table 10 show sizeable increases in the value of farm products sold in the six-state area, ranging from a low of 43.2 percent in South Carolina to a high of 87.1 percent in Florida. For the area as a whole the increase was 62 percent, but when the change in value of sales is measured in terms of 1972 dollars, the gain experienced by farms in the region turns out to be much smaller, i.e., from about \$9.5 billion to about \$10 billion.

North Carolina farmers, on the average, benefitted more than those in the other five states. That is, average sales per farm were greater in that state, moving up from \$23,239 in 1974 to \$48,093 in 1982. Mississippi farmers were second in this regard, almost doubling their average sales per farm.

Market Value - Crops and Livestock Compared - Table 11

Crops accounted for the largest share of total value of farm products sold in both 1978 and 1982. The spread between crops and livestock increased slightly during this period, with the value of crop sales increasing by 17.6 percent while the value of livestock sales increased by 14.2 percent. Only in Alabama and Georgia did the sale of livestock exceed the value of crops sold. In Alabama, however, the percent increase in crop sales was much greater than the increase in livestock sales--about 20 percent for crops and about 1 percent for livestock.

Georgia's crop sales increased by about 29 percent during this period while livestock sales experienced an increase of about 11 percent. Thus, in both states crop sales gained in terms of total value of farm products sold. On the other hand, growth in livestock sales in North Carolina exceeded growth in crop sales by 8.6 percentage points, i.e. 22.3 for livestock and 13.7 for crops.

These figures reflect some of the diversity characteristic of agriculture in the South. For the six-state area as a whole, crops account for the larger portion of value of products sold, but this does not hold true for each state.

Commercial Vegetables: Proportion of U.S. Acreage - Table 12

Shown in Table 12 are proportionate share of acreage, production, and value of commercial vegetables in the Southeast. For both 1969 and 1979, Southeastern farms accounted for about 15 percent of all acreage in the U.S. devoted to commercial vegetable production. That share dropped by half in 1980 and has remained at that level. However, this drop is explained by a reduction in statistical data on the number of commodities collected by USDA. In terms of volume produced, the share has been somewhat less than acreage planted. The value of commercial vegetables produced, however, has been a higher share of the U.S. total compared to volume produced.

Southeastern Share of U.S. Totals: Selected Crops - Table 13

Figures in Table 13 show the Southeastern share of acreage, volume produced, and value of the U.S. for five major crops. Figures indicate that corn, cotton, and tobacco have all declined since 1969 in acreage, volume produced and value of products sold as a proportion of total U.S. figures. Increases were experienced in grain sorghum, peanuts, and wheat, all of which have been on smaller total acres. While soybeans experienced an increase in overall share in the 1970s and early 1980s, acreage and volume produced declined somewhat by 1983.

There are some limitations in measuring the overall value of horticultural crops in the region. In some states the volume of some crops produced is not adequate for reporting. However, published information does allow some general observations.

Tenure, Off-farm Work, and Occupation - Table 14

While the number of farms has been decreasing, other changes have been occurring. Shown in Table 14 are shifts in tenure status of farm operators, off-farm work, and primary occupation of farm operators.

The number of full owners among farm operators in the six-state area decline was partially offset by increases in the part owner and tenant categories. That is, while the total number of farms decreased by 8.6 percent, the number of full owners decreased by 18.1 percent. The difference was made up by increases in part owners and tenants. Between 1978 and 1982 there were decreases in all three tenure categories ranging from 0.7 percent in full owners to 20.3 percent in the tenant category. By 1982 the full owner class had decreased by another 18 percent, but the part owner group increased by 3.1 percent. Tenants dropped by 17.6 percent.

First collected in 1974 for the agricultural census was information about principal occupation of farm operators. Collection of this information reflected the growth of farm operators reporting off-farm work. As shown in Table 14, the percent of all farm operators reporting something other than farming as their principal occupation has grown. There is, therefore, a growing interdependence between farm and non-farm economies of the region, a condition projected for Southern agriculture by the Southern Growth Policies Board.

Part-time farming is becoming more and more the dominant form of agriculture. This fact is reflected in the growing numbers of farm operators reporting off-farm work. What is more indicative of the growing interdependence, perhaps, is the fact that a large majority of those farm operators who report any off-farm work indicate that they work more than 200 days off the farm. The Southern Growth Policies Board also predicted that farms that survive into the future will be those that rely on non-farm income to support their farming operations.

Hired Farm Labor - Table 15

The number of farms in the six-state area reporting the use of hired farm labor dropped from about 125,00 in 1978 to about 104,000 in 1982, for a decline of 16.7 percent. However, the average number of workers per farm remained fairly stable--7.4 in 1978 and 7.0 in 1982. However, much of this activity occurred on farms with sales of \$10,000 or more per year. This group of farms accounted for 63 percent of all farms using hired labor in 1978, 82.3 percent of the total number of hired workers, and 95.8 percent of the total payroll. Percentages for 1982 were very similar. About 43 percent of all the farms in the area reported using hired farm labor in 1978, but by 1982 this figure had dropped to slightly less than 39 percent. The total number of hired farm workers declined by 22 percent during this period.

CONCLUSIONS

Trends described in this report depict a changing socioeconomic milieu within which Southern farmers conduct their operations of food and fiber production and marketing. Most of the changes are but continuations of long-standing trends whose origins are not of recent vintage, but there has been an acceleration of change in recent years, and competition for markets for farm products has become a "global contest" (Winter, 1986: 2).

Changes that impact on Southern agriculture are local, regional, national, and international, and the nature of that impact on Southern agriculture is not easily specified insofar as the future of Southern agriculture is concerned. Population growth, one of the main changes in the South in recent years, means more demand for consumer products and services--food, housing, education, transportation, and the like. It also means more jobs are needed, but it is doubtful that a significant number of those jobs will be found in the fields of Southern farms.

Yet, given a growing population, who will meet the additional requirements for food? Southern farmers have depended more on basic field crops such as corn, cotton, and soybeans than on commercial vegetable production for their livelihood. But the viability of such crops for sustaining Southern agriculture has suffered international markets from the growing productivity of farmers in other lands.

The question of farm enterprise alternatives is of much interest to those concerned about the future of Southern agriculture, not the least of whom are the farmers themselves. For many of these, however, the concern is more heavily focused on short-term survival than on future viability.

Not only is there a growing population in the South, but the character of the population is changing. Southerners are growing older, and they are improving their educational achievements. They are taking more of their meals outside the home and they are buying more of the food products that are more quickly and more easily prepared. There is more concern for so-called health foods. Thus, consumer tastes are changing.

All of these changes, viewed as a configuration of interacting forces that have implications for Southern farmers, can be seen as a set of opportunities for agriculture in the South.

Table 1
Demographic Characteristics*

Population	1970	1980	% Change
Total	24,712,495	30,627,501	23.9
Urban	14,750,197	19,663,873	33.3
Rural Nonfarm	8,866,243	10,369,303	17.0
Rural Farm	1,096,055	594,200	-45.8
Age			
Median Age	27.8	30.4	
65 And Older	2,519,574	3,817,972	51.5
Education (% 25 years of age and older)			
8 Years Or Less	34.6	22.3	
High School Graduate	25.0	30.5	
1 - 3 Years of College	9.3	14.3	
4 Years or more College	9.0	13.7	

*Data in Tables 1-6 are from U. S. Census of Population reports.

**Table 2
Labor Force**

Labor Force (16 years and older)	1970	1980	% Change
Total	9,789,720	13,507,539	38.0
Male	6,014,287	7,541,145	25.4
Female	3,775,433	5,966,394	58.0
 Employed			
Total	9,024,258	12,715,194	40.9
Male	5,448,430	7,149,440	31.2
Female	3,575,828	5,565,754	55.6
 Percent Unemployed			
Total	3.6	5.9	
Male	2.9	5.2	
Female	5.0	6.7	
Whites			
Total	3.0	4.7	
Male	2.3	4.2	
Female	5.0	6.7	
Other Races			
Total	6.1	10.4	
Male	5.0	10.5	
Female	8.0	12.8	

Table 3
Income

Mean Income (18 years old and older)	1970	1980	% Change
Male	\$ 6,346	\$13,552	112.9
Female	2,122	6,161	190.3
Mean Income - Families	9,056	19,965	120.5
Married couples	9,707	21,768	124.2
Female head	5,077	10,638	109.5
Mean Income by Race			
Whites			
Male	7,051	14,795	109.8
Female	2,420	6,234	157.6
Others			
Male	3,386	8,082	138.7
Female	1,903	5,916	210.9
Mean Income - Families by Race			
Whites	10,203	22,072	116.3
Married couples	10,646	23,298	118.0
Female head	6,280	12,757	103.1
Others	8,859	19,892	124.5
Married couples	9,519	21,746	128.4
Female head	4,913	10,811	120.0

Table 4
Industry of Employed Persons
(16 years old and older)

Industry - Percent employed in:	1970	1980	% Change
Manufacturing, nondurable	16.5	13.0	13.4
Professional services	15.7	18.6	70.0
Retail trade	13.9	16.2	67.8
Manufacturing, durable	10.6	10.1	36.5
Construction	7.5	7.2	37.4
Personal services	6.8	3.9	-17.9
Transportation	6.6	7.2	56.2
Public administration	5.0	5.2	48.7
Agriculture	4.9	3.3	-3.4
Finance	4.5	5.7	81.9
Wholesale trade	4.1	4.3	50.9
Business and repair services	2.8	3.7	93.2
Entertainment	0.8	1.1	98.3
Mining	0.4	0.5	63.8

Table 5
Class of Employed Persons
(16 years old and older)

Class - Percent of employed persons	1970	1980	% Change
Private wage and salary	76.0	75.7	39.7
Government, Federal	4.1	3.8	28.1
Government, State	4.4	5.7	82.0
Government, Local	7.1	8.1	60.1
Self-employed	7.8	6.6	19.6
Class - Percent of employed persons by race			
Whites			
Private wage and salary	75.7	76.0	42.3
Government, Federal	4.2	3.4	14.8
Government, State	4.4	5.1	65.8
Government, Local	6.7	7.2	53.2
Self-employed	8.8	7.6	21.8
Others			
Private wage and salary	77.4	72.6	29.6
Government, Federal	3.7	5.0	87.6
Government, State	4.3	7.7	145.8
Government, Local	8.8	11.5	80.2
Self-employed	4.0	2.9	0.3

Table 6
Sources of Family Income

	1970	1980	% Change
Total Number of Families	6,291,693	8,220,304	30.7
Sources of Income			
Wages & salaries	5,305,868	6,734,379	26.9
Urban	3,207,940	4,277,248	33.3
Rural	2,097,928	2,457,131	17.1
Nonfarm self-emp.	636,622	823,488	29.4
Urban	382,300	506,660	32.5
Rural	254,322	316,828	24.6
Farm self-emp.	292,765	280,268	-4.3
Urban	37,751	59,966	58.8
Rural	255,014	220,302	-13.6
Social Security	1,385,948	2,127,264	53.5
Urban	824,725	1,373,589	66.6
Rural	561,223	753,675	34.3
Public Assistance	395,145	710,201	79.7
Urban	204,694	426,360	108.3
Rural	190,451	283,841	49.0
Other	1,689,878	1,975,621	16.9
Urban	1,208,806	1,307,291	8.1
Rural	481,072	668,330	38.9

Table 7
Farms, Farmland, and Average Size*

Six-State Region		Farms	Farmland	Average Size
	1978	290,810	67,838,196	233
	1982	274,566	63,638,930	232
Alabama	1978	50,788	11,147,825	220
	1982	48,448	10,200,547	211
Florida	1978	36,109	13,016,288	360
	1982	36,352	12,814,216	353
Georgia	1978	51,405	13,416,833	261
	1982	49,630	12,291,885	248
Mississippi	1978	44,104	13,210,879	300
	1982	42,415	12,421,651	293
North Carolina	1978	81,706	10,998,652	135
	1982	72,792	10,320,832	142
South Carolina	1978	26,706	6,045,719	226
	1982	14,929	5,589,799	224

*Data in Tables 7-15 are from Census of Agriculture reports.

Table 8
Harvested Cropland and Irrigated Land

	Harvested Cropland			
	Percent All Farms		Percent Cropland	
	1978	1982	1978	1982
Six-state Region	80.4	75.8	34.8	37.1
Alabama	73.4	68.8	30.2	32.0
Florida	72.6	67.1	20.7	20.6
Georgia	76.5	71.8	34.9	38.7
Mississippi	77.5	73.4	44.3	46.7
North Carolina	90.4	87.1	40.6	44.2
South Carolina	85.6	80.8	41.8	44.2
			Irrigated Land	
Six-state Region	8.2	8.2	4.3	4.4
Alabama	2.0	2.1	0.5	0.6
Florida	28.7	29.0	15.2	12.4
Georgia	8.9	8.9	3.4	4.7
Mississippi	2.6	3.4	2.3	3.4
North Carolina	7.4	5.5	0.8	0.8
South Carolina	2.9	3.8	0.5	1.4

Table 9
Farms and Acreage of Selected Crops

Crops	Farms			Acreage		% Change
	1978	1982	Change	1978	1982	
Irish Potatoes	3,627	3,564	-1.7	66,103	61,800	- 6.5
Sweet Potatoes	3,878	3,853	-0.6	51,500	65,691	27.0
Vegetables	15,877	14,443	-9.0	558,425	467,518	-16.3
Orchards	24,985	23,259	-6.9	1,211,678	1,216,523	4.0
Berries	1,486	1,425	-4.1	7,371	10,429	41.5
Nursery/ Greenhouse	6,786	6,872	1.2	77,877	85,871	10.1

Table 10
Market Value of Farm Products Sold
Total Sales (\$1,000)

	1974	1978	1982	% Change 74-82
Six-state Region	8,907,674	12,396,452	14,411,732	61.8
Alabama	1,122,481	1,531,432	1,704,160	51.8
Florida	1,898,658	3,025,633	3,552,103	87.1
Georgia	1,859,780	2,340,505	2,767,679	48.8
Mississippi	1,229,033	1,663,830	1,918,486	56.1
North Carolina	2,121,226	2,980,078	3,500,750	65.0
South Carolina	676,674	854,974	968,554	43.2
	Average Per Farm			
Six-state Region	27,991	42,627	53,430	87.3
Alabama	19,805	30,158	35,175	77.6
Florida	58,481	83,792	96,889	65.7
Georgia	33,869	45,531	55,766	64.7
Mississippi	22,921	37,725	45,231	97.3
North Carolina	23,239	36,473	48,093	106.9
South Carolina	23,108	32,014	38,853	68.1

Table 11
Market Value: Crops and Livestock

	1978	1982	%
Total Value of Farm Products Sold (\$1,000)	12,396,452	14,411,732	Change 16.3
Percent of Total Value Accounted for by:			
Crops	54.4	55.1	17.6
Livestock	45.6	44.9	14.2

Table 12
Commercial Vegetables: Proportion of U. S. Acreage, Volume, and Value in the Southeast

	1969	1979	1980	1981	1982	1983
Acreage	15.7	15.0	7.5	7.4	7.2	7.6
Volume	11.9	10.8	7.0	7.0	6.3	7.1
Value	17.3	19.2	14.7	13.2	14.8	16.2

Table 13
Southeastern Share of U. S. Totals:
Acreage, Volume, and Value of Selected Crops

Crops	1969	1979	1980	1981	1982	1983
Corn:						
Acreage	8.1	6.5	6.0	6.4	4.7	5.4
Volume	4.2	4.1	3.3	3.7	3.7	4.3
Value	4.6	4.6	11.6	4.0	3.4	4.6
Tobacco:						
Acreage	57.8	55.4	55.8	52.0	48.5	48.6
Volume	54.2	56.6	57.1	52.8	47.7	54.2
Value	54.2	56.6	57.1	57.9	47.8	54.2
Soybeans:						
Acreage	13.2	17.6	17.8	17.7	17.6	16.2
Volume	11.2	14.6	10.6	13.0	13.8	11.9
Value	11.3	14.6	10.6	13.0	13.8	11.9
Cotton:						
Acreage:	23.3	13.0	13.6	14.2	16.6	15.5
Volume	23.8	14.2	14.7	15.5	22.8	16.8
Value	24.4	13.5	15.3	16.0	22.8	16.8
Grain Sorghum:						
Acreage	0.9	1.5	1.8	2.8	2.9	4.7
Volume	0.7	1.1	1.2	1.7	2.3	4.5
Value	0.7	1.2	1.2	1.7	1.9	4.6

Table 14
Operator Tenure, Occupation and
Off-farm Work

	1974	1978	1982	% Change 74-78
Tenure				
Full owner	68.6	61.5	59.4	-18.1
Part owner	22.4	28.4	32.7	3.1
Tenant	9.0	10.1	7.9	-17.8
Occupation				
Farming	54.7	48.1	46.0	-25.8
Other	45.3	51.9	54.0	5.0
Off-farm Work				
None	40.7	40.2	38.8	- 9.0
Any	59.3	59.8	61.2	1.9
200 days or more	69.5	69.0	70.9	3.9

Table 15
Hired Farm Labor

	All farms		%
	1978	1982	
Number of farms	124,971	103,981	-16.7
Number of workers	930,961	724,324	-22.2
Payroll (\$1,000)	\$1,041,286	1,179,971	13.3
Farms with \$10,000+ Sales			
Number of workers	78,726	63,685	-19.1
Number of workers	766,465	594,607	-22.4
Payroll (\$1,000)	\$997,761	1,137,488	14.0

Development of Alternative Beef Production Systems for the Southeast Using Cotton and Poultry Industry Wastes: Summary Report

**Richard Russell, J. Crews, J. J. Molnar, S. Smutko,
B. G. Ruffin, and P. Duffy**

The extensive fescue acreage in the southeastern United States overlaps major regions of poultry and cotton production. The purpose of this project was to develop an adoptable technology package to improve the profitability of the beef industry associated with the fescue acreage of the Southeast by using by-products of the poultry and cotton industries as inputs to the beef industry. A resource allocation model determined that broiler litter would not be limited, but the supply of whole cottonseed within Alabama is inadequate for use by all beef producers. Linear programming was used to select systems that optimized profit. All systems had initial constraints of 60 cow-calf units and 200 acres of fescue. Over 100 different management activities were included in the linear program. The conventional fescue-based system without using by-products returned approximately \$31,000/year on land, management, and capital. Including broiler litter and corn without cottonseed as supplements to fescue increased returns to approximately \$68,000/year, and including broiler litter, milo, and cottonseed as supplements increased returns to approximately \$78,000/year. Focus group interviews with farmers indicate farmers would adopt the proposed beef production systems. Farmers, however, did request guidelines from the extension service that could be tailored to their specific situations. The details of this report will be used in extension programs. The project provides a framework for development of additional production systems.

INTRODUCTION

The beef industry in the Southeast primarily is restricted to cow/calf and stocker operations with relatively few cattle fattened for slaughter. This tradition matches the resources of the region of relative abundance of forage and scarcity of grains.

Tall fescue is a cool-season perennial forage grown primarily in the Southeast and is the major to predominant forage in much of the Southeast. The popularity of fescue results from its relatively inexpensive establishment and maintenance costs, its long growing season, and its good yield of nutrients per acre. Other important forages are bahia and bermuda grasses which are warm-season perennials.

There are large areas among fescue, poultry, and cotton producing areas within the Southeast. This arrangement allows for effective transfer of poultry and cotton wastes to the fescue-based beef industry. Although poultry litter and cottonseed have been fed to beef cattle for many years, little effort has been made on how to optimally integrate these by-products into beef production systems.

Despite the unaesthetic image of poultry litter, litter is a very good cattle feed that has a chemical analysis similar to alfalfa. The combination of litter and cottonseed, when incorporated into beef production systems, can reduce by up to 70 percent the need for grains in any phase of beef production. This reduction in the need for grain allows for expansion, not only in magnitude, but also in scope of beef production in the grain-short Southeast. The expansion in scope gives producers more options in the types of production systems that can be considered.

There are several factors that must be considered in developing a production system. Several important considerations are: what are the availability and cost of resources; what are the options for on-farm use of available resources; how are systems that optimize profit selected; what is the adoptability of the system by producers, and how will producers be made aware of the system? This project examined availability of resources and formulated multiple systems for using these resources for each phase of beef production. These multiple systems were organized as subsystems in the framework of a linear program, and the combination of subsystems that maximized profit was selected. The adoptability of the systems was examined, and an extension plan was developed.

This project focused on a 19-county region of North Alabama. Within the selected region there exist degrees of overlap of fescue-base beef production, poultry production, and cotton production.

REGIONAL RESOURCE MODEL

A regional resource linear programming model was developed to find the least-cost allocation of poultry litter and cottonseed from production centers to beef production areas. Because of data limitations and size constraints in developing the linear programming model, production and consumption areas were defined by the 19 counties in the region.

County-level data from 1984 were used to develop demand and supply of cottonseed and chicken litter. A truck transport cost of \$1.75 per mile was used in developing transportation charges. With a 25 ton cargo, this would result in a transportation charge of \$0.07 per mile per ton of cargo. Average transportation costs for moving chicken litter and cottonseed to cattle producers in a given county were developed using a formula that accounted for both distance and road quality.

Model results indicate that the regional production of chicken litter is sufficient for all cattle in the region to be placed on this feeding system. Maximum possible cotton ginnings, however, are only sufficient to supply 93 percent of the beef cattle. Because cottonseed is a nationally traded product, additional cottonseed could be brought into the area.

Average transportation costs in the region were \$1.93 per ton of chicken litter and \$2.90 per ton of cottonseed. The transportation cost of chicken litter is the lower limit of farm-level cost of this resource. Additional costs would be incurred if poultry producers charged beef producers for poultry litter. Because cottonseed has value in other uses, the transportation costs in this case do not represent a minimum cost but rather would be added to the price.

ADOPTABILITY OF THE CONCEPT BY PRODUCERS

Focus group interviews were held in Cullman and Franklin counties on Dec. 18 and 19, 1986. A focus group interview is a group discussion intended to explore the effects of a given phenomenon experienced by the respondents. In this case, the topic was full-cycle cattle feeding through the use of chicken litter as a feeding supplement.

The County-Agent Coordinator in each county contacted selected cattle producers and invited them to attend the meeting. The farmers were all beef cattle producers who had knowledge or experience with the use of litter in beef cattle production. Of their 16 farmers, only one had discontinued the use of litter as a feed supplement; another was not presently feeding cattle but planned to resume using litter as a supplement.

Two animal scientists and an economist were present during the interviews for technical backstopping purposes. But the point of the meetings was to explore the problems, advantages, and likelihood of implementing an intensified production system.

All respondents were white. Most were late middle age, and two women attended (a producer's wife and daughter).

Results from the focus group interviews suggest that farmers have no clear technical basis for the way they are feeding litter to cattle. The use of litter as a feed supplement is a long-standing practice. Some maintain it has been going on for over 30 years. Experiment station research in a number of states provides some basis and guidelines for litter feeding, yet few farmers were systematically following any external recommendations.

One major implication of the focus group results is that the extension advice must be tailored to the facilities and labor situation on each individual farm. When optimum feed preparation strategies are identified, a clear base will be established for identifying production and marketing strategies for beef cattle using litter as a supplement.

Because facilities and labor requirements seem to be limiting resources for the effective use of litter, farm reservations about rates of gain are understandable.

It has yet to be demonstrated that litter-fed cattle do in fact gain at lesser rates. Even if differences in gain are demonstrated, any shortcomings of litter fed cattle may be offset by the economics of litter.

Litter supplement feeding is clearly a reasonable option for many north Alabama farmers. Most producers we interviewed seemed to realize this. They appeared to lack (or refused to acknowledge) clear guidelines for its use, potentials, and limitations. A great deal of uncertainty seemed to surround the most desirable feed preparation and handling procedures. Technical assistance in this area should recognize a farm's facility and labor situation as key variables in conditioning recommendations about litter feeding to beef cattle.

FEEDING SYSTEMS CONSIDERED

Potential feeding systems were developed for cow/calf, stocker, and finishing phases of beef production. The systems were based on spring calving that produces stocker cattle in the fall. Within each phase, options were available that used fescue only, fescue with litter, or fescue, litter and whole cottonseed. The fescue-supplemented options allowed for various levels of increased production intensity relative to the fescue only systems.

In the cow/calf phase, the conventional system was one cow/calf unit per acre of fescue. Approximately 75 percent of the fescue acreage was grazed, and 25 percent was harvested as hay to be fed during those times when fescue growth rate was inadequate to provide sufficient TDN. Alternate cow/calf systems provided a 70 percent TDN supplemental complete feed composed of litter and corn or litter, milo, and whole cottonseed. The litter-based supplements, fed as extenders to fescue grazing, allowed stocking rates to be increased to 1.5, 2.0, or 2.5 cow/calf units per acre depending on the amount of supplement fed. All cow/calf systems produced 400-pound steers and 375-pound heifers weaned in the fall.

The stocker phase started with weaned calves, purchased or raised, in the fall. The conventional system grazed calves at 1.3 head/acre of fescue and produced 800-pound or 734-pound feeders, steers and heifers respectively, in the early summer. In the alternate systems, the 70 percent TDN supplements were offered in addition to grazing fescue. The alternate systems provided the flexibility to produce feeder calves in early spring or slaughter weight cattle (1200-pound steers or 1060- to 1070-pound heifers) in early summer. A second group of purchased stockers could be carried to feeder weight on the same fescue acreage if the first group of stockers were removed as feeder cattle in early spring. Cattle could be stocked at two, three, four, or five head/acre of fescue, increasing the amount of supplemental feed as stocking rate increased.

Producing slaughter weight cattle is not a conventional practice in the Southeast. Two 77 percent TDN diets were developed for feeding cattle in drylot. One diet was a mixture of litter, milo, and whole cottonseed, and the other was a mixture of litter, corn, whole cottonseed, and chopped fescue hay. Options were available to feed cattle in drylot beginning with either weaned calves or feeder weight cattle. Drylot feeding systems produced slaughter weight cattle. Compositions of the litter-based supplements are listed in Tables 1 through 4.

PROFIT MAXIMIZATION BY LINEAR PROGRAMMING

The objective of this stage of the analysis was to develop farm-level profit-maximization models of a beef cattle operation in north Alabama. The models demonstrated the relative profitability of alternative feeding systems using cotton and poultry wastes versus conventional management systems. The feeding systems and management practices incorporated in the models permitted full-cycle cattle production profitably yielding 1200-pound finished cattle, as well as 400-pound stockers and 800-pound feeders as are conventionally produced in this region of the state.

The solutions to the linear programming models clearly demonstrated that the potential returns to land, management, and capital of a beef cattle enterprise can be increased using poultry and cotton wastes as feed supplements in full-cycle beef production assuming best management practices. The milo-based feeding system, because of its particular mix of ingredients and lower grain price as compared to corn, proved most profitable. The cheaper feed mix allowed 99 more cattle to come into solution than the corn model, using dry lot feeding to support the additional head. The corn model utilized feed-supplemented grazing systems exclusively. Returns to the farm enterprise totalled \$77,652.62 using the milo-based supplement in full-cycle production, \$67,613.13 with the corn-based supplement, and only \$30,933.02 for the conventional brood cow-stocker production system. The systems are outlined in Figures 1 through 3.

However, to maximize returns at the levels that came into solution, the alternative feeding systems required much greater inputs of labor and capital than did the conventional system. The milo model brought all but 75.2 hours of full-time labor into solution and required an additional 1,848.7 hours of hired labor in the fall and winter months. Assuming additional labor is employed at 40 hours per week, 1.3 workers must be hired in September through October, 1.7 in November through December, and 2.3 in January through February in order to realize the returns produced in the model.

The corn-based production system was relatively less labor intensive. Full-time labor was not used for 357.8 hours, and 1,423.9 hours of additional labor were required in the fall and winter. In terms of man-days, one additional worker is required in September through October, 1.2 in November through December, and 2.0 in January through February.

The conventional beef production system required only 1,456 hours of full-time labor, leaving 1,040 hours available for other uses. Furthermore, only 187.7 additional hours of labor were hired, .05 worker at 40 hours per week in November through December, and 0.5 worker in January through February.

Both alternative feeding system models were constrained by capital requirements. All \$100,000 in operating capital, and \$35,000 in brood cow investment capital were consumed in maximizing returns in the two models. If more operating capital were available, each additional dollar over \$100,000 would add \$0.44 to the returns from the milo system, and \$0.29 to the corn system. Each additional dollar of investment capital would add \$0.47 in returns to the milo system, and \$0.36 to the corn system. Alternatively, the conventional system required only \$59,736.36 in operating capital, and because no brood cows were purchased, no investment capital was used.

The milo model was reasonably insensitive to changes in price of all feed inputs; however, an upward change in the price of litter will affect the outcome of the corn-based system. A price of \$25 per ton of litter was used in the two models. Increasing the price above \$27.98 will change

Table 1. Feed Mix for a 70% TDN Litter-Based Complete Feed Without Whole Cottonseed

Ingredient	% Dry Weight	\$ As Fed
Broiler Litter	51	55
Corn Grain, Cracked	49	45

Supplement with vitamin A to 2200 IU/KG

Table 2. Feed Mix of a 70% TDN Litter-Based Complete Feed Containing Whole Cottonseed

Ingredient	% Dry Weight	% As Fed
Broiler Litter	50	55
Cottonseed	29	26
Milo, Ground	19	17
Limestone	2	2

Supplement with vitamin A to 2200 IU/KG

Table 3. Feed Mix for a 77% Litter/Corn-Based Complete Feed for Drylot Cattle

Ingredient	% Dry Weight	% As Fed
Broiler Litter	29	34
Corn Grain, Cracked	32	31
Whole Cottonseed	30	28
Fescue Hay, Chopped	6	6
Limestone	2	2

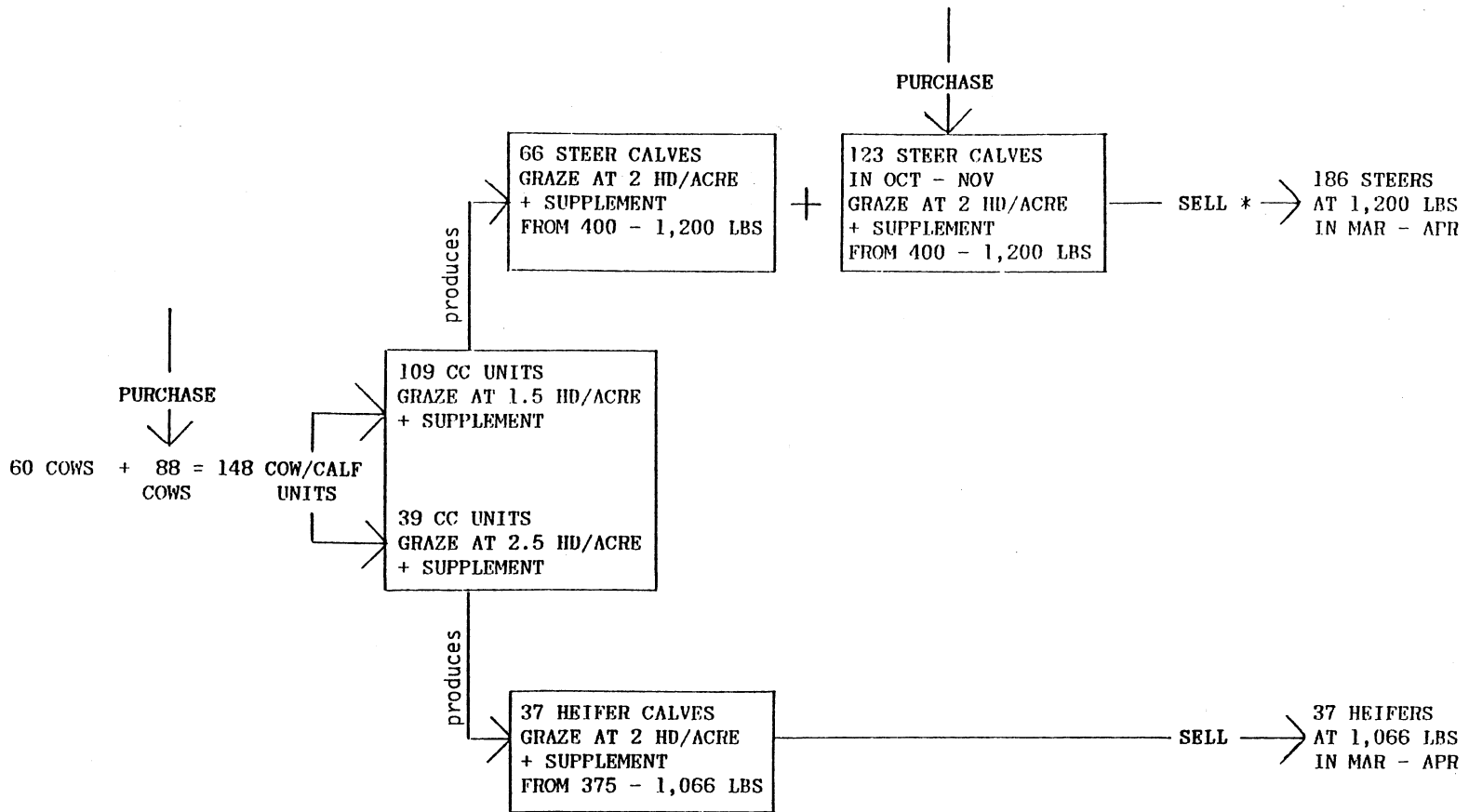
Supplement to 2200 IU vitamin A/KG

Table 4. Feed Mix for a 77% TDN Litter/Milo-Based Complete Feed for Drylot Cattle

Ingredient	% Dry Weight	% As Fed
Milo, Ground	45	44
Broiler Litter	25	28
Whole Cottonseed	29	26
Limestone	2	1

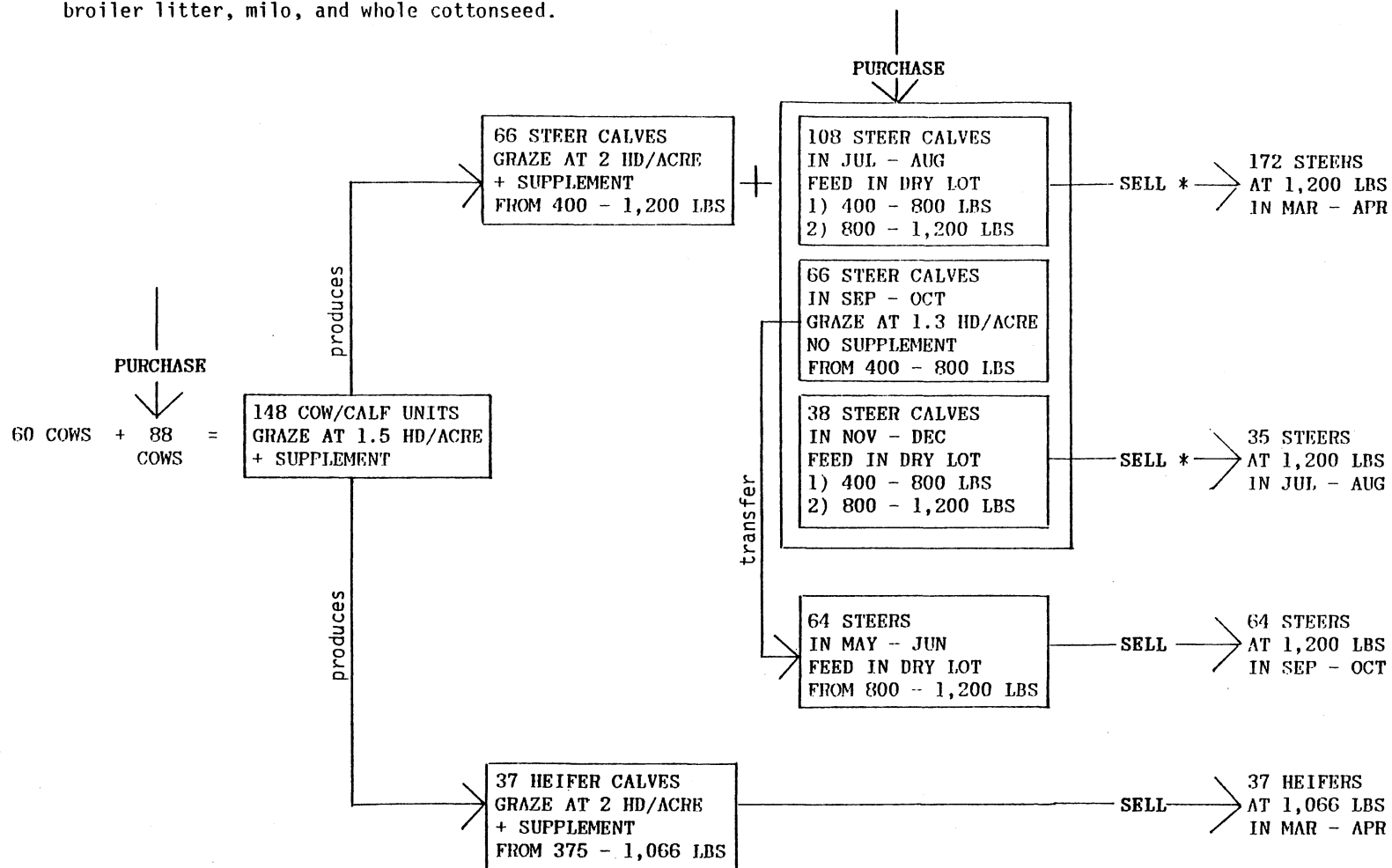
Supplement with vitamin A to 2200 IU/KG

Figure 1. System using fescue pasture, broiler litter, and corn.



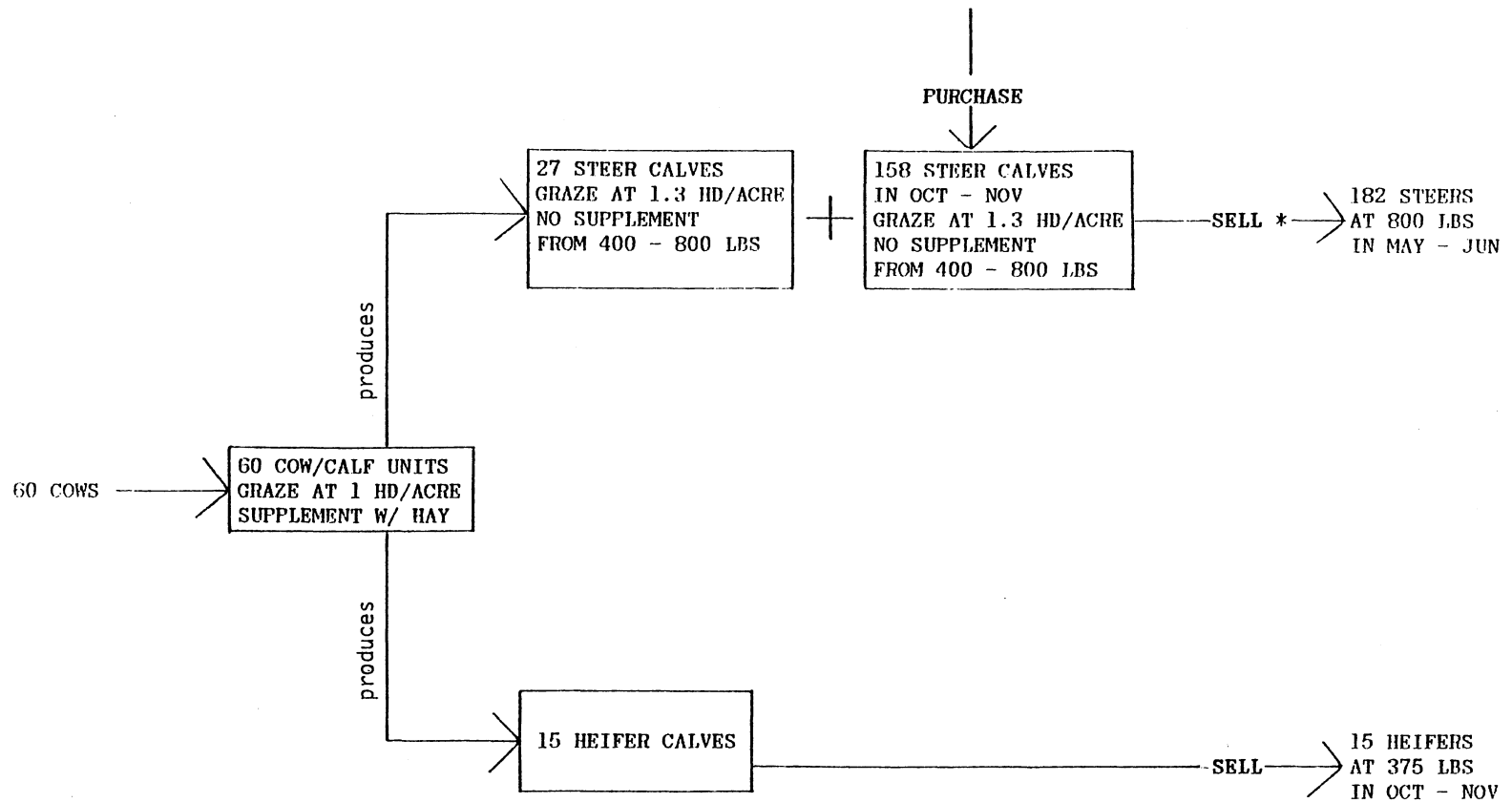
* Number of cattle sold reflects
2% death loss of purchased animals.

Figure 2. System using fescue pasture, broiler litter, milo, and whole cottonseed.



* Number of cattle transferred and sold reflects 2% death loss of purchased animals.

Figure 3. Conventional system.



* Number of cattle sold reflects
2% death loss of purchased animals.

the solution value (returns to land, management, and capital) in the corn model, and above \$34 per ton profit maximization occurs when some cattle are fed in a dry lot and sold as feeders rather than all at slaughter weight. Litter can vary from about \$44 to \$15.30 per ton in the milo system with a change in solution value.

Increasing the price of corn up to about \$0.05 per pound will lower the solution value in the corn model without altering any of the activities coming into solution. Beyond that price, it is most profitable to feed some cattle in a dry lot and sell them as feeders instead of bringing all head to slaughter weight. At a corn price of approximately \$0.01 per pound, it becomes most profitable to feed part of the stocker steer herd in a dry lot and sell at slaughter weight.

Although the solution value decreases when milo is priced higher than \$0.036 per pound, no change in production activities occur until the price is approximately doubled at \$0.06 per pound. At this higher price, profit maximization will occur when some of the stocker steers are grazed to feeder weight and sold. At \$0.027 per pound the solution value begins to increase, but no new activities come into solution even when the price is halved to \$0.015 per pound.

GENERAL DISCUSSION

This project provides an optimistic projection of the beef industry in the Southeast. Although conventional feed grains are limited in the region, this scarcity can be overcome by feeding broiler litter and whole cottonseed primarily as a supplement to the abundant forage produced in the region. Even in the most grain-intensive phase of the beef industry, the need for grain can be reduced by up to 70 percent.

A potential limitation is that the resource allocation model was not dynamic, i.e., it was based on current production and did not consider expansion of the beef industry that would occur if producers adopted the alternate systems described in the project. The 19-county study region currently produces an ample supply of litter for complete adoption of either alternative system, but only about 10 percent of the cottonseed currently is produced that would be necessary for adoption of the litter/milo alternative. Thus it would be necessary to buy cottonseed from other areas or adopt a combination of the litter/milo and litter/corn alternatives. The litter/corn alternative does not require cottonseed. Because of the stability of the LP solutions of feed prices, it is unlikely that adoption dynamics would alter the recommendations resulting from this project.

Adoptability of the alternative systems is expected to be good. Producers are very willing to feed litter, but are searching for guidelines on how to incorporate litter feeding into a farming system. The project provides generalized guidelines. Adopting an alternative system would require only a small investment for additional equipment.

Another potential limitation of the project is that the large number of management activities assembled for the linear programs make verification of each activity with data prohibitively expensive. In the few instances where analogous data are available, the model predicts similar performance. Because of the lack of verification, the models were constructed conservatively, i.e., all rounding was in the "pessimistic" direction.

Nutrient requirements and feed composition were based on NRC estimates except for litter. Nutrient composition of litter was "devalued" to reflect more accurately the quality of litter harvested in Alabama.

The conservative nature of the models are amplified by the fact that the base data used in calculating the feeding systems were from fungus-infected fescue grazed at minimal stocking rates. Better performance could be expected if fungus-free fescue were used. The alternative systems also incorporate heavier stocking rates and provide a supplement. Even if fungus-infected fescue were used, the toxicity likely would be reduced in the alternative systems. Toxic effects of the fungus are related directly to the concentration in the total diet. The supplemental feeding would dilute the effect of the fungus. The fungus is concentrated in the fescue seed

heads. Because the fescue is stocked more heavily in the alternative systems, the formation of seed heads would be reduced. Litter is utilized more effectively by grazing cattle than cattle fed litter while in drylot. This positive interaction between litter and pasture also was not incorporated into the models.

The alternative systems have the potential to more than double returns to the sum of land, management, and capital per 200 acre unit. The alternative systems, however, do require more management and capital per 200 acre unit than does a conventional system. Full adoption of the alternative models on Alabama's fescue acreage not only would provide more profit for the operator but would provide 3500 to 4500 full-time jobs at the farm level. The more than one million slaughter weight cattle that could be produced would nearly quadruple the packing industry in Alabama, creating many more jobs in the marketing, transporting, processing, and distributing segments of the beef industry.

The Basis of Buyer and Grower Relationships in The Fruit and Vegetable Market

Grace Zilverberg and Milton Coughenour

ABSTRACT

The fruit and vegetable distribution system is highly complex. Unpredictable weather conditions, high perishability of product, variable prices, and the wide distribution of production areas and marketing agents create a high level of uncertainty and risk in the wholesale market. Transaction cost analysis predicts that in complex and uncertain economic systems, actors will repeatedly exchange goods with the same trading partner. This study is a beginning effort to understand how these long-term exchange relationships based on trust are formed, how they reduce transaction costs and risk, and how they may minimize unacceptable "opportunistic" behavior in the absence of contracts.

INTRODUCTION

According to a recent study of fruit and vegetable production in eleven southeastern states, production of such crops is relatively small in Kentucky. Less than 1.5 percent of the acreage of fruits and vegetables for both the fresh and processed markets and only slightly more than .5 percent for the fresh market was in Kentucky in 1983 (Mook and Love 1984). In view of the decreasing domestic demand for tobacco, Kentucky's primary cash crop, decreasing price supports, and increasing Third World competition, both growers and politicians are interested in expanding Kentucky's share of the fruit and vegetable market.

In order to help develop fruit and vegetable production in Kentucky, the federal government has funded a three-year, multi-disciplinary, research project at the University of Kentucky which began in September 1986. The project is a cooperative research effort by the Departments of Agricultural Economics, Horticulture and Sociology. It aims to identify market opportunities, assess human and biophysical resources, and develop technologies needed to exploit opportunities and expand Kentucky's share of the market. The study we report on here is one aspect of the overall project. We look at the exchange relationships that develop between buyers and growers in the fresh wholesale fruit and vegetable market and attempt to explain their socio-economic basis.

The fresh wholesale fruit and vegetable market is marked by complexity and uncertainty. Weather conditions are unpredictable, the products are highly perishable, prices change rapidly, and production areas are distributed widely across geographical space. Thousands of individual producers and dealers and dozens of different products require specific and unique transactions, and often buyers and growers are not equally informed about supply, demand, and prices.

In this complex and uncertain market, we find that buyers and growers tend to deal repeatedly with the same trading partner. The relationships that form between them tend to be long-term and to embody a substantial amount of trust. We also find that, within limits, dependability appears to be more important than price (see also Law and Ellerman 1983:6). We suggest that repeated exchanges with trusted partners over long periods of time is a rational strategy to cope with complexity and to reduce transaction costs. It also minimizes risk in this uncertain market in which there are numerous opportunities for unfair trading behavior that can be costly (Plattner 1985:144).

The objectives, then, of this study, are (1) to identify the actors, both buyers and growers, participating in the fresh wholesale fruit and vegetable market; (2) to describe the rules, procedures, and understandings that pertain to the exchange relationship; and (3) to explain the theoretical and practical bases for these relationships.

In this paper we will first discuss some of the explanations the transactional cost analysis approach has for the phenomenon of long-term exchange relationships in complex markets. Second, we will describe our methods for gathering the data. Finally, we will describe some of the early results of the study.

It is important to note that at this early stage of research the present findings are tentative. All of the actors have not been identified, the rules and procedures pertaining to exchange relationships in the fresh wholesale market have only begun to emerge, and the conceptual and practical bases for those relationships that we present here will undoubtedly undergo some modification over the next few years. At present, we have more questions than answers.

Questions and Partial Theoretical Answers

Even at this early stage of research, it is clear that buyers and growers in the fresh wholesale fruit and vegetable market tend to form long-term trading relationships with each other based on trust. The questions, then, are why do buyers and growers form these relationships? What influence does this have on the structure of the market? And what does it mean for new growers trying to enter the market?

One explanation for this phenomenon comes from transaction cost analysis. Transaction cost analysis is an amalgam of economics, organization theory, aspects of contract law (Williamson 1981:573), and anthropology (e.g., Acheson 1985; Plattner 1982, 1983, 1985). This approach takes transaction costs as the basic unit of analysis and makes two assumptions: (1) that "human agents are subject to bounded rationality" and (2) "that at least some agents are given to opportunism" (Williamson 1981:553).

Simply stated, "bounded rationality" means that human beings devise "rules of thumb," "standard operating procedures," or decision rules that simplify manipulating information in complex and uncertain economic systems (e.g., March and Simon 1958; Cyert and March 1963; Simon 1978). According to transactional cost analysis theorists, humans will adopt two strategies to reduce complexity and uncertainty. They will organize hierarchically (Williamson 1981:551) or they will deal repeatedly with familiar trading partners (Coase 1937).

Both patterns can be seen in the fruit and vegetable market. Exchange in the processing market tends to be vertically integrated through contracting arrangements, but in the fresh wholesale market exchange tends to occur repeatedly with the same partners but without contracts. The question, then, is why do actors in the fresh wholesale market tend to base their exchanges on trust rather than on contracts?

Transaction cost analysis would state that transaction costs are reduced. Repeated exchanges with known partners reduce the real costs of information search and manipulation, of defining the rules of exchange, and of increasing the probability of fair and effective transactions (Plattner 1985:144) in complex and uncertain markets.

R. H. Coase, one of the earliest economists to draw attention to transaction costs, noted that the greater the spatial distribution of transactions, the greater the dissimilarity of the transactions, and the greater the probability of rapid price changes, then the greater the costs of organizing and the greater the losses through mistakes (Coase 1937:397). Only a cursory familiarity with the fresh wholesale produce market provides abundant evidence of the potential costs of transaction mistakes or misjudgments.

While the widespread use of telephones and computers may reduce some organizing costs, buyers are still unable to inspect supplies transported great distances or all of a load delivered directly to them by a grower. Furthermore, not all buyers or growers have access to computers. Thus, problems of uneven access to information and the inability to inspect highly perishable supplies transported great distances create many opportunities for unacceptable "opportunistic" behavior in such a market system; that is to say, dishonesty.

Our informants frequently describe such behavior. One hears stories of brokers selling a product to another broker in a low supply area, who will sell it for a higher price than is quoted to the grower, and then split the profit. We hear stories of brokers claiming the product was never sold when it probably was. We hear of receivers claiming the product was below quality on arrival in order to get a lower price, or growers placing their high quality product on the top of a pack and the poor quality on the bottom.

In each of these cases, the buyer or seller has difficulty confirming the information supplied or determining its accuracy. Why then, in a market with many opportunities for dishonest behavior, do actors traditionally rely on trust and not contracts? Transaction cost analysts would argue that contracts are costly to write and enforce and are more likely to get in the way of transactions rather than facilitate them (Williamson 1981:552).

Contracting does seem to be a cumbersome and inefficient strategy in a market in which decisions need to be made quickly as to where to buy, when, and at what price. Great flexibility is required in the fresh wholesale market in order to provide a year-round supply of fruits and vegetables to the consumer. It is well recognized that a buyer must be able to purchase fruits and vegetables from anyone when the product perishes in transport or on the ground due to weather conditions. For example, the rains in Michigan this summer interfered with the potato harvest, causing the product to deteriorate in the ground and raising the price. Had buyers been bound by contract to Michigan growers, the price would have been prohibitive and the product below quality.

We are suggesting that the long-term exchange relationships based on trust that develop in the fresh wholesale fruit and vegetable market are socio-economic regulating devices that enable growers and buyers to obtain a balance between dependability and flexibility. On one hand, a buyer may conduct business with dependable suppliers for years and even for generations. On the other hand, they permit the flexibility necessary to temporarily change suppliers when crops fail and/or when prices are prohibitively high, without the encumbrance of contracts.

The question that arises, however, is whether some form of contracting strategy can be developed that permits the required flexibility and still protects actors from the risk of dishonest or "opportunistic" behavior in an uncertain market. For some insight on that question we need to look at the social relationships that seem to underlie the exchange relationships.

When trading partners and families of traders repeatedly deal with each other for years and even generations, the rules and procedures of exchange that develop are passed from generation to generation and become "tradition." Implicit assumptions or boundaries of trust are well known, "everyone knows what everyone else is doing," and an information flow network is created. Furthermore, when families deal with families for generations as seems to be common in the fresh wholesale market, the familiarity, knowledge of, or prior information on the character and skill of individuals is multiplied.

When it is known who can be trusted and who cannot, opportunistic behavior and its concomitant transaction costs can be minimized by dealing only with trustworthy partners and avoiding untrustworthy individuals. A balance may be obtained between dependability and flexibility, and risk of loss in transactions with unknown partners is reduced. On the other hand, such extensive kinship and social networks could also protect dishonest behavior. Family members and friends with access to greater information could collude to take advantage of a smaller or inexperienced grower and then protect each other. Such behavior does occur but does not seem to be common. Word of it seems to spread easily and quickly, and other members of the network claim they won't deal with those people for fear "they'll do the same to them."

Finally, when the rules and procedures of market exchange become "tradition" there will also be an inherent reluctance to change even if a better exchange strategy is offered. It would be an insult to ask a man who has conducted his business on "honor" and "trust" his entire life to base his transactions on contracts. When buyers have invested years and generations developing "trust" relationships with their trading partners, they are going to be hesitant to invest in new partners and risk the potential transaction costs.

The questions, then, are: (1) to what extent does this kinship and social network exist; (2) how does it influence the structure of the market; (3) what information advantage do the network members have compared to new participants in the market--growers or buyers; and (4) what are the barriers it establishes in the market for new growers? Transaction cost analysis provides some explanation for long-term exchange relationships but not for the impact of exchange and information networks in markets or for some of the other questions we have noted. We do not have the answers to these questions yet, but we can describe the methods we are using to find them.

Methodology

We are using both ethnographic and survey methods of data collection. The ethnographic method facilitates identification of issues relevant to the actors in the market and provides context and explanation for market exchange behavior. Survey methods provide objective, quantifiable and generalizable verification of those data.

The ethnographic method consists of in-depth, personal interviews of buyers and growers. The interviews are loosely structured and open ended. They are tape-recorded, if permissible, transcribed, and then analyzed for the salient themes used by buyers and growers to express what is important to them.

Content analysis of interviews draws attention to insights that may at first appear to be insignificant but which can be explored in later interviews. As these insights are coded into categories, the analyst is able to see the linkages and relationships between categories as well as between the actors. Figure 1 is an example of coding the interview.

By comparing grower with buyer statements and buyer with buyer statements, conclusions are validated, problems or issues can be isolated that are important to the actors involved in this socio-economic system, and an explanation for their behavior is possible.

Nonetheless, the results are not generalizable unless a larger population of actors is sampled. For that reason we will develop a formal survey questionnaire to submit to all the buyers in Kentucky who purchase significant amounts of Kentucky produce. Data pertaining to growers will be used to develop a statewide survey to be administered late in 1987.

To date, in the fresh wholesale market we have interviewed five wholesalers, one grower, and two persons active but not directly buying or selling. Of these, two refused to be tape-recorded and two have not yet been transcribed. While the completed interviews are very suggestive both theoretically and practically, we again stress that the findings are tentative.

The Data and Discussion

"Trust" or "Faith" is often the first characterization of the market made by a wholesale buyer before the interview has even begun and before even a question on the topic is asked. Deeper probing and analysis indicate that "Trust" or "Faith" translates into "Dependability." When a buyer says that he can trust a grower "with his life," he means that when he needs 50 bushels of peppers "yesterday," that grower will do his or her utmost to get him those peppers, that he can depend on that grower.

Conversely, the grower can depend on the buyer to purchase his or her crop once they have established their dependability. Hence, one often hears statements like "...if we've got a good, good relationship over the years, he'll trust me [to set a fair price]" or "they trust us so they keep on supplying us" and so on. Once the exchange relationship is established, it goes on for years. As one grower told us, once he can get a buyer to purchase his product, he is "in." The question is, how does a grower get "in?"

Table 1 lists the requirements wholesale buyers usually cite (e.g., Law and Ellerman 1983; Brooker 1983; Brooker, et al 1983; Zilverberg and Courtney 1984) before they will purchase a product from a new grower. Analysing the contents and coding the interviews enabled us to reduce the criteria to two larger conceptual categories: comparability and availability--and add a third category, familiarity. Comparability and availability are necessary criteria required of a grower before a buyer will consider purchasing from him or her. But familiarity (previous knowledge, recommendation by someone trusted, or long-time dealings with the person) is the basis upon which the buyer judges the grower's dependability and makes the decision to develop an exchange relationship with the grower.

Table 1
Wholesale Buyer Requirements

Dependability---	Comparability:	Packaging Grading Quality Price
	Availability:	Quantity Length of Season
	Familiarity:	Previous knowledge Recommendation Long-time dealings

Quality, grading requirements, and proper packaging under the comparability category facilitate handling for buyers in the wholesale market. As one of our wholesalers stated:

I don't want my supermarket to know whether that cucumber came from Florida or whether it came from Hardin County [Kentucky] or somewhere like that. I want them just to be a constant source of supply.

This standardization of product has two consequences. The first and most germane to this discussion is that standardization permits distribution of the product across greater geographical space as the different production areas come into, or go out of, production either seasonally or permanently. This increases the complexity and uncertainty in a market where buyers already have the information advantage over smaller growers. On the other hand, standard grading reduces the risk of receiving a good product at the top of the pack and a poor product at the bottom as packaging becomes more mechanized.

Proper packaging is one of the biggest problems wholesalers have in dealing with local growers. Thus, the second consequence is that our smaller, southeastern growers have several alternatives: (1) either be large enough or (2) operate cooperatively so that packaging is profitable; (3) find a market such as the processing or direct fresh markets; or (4) go out of production of fruits and vegetables.

Our analysis indicates that quantity and length of season are both functions of "Availability" or product flow. A number of studies of wholesale marketing in the South (Brooker 1983; Brooker, et al 1983; Law and Ellerman 1983) and our study indicate a wide range of quantity and length of season required by wholesalers. Availability requirements really depend on the individual buyer and grower, the size and type of their operation, their personal attitudes, and so on.

Most buyers, however, prefer to purchase frequently from one supplier; that is, every day or three to four times a week. Thus, even a minimum quantity supplied every day or every other

day for a minimum period of time requires a minimum farm size in order to continue supplying a buyer for an extended period of time.

If a grower has overcome the comparability constraints and has a large enough operation to supply the minimum needs of a buyer, he or she has the necessary but not sufficient foundation for entering the fresh wholesale market. The buyer is not yet "Familiar" with the grower. The buyer may know that the grower can make a comparable product available over the specified period of time, but he does not know if the grower *will* be dependable. Can the grower be trusted? Can the buyer be trusted? If not, the transaction cost is high. Mistakes not only have immediate costs for both buyers and growers, but future transactions are also threatened.

In order for buyers to purchase from new suppliers, then, the grower must not only have a comparable product available at the required times, but the buyer must be familiar with the grower's dependability. That is, new growers must not only have the requisite skills and resources to enter the fresh wholesale fruit and vegetable market, they must not only have comparative price and "market window" advantages, they must also be dependable before buyers will consider them as exchange partners.

As buyers and growers in the fresh wholesale fruit and vegetable market establish "working relationships" with each other, a considerable amount of trust develops between them, and they come to depend on each other. Neither exchange partner is likely to forego that relationship in favor of a new partner for the sake of a one-time lower or higher price (see Plattner's study of the Soulard wholesale market in St. Louis, 1982, 1983, 1985). They are well aware of transaction costs and the risks of dishonest or "opportunistic" behavior.

"Trust" translated as "Dependability" keeps the product moving smoothly and fairly from grower to consumer. The occurrence of dishonest or opportunistic behavior partially explains the emphasis on trust or dependability and why buyers and growers repeatedly deal with each other. In the absence of contracts, the system cannot function without trust. The transaction costs are too high.

CONCLUSION

We conclude that buyers and growers reduce risk and uncertainty by building trust with their trading partners and maximize long-term security by continuing to deal with those trusted and dependable partners. Thus, we suggest that long-term trading relationships between growers suggest that long-term trading relationships between growers and buyers or among buyers function to reduce transaction costs by building dependability and reducing the risk of opportunistic or dishonest behavior. It explains why buyers and growers will often forego an extra short-term profit in favor of long-term security with whom they have had "good working relationships" for significant periods of time and whom they "trust."

It does not explain how the extensive communication network among buyers influences the structure of the fresh wholesale fruit and vegetable market. It does not explain what kind and how much power this information network gives to buyers relative to growers or to what extent it erects barriers to market entry. It does not explain how kinship and social ties influence the distribution system in the transmittal of information, in the prevention (or otherwise) of opportunistic behavior, and in the transference of knowledge or expertise from one generation to the next. While we have generated more questions than answers in this discussion, we continue our inquiry.

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Systems Approach for Introducing Alternative Enterprises

W. Joe Free and Roger Woodworth

INTRODUCTION

The TVA agricultural development program has undergone a major reorientation--with a new name, a new targeted program, and new ways of relating and working with others. The name change to the Agricultural Institute within the Office of Agricultural and Chemical Development will give the program a clear identity both inside and outside TVA.

The basic mission of TVA's agricultural program is to improve the quality of life of the rural sector of the region. This includes maintenance of a desirable environment and economic development. The Agricultural Institute staff is in the process of restructuring its activities to approach this charge in a more systematic way and with a concentration of resources that will have a significant impact.

Four thrusts have been selected on which resources of the Institute will be concentrated during the initial years. These thrusts are: (1) develop alternative enterprises, especially the fruit, vegetable, and specialty crops; (2) test and introduce emerging technologies; (3) protect the natural environment with special emphasis on soil conservation and water quality; and (4) increase income and jobs in areas outside the economic mainstream.

PURPOSE AND OBJECTIVES

The purpose of the alternative enterprise thrust is to plan, cause implementation, and nurture a concentrated effort in the development of alternative enterprises in the Valley region and over time to be able to show a substantial regional impact. Measurement of impact will be in terms of number of growers, acreage, value of sales, estimated grower net income, physical volume of sales and employment in processing, marketing, and distribution firms. During the initial phase, developing fruits and vegetables will be the primary concentration, with some resources committed to ornamentals and other specialty products for wholesale and/or direct marketing.

To be successful, the introduction of new enterprises often requires development of skills and infrastructure on farms, and in processing, marketing, and service sectors. Coordinated development of production and marketing involves a comprehensive systems approach.

The following basic strategy has been identified to implement the thrust:

- A. Identify development opportunities in terms of national and regional markets;

- B. Concentrate resources on targeted high priority projects using a sustained comprehensive and coordinated approach;
- C. Develop production concentration to establish market power required to effectively penetrate major markets and reduce marketing costs;
- D. Continue and strengthen the involvement of local citizens and groups in the identification, planning, and implementation of projects, and ensure grower commitment;
- E. Strengthen cooperation and joint efforts with a variety of other institutions, public and private;
- F. Increase coordination and joint activities with other TVA divisions involved in economic development;
- G. Participate in projects as a flexible, problem-solving partner; and
- H. Increase emphasis on program evaluation and appropriate reporting of demonstrations for use by others.

AN OVERVIEW OF TVA PROGRAMS

Markets for agricultural products and lack of adequate supplies and services were recognized as critical constraints to agricultural development by the first TVA Board of Directors. Research programs were initiated in food processing, development of harvesting equipment, and in co-op development opportunities. Programs were initiated to establish and provide technical assistance to cooperators and to introduce new crops and market them through cooperatives.

The Test and Demonstration Program conducted with the cooperation of the land-grant universities was developed around county associations of farmers. These associations began purchasing inputs for their members in addition to serving as distribution organizations for TVA fertilizers. These associations developed into county co-ops and were the forerunners to regional Farmers' Co-ops which now serve the Southern states. With development of farm supply cooperatives, Valley farmers gained access to inputs generally available to other farmers.

While TVA devoted much attention to market development during its early years, many food processors located in the region were later absorbed by other firms or phased out. The TVA engineering staff that was devoted to innovations in vegetable harvesting and processing equipment was phased out, and the Cooperative Research Division was reorganized. During the early 1960s, market development included assistance in organizing markets to handle fresh tomatoes produced in North Carolina and feeder pig markets in Tennessee and north Alabama. In the late 1960s and early 1970s, the program concentrated on expanding soybean processing facilities and an efficient elevator support system.

In the 1970s, emphasis shifted to help small farm producers improve income through the introduction of new enterprises and development of infrastructure to market the produce. A number of fresh wholesale markets were organized to provide outlets for vegetables. Market research suggested that wholesale buyers were interested in buying locally only if they could be assured of a consistent supply over a given period of time. Even though these markets are selling produce for 50 to 100 farmers, they are still too small to sell to many of the larger buyers. A move was started in the late 1970s to bring these markets into a marketing association or federation to act as overall sales agent. The Horticultural Producers Association was chartered in 1983 and is developing services for member co-ops. (Additional information on the Federation is discussed in paper by Larry Snell and Joe Free.)

Other efforts in vegetable marketing have been to assist in organizing farmers' markets and in establishing roadside markets, and pick-your-own operations for berries, fruits, and vegetables. Educational programs were conducted with farmers to help them integrate market planning with production planning and to better merchandise their fruit and vegetables. In 1983, an "Intensified Horticultural Farm Demonstration" was initiated in cooperation with the University of Tennessee to demonstrate how market planning can be used to improve farm income from farms selling directly to consumers.

In evaluating the current status of the horticultural farm demonstrations, it has proven successful as a tool to introduce new enterprises, and to systematically plan planting dates, production technology, harvest dates, and market techniques. The introduction of production technology or a number of enterprises introduced simultaneously has been successful, and most have irrigation to ensure that a supply of marketable vegetables is available throughout the growing season. The weak link is training the producer in techniques to evaluate the market feasibility of each crop and of expanding those with potential that have been successfully produced and marketed. Techniques for attracting customers and maintaining promotional efforts are other areas that need strengthening. Understanding market structure is another area that must be addressed. A farmer that plans to sell vegetables to consumers in a small town must understand that he is often operating in an oligopolistic or monopolistic competition setting. This means that he must be concerned about what and how much his neighbor produces and the prices at local stores.

TVA experiences of the past will influence its new initiative in the introduction of alternative enterprises.

While there has always been a need to coordinate production and market development in some way, various forces in the past have made it possible for TVA to concentrate a large share of its resources toward on-farm activities and to a considerable degree to separate production and off-farm marketing projects. For example, the Test and Demonstration, Rapid Adjustment, and Resource Management Programs were designed to reduce erosion, introduce new farm technology, and increase farm productivity and reduce risk. For the most part, farmers were involved in traditional enterprises with relatively stable prices, and someone else developed the facilities and infrastructures and assumed the market risk to make the system work. In other words, farm income was not influenced significantly by market decisions. With many of the alternative crops, farmer income and often the market itself require farmer input. As a minimum, farmers must identify market needs and strive to produce for them.

THE NEW THRUST

TVA, like farmers, must identify its market niche and strive to provide a product to satisfy that identified need or opportunity.

The introduction of new enterprises is one thrust where TVA can concentrate effort across the board involving research, demonstration, infrastructure development, marketing, and production to make a significant and measurable impact in the region. This role is enhanced by the fact that TVA is regional and interdisciplinary in nature, works in partnership with a number of national, regional, state, and local agencies and organizations, and has flexibility in dealing with problems and opportunities as they arise.

Based upon TVA's experience, there is a long list of steps and activities which may be essential for success for any given project. They must be anticipated and phased in at the appropriate time and coordinated in a timely fashion.

Some of these steps and activities are:

Identify Enterprises

Selection of new enterprises is based upon research to identify the market niche and production data to determine if the new enterprise can be successfully introduced. These studies range from regional research studies to less formal interviews and group discussions.

The introduction of sweet corn on Sand Mountain is an example of a combination investigation. The market window was identified as a part of the Southern Regional Market Research Committee work. Weather station data were used to determine whether the area might enter the market during the early part of the market window. Local growers verified the likelihood of entry based upon local experience. Auburn and University of Tennessee budgets were used for

approximating cost, and experienced sweet corn growers were contacted to refine cost and evaluate yield estimates. Buyers were contacted to determine their interest in purchasing sweet corn during the anticipated market season. Potential growers were invited to participate in tours and participated in a meeting to evaluate their interest.

Evaluate Resource Base

The resource base in the target area should be evaluated to determine its suitability for the proposed enterprise. In the Sand Mountain example, field sizes were adequate for anticipated equipment, and production capabilities appeared to be consistent with the 250 to 300 crate-per-acre yield that was needed for long-run success. Water availability for irrigation was questionable, but the potential for developing adequate sources appeared reasonable.

Determine Grower Commitment

If a new enterprise is to be successful, farmers must be interested and willing to support it with resources and technology adequate to make it successful. The Sand Mountain group appeared to have that degree of commitment for the new sweet corn enterprise and an interest in expanding to other vegetable crops as the market potentials were refined and the sweet corn enterprise successfully introduced.

Obtain Interagency Participation

TVA projects usually involve cooperative efforts with other agencies, educational institutions, and other divisions of TVA, as well as with private groups.

Introducing sweet corn on Sand Mountain involved three TVA offices, federal, state, and local agencies, two educational institutions, local farmers, financial institutions, the Warrior Basin Development Association, a local church organization, and other interested parties. TVA has the flexibility to work with all groups in the introduction of a new enterprise.

Assist Local Groups in Obtaining Adequate Financing

It is necessary to estimate both investment capital needs and operating funds required to sustain the business and potential sources of these funds. TVA worked with other agencies and local people to make these estimates.

TVA agreed to purchase a hydrocooler and introduce it as a new technology in post harvest handling of vegetables if other financing could be secured for the remainder of the capital required to initiate the new business. Producers agreed to purchase \$500 shares of common stock to purchase a grading line and part of the capital needed for a building. The Alabama Farmers Market Authority agreed to provide loan funds at no interest for the building, and local bankers supplied operating funds. The local community assisted with grading and roads. Producer funds were used to purchase the grading and packing lines. The Office of Power assisted with the three-phase lines and worked with the Sand Mountain Electric Co-op in working out a rate that was manageable for the newly organized co-op. OACD and ONRED also assisted with funds to develop management capabilities and to acquire and use a microcomputer for recordkeeping and market information.

Define and Develop Appropriate Production Technology

Frequently production systems in use elsewhere cannot be transferred without modification and refinement for local conditions. TVA and Auburn sponsored experiments both on experiment stations and on farms to refine and introduce the appropriate technology. Planting and harvest dates are planned and scheduled on each farm. Production technology is also discussed and generally followed by each producer. Irrigation is being introduced. The entire farming system is being introduced and refined.

Provide Technical Assistance to Ensure the Development of Management, Job and Production Skills

Management and board training for the Sand Mountain Vegetable Growers Association has been a joint effort between TVA, Auburn University, the Agricultural Cooperative Service, U.S. Department of Agriculture, and Virginia Polytechnic Institute.

The co-op was unsuccessful in training local workers to harvest and pack sweet corn. After the first week of harvest, they have depended upon transient farm labor for the harvest and packing crew. Technical assistance in helping farmers adopt appropriate technology and farming systems has been by interdisciplinary teams from Auburn, TVA, and industry. TVA has assisted with fertility and irrigation demonstrations. Research jointly sponsored by TVA and Auburn is being conducted both on farms and at the nearby Auburn Branch Experiment Station.

Communication systems between wholesale market firms and the local co-op have been developed, and consequently producers are informed about buyer needs so that they can plan appropriate timing, variety, production technology, and quality control to satisfy the buyers' requirements and needs when the crop is harvested.

Institutions are being developed to foster the exchange of marketing formation among producing areas in the region, and the buying centers. This enhances the producers' position in bargaining for top market prices consistent with his quality and quantity.

FUTURE DIRECTION

Past projects in the introduction of new enterprises in vegetable production and marketing show that in early phases of development, farmers often get discouraged because they have high expectations, and they often obtain a low price because of poor timing, poor quality, or an excess quantity for consumer needs. Conversely, packing houses often lack financial viability because there is not a sufficient volume of production to give them the volume and quality required to be efficient in packing and effective in gaining market entry.

Essential characteristics of a program to successfully introduce alternative enterprises include: (1) identification of new products and projects from a marketing and a production point of view; (2) a comprehensive systems approach to identify, introduce, and follow through; (3) provision for flexibility to address unforeseen problems; (4) a regional integrated production and market orientation; (5) strong involvement and commitment by local leaders, business firms, and farmers; (6) ability to work with and involve other public and private agencies and institutions; and (7) a long-term effort.

The change in program and commitment to develop alternative enterprises as a major thrust for TVA programs is a productive niche for TVA in making an important contribution to agriculture and rural residents of the Valley region. As with any change in direction, risk and uncertainty are involved.

A systems approach is required to integrate production and marketing which can minimize adverse results from unforeseen events, and increase probability of success.

Evaluation Criteria for Alternative Enterprises

P. James Rathwell

Southern agricultural producers are searching for alternative enterprises to supplement farm incomes from traditional row crops. It is readily apparent that there is no single or "magic" alternative that will supplement everyone's income. What is available is a wide range of alternatives suitable for some individuals but not for all.

How then does an individual producer critically evaluate these alternatives and determine their ability to contribute to his particular farming operation? Each producer must evaluate every alternative separately. Today's financial environment will not allow a quick and dirty analysis. The old procedure of following your neighbor's lead is the wrong approach--no two farming operations are alike. The risks of making a mistake are too great.

Producers must first critically evaluate their existing farming operation to determine: financial capability; available resources, i.e., land, labor, capital and management; markets; size of operation and their ability and commitment to undertake a change in their farm.

Evaluation Criteria

There are many factors that will determine the overall feasibility of an alternative enterprise for an individual producer. Listed below are several facts that are useful in analyzing an enterprise's potential. The factors are often times interdependent; one can not be viewed without the other. Not all are directly applicable to every enterprise. However, they provide a starting point for the analysis, questions that generally need to be addressed and a logical procedure to follow in the decision process.

Each of these factors is important in analyzing the alternative enterprise. It is difficult to say which factor is most or least important. The sequence presented is not an attempt to suggest an order of importance. It is simply a listing.

Management

What is the degree of management intensity needed to successfully produce and market a commodity? Management is the critical link in taking the alternative enterprise from its infancy to a profitable business venture. The most efficient equipment, facilities and prior planning can not offset bad management. Many producers lack the managerial commitment necessary to make a venture work.

Each enterprise has its own level of managerial commitment. Not all enterprises are suited to all individuals. Personal bias and resource availability will eliminate some alternatives, but once an enterprise is selected, management becomes the key to its success.

Management is perhaps the most limiting resource of all for any new enterprise. Today's agriculture demands a manager that can combine business and marketing savvy with production skills. Most producers have concentrated on production management and are poorly trained in business and marketing.

A producer is often times considered to be a good manager on the basis of how high his yields per acre were last year, how clean his fields are or what is his historical pigs per litter average. These criteria are production oriented and do not reflect the total management picture. Today's agriculture is littered with bankrupted 160 bushel corn producers.

What defines managerial success today is whether or not the producer can remain solvent. This suggests more than production management. It requires financial and marketing management as well.

You can't visibly see this kind of management as you drive by the producer's farm. But it must be there in the form of good recordkeeping, knowing your costs of production, whether or not you can pay for a new piece of land from farm generated income, or whether you should plant a crop or let the land be idle.

Marketing also plays a vital role. Selling the crop at harvest or calves at weaning is not marketing, and it isn't good management. Management must know the market alternatives and utilize them to get the best possible price.

There are ways to help managers in today's agriculture. Farm management associations provide good recordkeeping and analysis programs for farm businesses. Association information can, if used, keep producers up-to-date on production costs and financial capabilities. They have proven to be very successful programs.

Integrated farm enterprises have been used by many farmers specifically because someone besides the farmer is making management decisions. Integrated enterprises have been utilized for many years in U.S. agriculture. Farmers basically rent their facilities and hire out their labor to the poultry company. Farmers are told when birds will be placed, how much they should be fed, and when the birds will be sold. In essence, someone else is making the decisions for the producer.

Management skills will be severely tested as the producer ventures into a new enterprise. It becomes very critical for the producer to understand what is going to be demanded of his management capabilities by any enterprises he may consider. Not all enterprises demand the same level of management, i.e., pine trees vs. commercial catfish production. An enterprise should be considered on the basis of the amount of management skill required and the commitment level necessary to follow through and manage the enterprise.

Marketing

Does a market exist for an enterprise at a time the farmer can reasonably produce it? Many alternatives are technically feasible but lack a definable market. Grain sorghum is a readily substitutable feed grain for corn in many livestock rations. But until South Carolina growers started using non-bird resistant varieties and poultry producers built drying facilities, grain sorghum as an alternative enterprise was limited.

Most vegetable commodities lack readily accessible markets as well. Clearly, there is a large and growing market for fresh vegetables in this country. However, getting access to these markets is the problem. There are many market entry barriers that a grower must overcome to effectively develop this alternative's profit potential.

Potential vegetable growers need to find a market for the crop before they plant. The risk of not finding a market after planting is very large. Unlike corn or soybeans, most fresh vegetables are highly perishable, and their storage capacity in the field or in a cold storage facility is quite

short. Buyers know this and do use the perishability problem against a grower. The net result is that the crop is not harvested or that it must be dumped--both cases mean losses back to the grower.

Any new grower must find out where a market exists, what volume the market requires, when the market needs the product and what quality is necessary to satisfy the market's needs. This information is sometimes difficult for the grower to obtain. As an example, buyers for most vegetables are located in large metropolitan areas, quite a distance from where the product is produced. The distance between buyer and producer causes problems. How does the producer find out who buys vegetables? How does he get his foot in the door--actually develop his market?

The volume of product an individual buyer wants is largely determined by the demand of the people he sells to. Consequently, a grower must be very willing to work with the buyer and his volume needs. Large buyers want to minimize their efforts to obtain enough volume to meet their customers' needs. If the buyer can buy in trucklots, he will seldom buy pickup truck loads. He can minimize his buying costs and uniformity problems by working with larger suppliers.

What then does the smaller producer do? He is effectively shut out of the larger markets. Direct sales become one of this grower's market alternatives, i.e., roadside sales, farmers markets, and pick-your-own operations. Direct sales provide the grower with a viable market for small volumes. In addition, the grower can maintain his managerial independence and avoid large scale investments necessary to provide the volume necessary to compete with the "big boys."

Another viable marketing alternative is the formation of grower marketing associations. These associations pool small lots from many growers into larger, more marketable volumes--volumes sufficient to attract attention from large buyers. The marketing function can then be performed by association hired marketing experts, thus removing the burden from the individual grower.

Regardless of the form of the grower's marketing effort, quality is extremely important. USDA has standards for produce. These standards define minimum levels of acceptable products as defined by the industry producing the commodity. Produce buyers often have standards that exceed these USDA minimums. Hence, a grower must be aware of the quality standards he must meet. For example, the USDA standards for broccoli suggest a 5 percent decay allowance for a truckload of broccoli. A chain store buyer's allowance might be 2 percent. What allowance guides the sale of this load? **The buyer's.**

Without a working knowledge of the buyer's needs, the grower is facing a "nonexistent" market. He can grow the product, but no one will buy it.

Given that a feasible market exists for an alternative enterprise, is it readily accessible to producers? Most vegetable commodities have this problem. Clearly, there is an existing market for most vegetable products. However, getting access to this market is a problem. Potential growers need to find out where the marketing area is located, who can physically sell the product for the grower, what volume the market requires, when the market wants the product, and what quality is necessary to satisfy the market's needs. Without a firm understanding of these basic marketing needs and a grower's commitment to fulfilling these needs, a market may exist but the grower will find it difficult to become part of it.

Financial Requirements

Part of any alternative enterprise analysis must be to consider the financial resource base. We are not simply interested in a grower's net worth statement and his ability to pay for the enterprise, but in how the enterprise affects his overall business environment. What is the effect this year, over the long haul, and on other existing enterprises? Does the enterprise need time to produce a profit? What is the initial capital requirement?

These questions need answers in addition to an analysis of the enterprise's market and managerial requirements.

Cost of Production. This category is a basic building block to understanding an enterprise's profit potential. It is often overlooked or severely underestimated. Producers should critically estimate production costs, keeping in mind that being conservative in their estimates reduces inherent risks in any enterprise.

Growers interested in annual enterprises should evaluate the costs associated with actually producing the commodity, i.e., fertilizer, labor, etc, and in addition, costs associated with loan repayment, taxes and insurance. These latter costs may not actually be involved in producing the commodity, but the commodity will undoubtedly be required to contribute to their payment.

The easiest way to develop and evaluate these costs is to develop an enterprise budget (Table 1). The budget is an itemization of variable costs (fertilizer, labor, seed, etc.), fixed costs (depreciation, interest, taxes and insurance) and total costs (variable plus fixed costs). It is an attempt to describe the enterprise's cost structure by critically analyzing each component in the production of the enterprise.

Perennial enterprises or enterprises of over one year duration should also consider "start up costs." Many perennial enterprises have large start up costs that are incurred prior to any inflow of income. These costs may occur for several years before any income is possible. It is important to know the level of these costs and how you are going to support the enterprise in the years of no income. These costs are sometimes referred to as acquisition or establishment costs. They are incurred above the costs of annual operation or maintenance.

Projected Income. This category is an attempt to estimate expected income from an alternative enterprise. Income is generally calculated by multiplying the price of the product by the amount of the product produced. It is apparent that a producer must then estimate two specific items to obtain an expected income, price, yield, etc.

Several questions need answering before any grower can satisfactorily estimate expected income. First, what source of information is available to aid in the estimation process? Second, is this public information directly applicable to my individual farming operation?

Generally, price and yield information are available from governmental (USDA and universities) and private (neighbors, seed companies, producer organizations) sources. It may require a little effort on the part of the grower to find information on minor commodities, but it can be found for most items.

Once the information is found, it must be viewed in light of the individual's farming operation. It is not wise to develop only one income estimate. Generally, three estimates are needed to consider the best, most common and worst possible situations. These estimates provide a producer with an estimate of the income risk associated with the enterprise. Over time, prices and yields vary. Producers do not control this variation and should therefore plan for this variation in their initial analysis. This is even more critical for long-term enterprises.

An example will show this process. Over the last ten years, June prices for yellow squash have averaged \$5.75 per bushel. The highest reported price was \$9.54 and the lowest was \$3.04. This is a \$6.50 per bushel range from highest to lowest. Statistically, over this ten year period June yellow squash prices fell between \$4.11 and \$7.39, 67 percent of the time.

Total cost of producing yellow squash in South Carolina is currently estimated at \$6.01/per unit. It is apparent that a producer who intends to grow yellow squash has a fairly large level of price variation. A grower who just used the average ten year price or a single price estimate would not be accounting for these price variations, and his decision would be at risk from the start.

Yield variability is generally related to weather conditions and managerial capability. As with price information, yield data for alternative enterprises should be conservatively estimated and ranged to approximate risk (Table 2).

After price and yield estimates are developed, the next step is to estimate projected income. Keep in mind that we are talking about more than one estimate of income. Table 2 also shows what should be calculated. Prices, yields, and costs are shown for the enterprise yellow squash. Five price and yield situations are developed, and each combination is adjusted for the cost of production resulting in an expected net income matrix. These figures suggest a range of net income potential from \$-129.91 to \$1,539.07 per acre.

Department of Agricultural Economics and Rural Sociology

CLEMON UNIVERSITY
Cooperative Extension Service
ENTERPRISE BUDGET

IRRIGATED YELLOW SQUASH FOR FRESH MARKET
1985 AND 1986 ESTIMATED COSTS AND RETURNS PER ACRE
BASED ON IMPROVED PRODUCTION PRACTICES FOR COMMERCIAL PRODUCERS

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST PER ACRE	VALUE OR COST PER UNIT OF PRODUCTION	YOUR ESTIMATES
1. GROSS RECEIPTS FROM PRODUCTION:						
#1 YELLOW SQUASH	BU.	9.000	200.000	1800.00		
#2 YELLOW SQUASH	BU.	5.500	50.000	275.00		
TOTAL			250.000	2075.00	8.30	
2. VARIABLE COSTS						
PREHARVEST						
SEED	LBS.	14.000	2.000	28.00	0.11	
LIME (SPREAD)	TONS	26.000	0.330	8.58	0.03	
6-12-12 (SPREAD)	CWT.	8.000	10.000	80.00	0.32	
SIDE DR 33.5% N	CWT.	9.750	0.750	7.31	0.03	
PRE-EMERGE HERB.	QT.	7.000	5.000	35.00	0.14	
NEMATICIDE	GAL.	9.500	3.000	28.50	0.11	
INSECTICIDE 2X	QT.	3.100	2.000	6.20	0.02	
INSECTICIDE 3X	QT.	7.250	3.000	21.75	0.09	
STICKER	OZ.	0.080	3.000	0.24	0.00	
MACHINERY	ACRE	16.475	1.000	16.47	0.07	
TRACTORS	ACRE	11.383	1.000	11.38	0.05	
IRRIGATION MACHINERY	ACRE	17.180	1.000	17.18	0.07	
LABOR, TRACTOR & MACHINERY	HR.	4.150	6.876	28.53	0.11	
LABOR, IRRIGATION	HR.	4.150	0.400	1.66	0.01	
INTEREST ON OP. CAP	DOL.	0.125	64.598	8.07	0.03	
SUBTOTAL, PRE-HARVEST				298.89	1.20	
HARVEST COSTS						
1 BU CONTAINERS	EACH	0.800	250.000	200.00	0.80	
FIELD BUCKETS	EACH	1.250	20.000	25.00	0.10	
HARV-GRADE-PACK	HR.	3.650	40.000	146.00	0.58	
BROKERAGE	BU.	0.350	250.000	87.50	0.35	
MACHINERY	ACRE	40.325	1.000	40.33	0.16	
TRACTORS	ACRE	115.820	1.000	115.82	0.46	
LABOR, TRACTOR & MACHINERY	HR.	4.150	24.994	103.73	0.41	
SUBTOTAL, HARVEST				718.37	2.87	
TOTAL VARIABLE COST				1017.26	4.07	
3. INCOME ABOVE VARIABLE COSTS				1057.74	4.23	
4. FIXED COSTS						
MACHINERY	ACRE	60.396	1.000	60.40	0.24	
TRACTORS	ACRE	165.675	1.000	165.67	0.66	
IRRIGATION MACHINERY	ACRE	153.510	1.000	153.51	0.61	
TOTAL FIXED COSTS				379.58	1.52	
5. TOTAL OF ABOVE COSTS				1396.84	5.59	
6. NET RETURNS TO LAND, OVERHEAD, RISK, AND MANAGEMENT				678.16	2.71	
7. LAND CHARGE				25.00	0.10	
8. OVERHEAD CHARGE (8.0% OF VARIABLE COSTS)				81.38	0.33	
9. TOTAL COSTS				1503.22	6.01	
10. RETURNS TO MANAGEMENT & RISK				571.78	2.29	

60 ACRE TRAVELER SYSTEM WITH 2 INCHES OF WATER.
A FUNGICIDE MAY BE REQUIRED IN SOME AREAS.
FEBRUARY 1985

INCOME ABOVE VARIABLE COST OF SQUASH AT DIFFERENT YIELDS AND PRICES

Yield	Price Per Bushel				
	\$6.30	\$7.30	\$8.30	\$9.30	\$10.30
150	215.09	365.09	515.09	665.09	815.09
200	386.41	586.41	786.41	986.41	1186.41
250	557.74	807.74	1057.74	1307.74	1557.74
300	729.07	1029.07	1329.07	1629.07	1929.07
350	900.39	1250.39	1600.39	1950.39	2300.39

NOTE: ASSUMES CONSTANT PRE-HARVEST COST OF -- \$298.89
AND A HARVEST COST THAT VARIES BASED ON YIELD.

MONTHLY SUMMARY OF RETURNS AND EXPENSES PER ACRE

CATEGORY	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	PRICE/ UNIT	TOTAL UNITS	TOTAL VALUE
PRODUCTION:																
#1 YELLOW SQUASH	BU.	0.0	0.0	0.0	0.0	0.0	200.00	0.0	0.0	0.0	0.0	0.0	0.0	9.00	200.00	1800.00
#2 YELLOW SQUASH	BU.	0.0	0.0	0.0	0.0	0.0	50.00	0.0	0.0	0.0	0.0	0.0	0.0	5.50	50.00	275.00
TOTAL RECEIPTS	ACRE	0.0	0.0	0.0	0.0	0.0	2075.00	0.0	0.0	0.0	0.0	0.0	0.0			2075.00
OPERATING INPUTS:																
SEED		0.0	0.0	14.00	14.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.00	2.00	28.00
LIME (SPREAD)		0.0	8.58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.00	0.33	8.58
6-12-12 (SPREAD)		0.0	80.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.00	10.00	80.00
SIDE DR 33.5% N		0.0	0.0	0.0	3.66	3.66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.75	0.75	7.31
PRE-EMERGE HERB.		0.0	35.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.00	5.00	35.00
NEMATOCIDE		0.0	0.0	28.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.50	3.00	28.50
INSECTICIDE 2X		0.0	0.0	0.0	0.0	6.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.10	2.00	6.20
INSECTICIDE 3X		0.0	0.0	0.0	0.0	14.50	7.25	0.0	0.0	0.0	0.0	0.0	0.0	7.25	3.00	21.75
STICKER		0.0	0.0	0.0	0.0	0.16	0.08	0.0	0.0	0.0	0.0	0.0	0.0	0.08	3.00	0.24
1 BU CONTAINERS		0.0	0.0	0.0	0.0	0.0	200.00	0.0	0.0	0.0	0.0	0.0	0.0	0.80	250.00	200.00
FIELD BUCKETS		0.0	0.0	0.0	0.0	0.0	25.00	0.0	0.0	0.0	0.0	0.0	0.0	1.25	20.00	25.00
HARV-GRADE-PACK		0.0	0.0	0.0	0.0	0.0	146.00	0.0	0.0	0.0	0.0	0.0	0.0	3.65	40.00	146.00
BROKERAGE		0.0	0.0	0.0	0.0	0.0	87.50	0.0	0.0	0.0	0.0	0.0	0.0	0.35	250.00	87.50
MACH FUEL & LUBE		0.0	1.60	6.44	3.94	3.04	139.56	0.0	0.0	0.0	0.0	0.0	0.0			154.57
MACHINERY REPAIRS		0.0	0.37	2.24	1.83	0.70	24.30	0.0	0.0	0.0	0.0	0.0	0.0			29.43
IRRIG FUEL & LUBE		0.0	0.0	0.0	6.86	6.86	0.0	0.0	0.0	0.0	0.0	0.0	0.0			13.72
IRRIGATION REPAIRS		0.0	0.0	0.0	1.73	1.73	0.0	0.0	0.0	0.0	0.0	0.0	0.0			3.46
TOTAL COST	ACRE	0.0	125.55	51.18	32.01	36.84	629.69	0.0	0.0	0.0	0.0	0.0	0.0			875.26

RETURN TO LAND, LABOR, CAPITAL, OVERHEAD, RISK, AND MANAGEMENT 1199.74

LABOR REQUIREMENTS BY MONTH

	TIMES OVER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
--- HOURS ---														
MACHINERY LABOR														
1.5T GAS TRUCK	2.00	0.0	0.0	0.56	0.56	0.0	1.12	0.0	0.0	0.0	0.0	0.0	0.0	2.24
4R ROLLING CULT	1.00	0.0	0.0	0.19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.19
14' DISK W/SP	1.00	0.0	0.32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.32
2R SUBSOIL-BED	1.00	0.0	0.0	0.57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.57
2R PLANTER	1.00	0.0	0.0	0.26	0.26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.51
TRCT MT SPRAYER	0.50	0.0	0.0	0.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.04
2R CULTIVATOR	2.00	0.0	0.0	0.0	0.60	0.60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.19
TRCT MT SPRAYER	3.00	0.0	0.0	0.0	0.0	0.70	0.35	0.0	0.0	0.0	0.0	0.0	0.0	1.05
NURSETANK	1.50	0.0	0.0	0.0	0.0	0.35	0.17	0.0	0.0	0.0	0.0	0.0	0.0	0.52
SIDEDRESSER	1.00	0.0	0.0	0.0	0.12	0.12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.23
FARM-WAGON	4.00	0.0	0.0	0.0	0.0	0.0	2.30	0.0	0.0	0.0	0.0	0.0	0.0	2.30
WASHER	10.00	0.0	0.0	0.0	0.0	0.0	22.69	0.0	0.0	0.0	0.0	0.0	0.0	22.69
TOTAL LABOR IN MECHANIZATION		0.0	0.32	1.62	1.53	1.76	26.64	0.0	0.0	0.0	0.0	0.0	0.0	31.87
IRRIGATION LABOR		0.0	0.0	0.0	0.20	0.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.40

MACHINERY FIXED AND VARIABLE COSTS PER HOUR

MACHINE	CODE	DEPREC. COST PER HOUR	INTEREST COST PER HOUR	INSURANCE COST PER HOUR	TAX COST PER HOUR	FIXED COST PER HOUR*	REPAIR COST PER HOUR	FUEL COST PER HOUR	LUBRICANT COST PER HOUR	VARIABLE COST PER HOUR**	HOURS PER ACRE	ACRES PER HOUR
DTRCTR 30-40HP	1	1.053	1.335	0.075	0.064	2.527	0.000	1.680	0.252	1.932	1.000	1.000
DTRCTR 95-105HP	4	2.964	3.827	0.214	0.182	7.187	0.000	4.800	0.720	5.520	1.000	1.000
1.5T GAS TRUCK	11	1.829	1.443	0.081	0.075	3.428	2.110	3.937	0.591	6.638	1.000	1.000
4R ROLLING CULT	44	1.341	1.308	0.073	0.0	2.722	1.264	0.0	0.0	1.264	0.151	6.633
14' DISK W/SP	52	3.335	3.306	0.185	0.0	6.826	1.432	0.0	0.0	1.432	0.258	3.869
2R SUBSOIL-BED	42	1.750	1.735	0.097	0.0	3.581	1.155	0.0	0.0	1.155	0.452	2.211
2R PLANTER	58	1.978	1.982	0.111	0.0	4.072	2.017	0.0	0.0	2.017	0.410	2.436
TRCT MT SPRAYER	88	1.896	1.915	0.107	0.0	3.918	0.443	0.0	0.0	0.443	0.278	3.593
2R CULTIVATOR	46	0.575	0.582	0.033	0.0	1.190	0.601	0.0	0.0	0.601	0.476	2.100
TRCT MT SPRAYER	88	1.896	1.915	0.107	0.0	3.918	0.443	0.0	0.0	0.443	0.278	3.593
NURSETANK	98	1.282	1.199	0.067	0.0	2.548	0.336	0.0	0.0	0.336	0.278	3.593
SIDEDRESSER	53	1.540	1.537	0.086	0.0	3.164	0.774	0.0	0.0	0.774	0.184	5.433
FARM-WAGON	92	0.338	0.351	0.020	0.0	0.709	0.367	0.0	0.0	0.367	0.458	2.182
WASHER	94	1.125	1.037	0.058	0.0	2.221	1.180	0.880	0.132	2.192	1.809	0.553

* FIXED COST IS SUMMATION OF DEPREC., INTEREST, INSURANCE, AND TAX COST.
 ** VARIABLE COST IS SUMMATION OF REPAIR, FUEL, LUBRICANT COST.

COST PER ACRE AND PER TIME OVER FOR MACHINERY AND EQUIPMENT

MACHINE	SIZE	TRACTOR HP	EQUIP. OP. COST/ ACRE	TRACTOR OP. COST/ ACRE	TOTAL OP. COST/ ACRE	FIXED EQUIP. COST/ ACRE	FIXED TRACTOR COST/ ACRE	TOTAL FIXED COST/ ACRE	TOTAL COST/ ACRE	TOTAL OP. COST/ TIME	TOTAL FIXED COST/ TIME	TOTAL COST/ TIME OVER
4R ROLLING CULT	16.00	100.00	0.19	0.93	1.12	0.41	1.21	1.62	2.75	1.12	1.62	2.75
14' DISK W/SP	14.00	100.00	0.37	1.60	1.97	1.76	2.08	3.84	5.81	1.97	3.84	5.81
2R SUBSOIL-BED	8.00	100.00	0.52	2.80	3.32	1.62	3.64	5.26	8.58	3.32	5.26	8.58
2R PLANTER	6.00	35.00	0.83	0.89	1.72	1.67	1.16	2.83	4.55	1.72	2.83	4.55
TRCT MT SPRAYER	13.00	0.0	0.06	0.0	0.06	0.55	0.0	0.55	0.61	0.12	1.09	1.21
2R CULTIVATOR	6.00	35.00	0.57	2.06	2.63	1.13	2.70	3.83	6.46	1.32	1.91	3.23
TRCT MT SPRAYER	13.00	35.00	0.37	1.81	2.18	3.27	2.36	5.64	7.81	0.73	1.88	2.60
NURSETANK	13.00	35.00	0.14	0.90	1.04	1.06	1.18	2.25	3.29	0.70	1.50	2.19
SIDEDRESSER	12.00	35.00	0.14	0.40	0.54	0.58	0.52	1.10	1.64	0.54	1.10	1.64
1.5T GAS TRUCK	1.50	0.0	13.28	0.0	13.28	6.86	0.0	6.86	20.13	6.64	3.43	10.07
FARM-WAGON	4.00	35.00	0.67	3.97	4.64	1.30	5.19	6.49	11.13	1.16	1.62	2.78
WASHER	16.00	100.00	39.65	111.85	151.51	40.18	145.63	185.80	337.31	15.15	18.58	33.73

Table 2. Vegetable Costs

Yellow Squash		Base: 250 Bushels				
Preharvest Costs:	Per Acre	Per Unit				
	\$298.89	1.19556				
Harvest Cost:	718.37	2.87348				
Yield Range (5)	150	200	250	275	300	
Price Range (5)	4	6.5	7.5	8	9	

Formula: Price/Unit – Preharvest cost/unit – Harvest cost/unit

Income Above Variable Costs of Yellow Squash at Different Yields and Prices.

Yield	Price Per Bushel				
	\$4.00	\$6.50	\$7.50	\$8.00	\$9.00
150	-129.91	245.09	395.09	470.09	620.09
200	- 73.59	426.41	626.41	726.41	926.41
250	- 17.26	607.74	857.74	982.74	1232.74
275	10.90	698.40	973.40	1110.90	1385.90
300	39.07	789.07	1089.07	1239.07	1539.07

Note: Assumes constant preharvest costs (\$298.89/ac.). Harvest costs based on \$2.87/unit.

Remembering that historical price information suggested that \$5.75 per bushel was the average price for June yellow squash and that 67 percent of the time the price fell between \$4.11 and \$7.39, yellow squash appears to be a good choice. Only under the lowest price situation and relatively low yields is yellow squash unprofitable.

Another way to view this information is to look at the breakeven price for the enterprise. At a projected yield of 250 bushels, cost of production is \$4.06 ($\$298.89/250 \text{ bu.} + \2.87 per bu.). June yellow squash prices have seldom reached this level. Statistically you would expect that the price would only fall below \$4.11 one-third of the time.

Payback Period. This category asks the question, "When will the money invested in the enterprise be paid back from income produced by the enterprise?" This item is applicable to enterprises with long-run income potential, and not to a pay-off within a year. An example might be a peach enterprise where no income is expected for at least three years from planting. Costs of establishment and maintenance are incurred without annual income to offset these costs until year four. Income derived from years four on is required to pay annual maintenance and repayment of costs incurred during the orchard's nonbearing years.

This is an important criteria in analyzing many long-run enterprises. It emphasizes the need to review the producer's cashflow position in the "nonpaying" years. While many enterprises can be very lucrative, the producer must be able to subsidize the enterprise from other funds until it can produce its own income.

In addition, there is the potential for more risk with longer term investments. Chances are good that cost and income projections made in the planning stages of the enterprise will change appreciably over time. Hence, the anticipated profit might be quite different from your original estimates.

Using peaches as an example, it takes about \$1,400 per acre to establish and maintain for the first year an orchard on a prepared site. Two nonbearing years' maintenance adds another \$825 per year per acre to the enterprise "nonpaying" years. This is a total of \$3,050 of cash outlay before the first bearing year. As peaches mature, years four, five and possibly six are not full potential production years. It is possible that these years will just cover costs of annual maintenance and return only a small amount to the "nonpayment" years. Based on Clemson budgets, a peach orchard set out today would look something like the example shown in Table 3.

Given these figures, the orchard does not pay back in ten years. It would take at least three more years given the 500, three-quarter bushel yield and \$8.00 price. What would happen if prices and yields were lower or higher?

Long term investments, while potentially profitable, must be critically evaluated. Nonpaying years can become burdensome cash flow years on existing enterprises.

Minimum Size

The minimum size of any enterprise is a critical question that needs to be answered. Are five acres of pine trees a viable enterprise? Will there be a commercial market for 10 acres of broccoli? Can I feasibly run 200 head of stocker cattle? What is the minimum size of a specific enterprise that will provide a profitable return to the grower?

Minimum size is not an easy concept to define, but it is one that must be addressed with an alternative enterprise. The initial size attempted many times will determine whether or not an enterprise succeeds or fails. At a minimum, it will define the enterprise's resource needs, financial and marketing requirements and managerial commitment.

Generally, size is determined by defining the most efficient operating level. In other words, what is the lowest per unit cost of production possible given the farm's resource situation? Traditionally, it has been considered on the basis of the fixed resources under the farmer's control. How often have you heard a farmer say that he could reduce his cost per bushel if he just had another 200? His equipment and labor force can handle this additional acreage.

Table 3. Ten-Year Peach Budget.

Year	Yield ¹	Cost ²	Return ³	Net
1	0	\$ 1,390	\$ 0	\$-1,390
2	0	825	0	-2,215
3	0	825	0	-3,040
4	400	3,171	3,200	-3,011
5	450	3,399	3,600	-2,810
6	500	3,633	4,000	-2,443
7	500	3,633	4,000	-2,076
8	500	3,633	4,000	-1,709
9	500	3,633	4,000	-1,342
10	500	3,633	4,000	- 975
Total		\$27,775	\$26,800	

¹Yield in 3/4 bushel boxes.

²Forces a payment for fixed costs, land and overhead charges of \$441 per acre.

³Assumes an average \$8 per 3/4 bushel box price.

What he is implicitly suggesting is a more efficient utilization of the resources used in the production of a commodity. Hopefully, this will translate into a lower per unit cost. Given his resource restrictions, he may not reach the absolute minimum cost per unit, but he could reach his minimum efficient size.

This is the economists' traditional way of viewing size. However, there are other problems that arise when talking about alternative enterprises and how one determines the initial size of the operation.

The market opportunity initially available to the farmer can often times dictate the enterprise's minimum size. What is the minimum acreage of broccoli that a farmer should grow? It first depends upon what his market suggests he grow. Then the per unit cost picture under his resource limitations is determined.

The same problem arises with less exotic commodities. A five acre block of pine trees might be a nice little enterprise on a marginal piece of ground. It would stop erosion and provide a potential long term income. But, is a lumber company interested in five acres?

What is the minimum size for a catfish operation? The market is certainly a determining factor as well as the farm's physical resource base. In addition, the processing facility's size is important. This part of the production process can and does dictate the size of the market that a grower could capture and the pounds of fish he can produce.

This is also true with many fresh vegetable products. The post harvest handling and packaging process can be the "bottleneck" in determining an enterprise's minimum size. Cantaloupe can be sold bedded in straw on a truck in local terminal markets. Major commercial outlets will require hydrocooling and crating. For a grower to start out servicing the commercial market would require a large initial volume of production to be cost competitive, regardless of the size of the market or the volume he can produce.

Not all alternatives have these problems. Many have existing markets that can handle any size volume or product quality and no post production costs. Most livestock enterprises will fall into this category. Fed cattle in the Southeast may not. Stocker cattle minimum size is more a function of available pasture, equipment, facilities and management than market volume.

Regardless of the enterprise, size estimation is important in determining its feasibility on the farmer's operation. The problem is in deciding what part of the enterprise's production and marketing process is the most critical. Size should be designed around this limitation.

This is not to say that one cannot grow a half acre of something to experiment and get production practices down pat, but one will be dealing with different markets for large volumes.

Fruits—Blueberries/Muscadine/Blackberries

Milo Burnham

One problem of appearing on the program so near the close of a conference is that in preparation you fear that someone will tell your story, make your point or use your catchy phrase. This talk, for example, bears little resemblance to what I had prepared by Monday morning, just two days ago. Coming near the end, however, provides the opportunity to summarize, to pull together all the pertinent facts and to appear brilliant. However, I'm not going to do that. If I repeat some things you've already heard, it could be they bear repeating, or else I may have missed hearing them.

During the past two days you've been presented with information on the many and varied approaches to alternative farming.

Conferences on alternative crops are sweeping the nation. At the December 2-3, 1986, Adapt 100 Conference in Des Moines, whose theme was, "Know Your Market First," one fact that kept cropping up was that one of the stumbling blocks for financially strapped producers is that so many of the alternative crops discussed at the convention involved a large initial investment. We've seen the same situation at this conference.

Ideally farmers should be able to use existing equipment on alternative crops, but frequently this is not the case because of the specialty nature of the crop. Specialty crops are frequently:

1. labor intensive, and
2. require specialized and expensive equipment.

Horticulture crops are receiving more than their fair share of the attention being focused on alternative crops. At the 107th Arkansas State Horticultural Society Convention, November 11-13, 1986, of the 400 registrants, 20 percent were new to horticulture and looking for alternative crops.

A major stumbling block to those of us trying to deal with the complex issues of the current farm problems is that so frequently we feel we have to offer something to the farmer, when in fact there is nothing to offer and the best advice may be to get out.

Many of the specialty crops considered as limited acreage alternatives lack a research base in new geographic areas of production. For example, here in Mississippi, we lack a research base in herbs, ginseng, medicinal plants, Shiitake, oyster mushrooms and no doubt many others. I don't know that our footing on muscadines, blueberries and blackberries is as sound as it should be. We are sort of "learning along with the farmer," which is both dangerous and sometimes fatal to the farmer. Ventures fail before a research base can be established. Mississippi recently lost an oyster mushroom operation, and it may have been because we didn't have a mycologist on staff, or it may have been because we shouldn't have been trying to grow them. I don't know the answer, but I do know that I feel the constant frustration of trying to answer questions for which I don't have the answers.

Extension Horticulturist, Mississippi Cooperative Extension Service, Mississippi State University.

My purpose here is to provide you with some basic information on three fruit crops (muscadines, blueberries and blackberries) and why they are considered as "viable" alternative crops for some Mississippi farmers and perhaps farmers in other states.

Each of the crops has its own set of unique circumstances that make it a viable alternative in this state. Each of the crops is of course a specialty crop.

While developing this presentation, I received a reprint from my associate director entitled, "Why Specialty Farming Can't Work for Everyone." The basic tenet of the article was simply that if too many people start to produce a specialty crop, the supply soon exceeds the demand, the price drops, and we're back where we started.

We must recognize that people within the U.S. consume only so much food each day, week, month or year. An increase in availability through increased production does not necessarily lead to increased consumption. While the make up of this total food consumption changes slowly over time, you don't see big or rapid increases or decreases in total consumption, whether you want to measure it in calories, protein, fruit and vegetables, cereal grains, red meat, etc. The present health-nutrition kick in the U.S. is having an effect on fresh consumption as indicated by reports from the fresh fruit and vegetable industry, but at the expense of what? What we eat may change, but how much we eat doesn't change much. Look at the chicken and fish versus red meat situation. While the industry on the upswing is happy, the industry on the downswing is trying to recover its lost market. I'm saying this at the beginning because there isn't necessarily a shortage of the fruit products we will be discussing. **THE GROWTH OF OUR INDUSTRY WITH THESE CROPS WILL BE BASED ON THE CONSUMER BUYING WHAT WE PRODUCE IN PLACE OF WHAT THEY ARE ALREADY BUYING.** We can't expect people to significantly increase their consumption of fruit juice, jams, jellies, syrups or pies. They may, however, change type of juice--muscadine for apple; jams--blackberry for strawberry; or syrup--blueberry or muscadine for maple flavored.

Since a lot of fresh fruit purchases are impulse buying, an at-the-market unplanned purchase, we will see fresh blueberry, blackberry or muscadine consumption increase because of increased availability. U-pick opportunities can result in increased fresh consumption and processed substitution. People who U-pick, pick for both fresh and home processing use.

Now, let's take a few minutes to look at each of the three crops and the opportunities they present the farmer.

BLUEBERRIES

Mississippi currently has more than 600 acres of rabbiteye (*Vaccinium ashei*) blueberries with the major portion of the acreage having been planted in recent years. Blueberry acreage planted in Mississippi from 1970 to 1985 is as follows:

1970	0 acres
1975	less than 5 acres
1980	120 acres
1985	624 acres

Eighty-one (81) percent of the acreage in Mississippi is less than five years old, while 62 percent of the acreage in Louisiana is less than five years old. With current acreage and prices, the industry can go from a value of \$2.5 million to \$6 million in five years as the young plantings mature and reach full production. Additional acreage is being planted in the major areas of production, and other areas of the state are investigating the establishment of blueberry plantings.

The Mississippi blueberry industry started in south-central Mississippi with U-pick operations but has developed into U-pick, fresh market and processing.

Reasons for the growth and success of the blueberry industry in Mississippi are (not in order of priority):

1. There is an Area Extension Horticulture Specialist in the geographic area of production, and he serves as a leader to the industry. He holds production meetings and harvesting and packaging workshops prior to the harvest season covering harvesting, grading standards, packaging procedures, general mechanics of the drop station and the marketing program.
2. The USDA Small Fruit Research Laboratory at Poplarville, Mississippi, is at the production area.
3. There is a grower organization; Miss-Lou Blueberry Growers Association. It currently has 220 members (140 are commercial growers). It is grower run. The growers organized the association to stabilize the volume of the market and price. Members combine their fruit and resources and market together. The organization also provides for volume purchasing of grower materials.
4. A marketing agreement exists with the Arkansas Blueberry Association. The 1987 year will be the third year for the marketing agreement. Arkansas markets the high quality fresh fruit not committed to U-pick operations. The marketing agreement allows growers to maintain their U-pick operations. The berries are marketed mostly west of the Mississippi River in areas where blueberries are not extensively grown or are not in season. Eastern markets are generally supplied by the production from Florida, North Carolina, and Georgia.
5. There is an identifiable logo. Arkansas markets under the Ozark label, while Mississippi and Louisiana market under the Miss-Lou label. The logo is on each cellophane wrapper and each 12-pint flat of berries.
6. Volume purchasing of production items such as peat moss, fertilizer harvest aids, and packaging materials saves growers money.
7. The demand for fresh fruit at the time of harvest is sufficient for growers to receive a good price.
8. The harvest and marketing season is early and beats major producing areas. In 1985, Florida's earliest harvest at Gainesville was April 27, while their latest harvest was June 21 (variety--Southland). Florida berries came in approximately six to eight weeks before Michigan berries and received \$26 per 12-pint flat. In Mississippi the 1985 harvest began June 5, and the berries sold for \$15 per flat. The last of the Mississippi berries in 1985 (July 19th harvest) brought \$10.02 per flat. Arkansas harvested about four weeks before Michigan in 1985, and their berries brought \$11.10 per flat. Michigan's 1985 berries averaged \$9.00 per flat.
9. There are adapted early varieties of rabbiteye blueberries.
10. A sponsored newsletter is mailed monthly to all members of the association.
11. There are limited insect and disease problems.
12. Adapted, well drained, sandy loam, acid soils are available.
13. Adequate quality water for irrigation is available.
14. Banking seminars are held to educate lenders about blueberries and the profit potential.
15. Educational field days are held in May each year.
16. A Blueberry Jubilee as a promotional activity is held each year during harvest season. Over 10,000 attended the 1986 Jubilee on June 14-15, 1986.

Areas of concern to existing and potential blueberry producers are:

1. In the areas of major production, the U-pick market is saturated, adequate hand labor is not available, and growers must move to mechanical harvesting and grading. Processing outlets need to be developed to utilize the mechanically harvested berries (small, misshapen, soft) that don't make it to fresh market.
2. The cost of available hand labor is high.
3. There is a potential for crop loss as a result of late frosts and freezes. A freeze on March 20-21, 1986, destroyed 84 percent of the fruit in north Mississippi and 47 percent of the fruit in south Mississippi. Following the 1986 freeze the bushes made excellent growth because of the light fruit load, and producers are looking for heavy production in 1987.

- Bird damage is not yet serious, but could become a problem.

Economics of Production

- Cost of establishment (excluding land and equipment)
 - \$2500/acre
 - 600 plants/acre (6' x 12') @ \$1.50-\$1.65/plant = \$900-\$990/acre
 - 30 bales of peat moss/acre @ \$5.50/bale = \$165/acre
 - drip irrigation materials
- Annual Maintenance Cost
 - \$450-\$500/acre
- Yield Potential
 - 20 pounds/plant (6 tons/acre) @ \$.80/pound = \$9600/acre

Age (years)	Yield Per Plant With Age					
	1	2	3	4	5	6+
Yield lbs/plant	0	1.2	2.4	10.4	13.9	19.3

 - Hand harvest labor \$.25/pound (don't require grading) 18 pounds per hour/man = \$4.50/hour wages
 - Mechanical Harvest \$.08/pound (shaker and catch frame) 300 pounds/hour with shaker and catch frame
 - Grading, \$.21/pound, line handles 1400 pounds of fruit/hour
 - Packaging materials, \$1.06/flat or \$.09/pound
- Marketing
 - The market has developed on three fronts:
 - U-pick (local)
 - Fresh Market (Arkansas Association with broker)
 - Processing (developing: syrups, preserves, toppings)
 - In 1985, Miss-Lou marketed 5,577 flats @ avg. \$10.03/flat \$.83/pound
 - In 1986, Miss-Lou marketed 506 flats @ avg. \$10.50/flat \$.87/pound
- Return 600 plants/acre with 20 pounds/plant @ \$.80/pound = \$9600

MUSCADINES

The muscadine grape (*Vitis rotundifolia*) is native to the Southeast and grows wild in Mississippi. The commercial muscadine industry, beyond limited U-pick operations, received its initial push with the passage of the Native Wine Bill in the Mississippi Legislature in the mid-70's. Several vineyards, none exceeding 50 acres, were established along with four or five wineries. The product did not receive the market acceptability expected, and the industry hasn't grown as expected. Research at the same time on the development of unfermented juice products such as juice, jams, and jellies looked promising. White muscadine juice had taste appeal, and market testing indicated consumer acceptance of the white muscadine juice.

Southeastern Specialty Foods Corporation, a division of Broadhead Enterprises in Meridian, Mississippi, took the unfermented muscadine juice products and ran with them. In 1985, the company began offering contracts to farmers to encourage vineyard establishment in Mississippi. Construction of a processing facility began in early 1986 and was completed in the late summer of that year in time to crush the 1986 muscadine harvest. The \$2.5 million facility has 12,000 square feet and a refrigerated storage capacity for 132,000 gallons of juice. The state-of-the-art equipment consists of crusher, press, pasturizer, filter, and the refrigerated storage tanks. A bottling and product development facility for jams, jellies and syrup, are yet to be constructed.

In spite of the establishment of a processing facility, muscadine plantings in the state remain small. There are approximately 200 acres of mature bearing vines that were originally planted for wine, U-pick, and fresh market. The acreage of young vineyards may total another 500 to 600 acres. The processor has indicated that he will eventually have the capacity and need for the production for ten to 20,000 acres. Mr. Broadhead had hoped to see 1000 acres of new vineyards planted in 1986. This past fall, in a newspaper interview, he was quoted as saying that he is frustrated and disappointed with Mississippi farmers. For three years he has tried to convince Mississippi farmers that muscadine grapes turned into muscadine juice are a profitable alternative to traditional crops. "So far the response in Mississippi has been next to nothing. Mississippi farmers aren't doing anything but standing around singing the blues."

In 1986, 100 acres of muscadine production were processed into 45,000 gallons of juice. Grapes were purchased from Florida and North Carolina as well as Mississippi. Mr. Broadhead said he needed ten times as many grapes to break even and in an effort to obtain the needed fruit started his own vineyard in 1986 with the intention of planting 350 acres by the fall of 1986.

As an alternative crop, the muscadine situation is one where there is a facility to produce a marketable product for which there is consumer acceptance and an apparent market but no raw product to produce it. Mississippi farmers have failed to respond. The question of course is WHY?

1. Geographical Limitation - Muscadine grapes are sensitive to temperatures near zero degrees and below, and the best levels of production are likely to be achieved in south Mississippi. The processing facility is located in south Mississippi.
2. Contract Prices - Potential producers have expressed that the price of \$200/ton may be too low a price for the grapes. U-pick and fresh market muscadines sell for considerably more, yet opportunities for acreage expansion in these areas are limited.
3. High Level of Management - Muscadines require a high level of management, grower skill, and knowledge. Installation and maintenance require knowledge and skill as well as specialized equipment that potential growers do not have.
4. Initial Cost of Establishment - Establishment costs run about \$4000/acre excluding land and equipment.
5. Delay in Harvest - It is three years before the initial crop, but returns may not be adequate to begin repayment until peak yields are obtained in the fifth, sixth, or seventh year.
6. Slow Payback - If all generated income is turned back to pay off the capital borrowed for establishment, generated budgets indicate payback may not be achieved until the tenth year.
7. Production Problems - Diseases and insects are not yet serious problems, but the potential is there.

There are potential problems that farmers considering muscadine grape production must be aware of:

1. Grape Root Borer (*Vitaceae polistiformis*) - Adult males were trapped in 1986 using pheromone traps in vineyards. So far, there is no evidence of emergence or damage in these vineyards. A high of 57 moths was recorded on July 29, 1986. The insect has been reported in Arkansas, Alabama, West Virginia, Missouri, and Georgia, but had not been reported as established in Mississippi.
2. Crown Gall (*Agrobacterium tumefaciens*) - Cold weather injury has resulted in the development of symptoms of crown gall in established vineyards. The severity of infection and potential seriousness of this disease to the muscadine industry are not yet established.
3. Birds - Crows, Redheaded Woodpeckers and Flickers caused serious losses in a vineyard in 1986. Only mechanical devices are available for controlling bird damage.

Economics of Production

1. Cost of Establishment (excluding land and equipment)
Approximately \$4000/acre
181 plants/acre
posts, wire, trellis arms
irrigation
2. Annual Maintenance Cost
\$292 (excluding labor)
3. Yield Potential 9-11 tons/acre in the sixth or seventh year (120-150 gallons of juice/ton)
4. Marketing
Contracted at \$200/ton
5. Return
Depends on borrowed capital, interest, and payback period

BLACKBERRIES

The major blackberry producing areas in the U.S. are Oregon, other Pacific Coast states, Texas, Oklahoma, and Arkansas. Most blackberries produced in the U.S. are processed.

The blackberry industry in Mississippi is small. Acreage is currently limited to U-pick and the local capacity to absorb the crop. The potential for fresh market is undeveloped at this time as is the potential for a processing industry. Industry growth in the immediate future will be limited to small, scattered plantings for U-pick consumption.

Blackberries do have a place in the South. The public will buy on a U-pick basis and apparently will also buy fresh market. All markets for fresh fruit must however be close to the production area.

Blackberries require lower levels of management, grower skill and investment than do blueberries or muscadines. They are also less demanding of soil type. However, like muscadines and blueberries they must be irrigated. They provide a cash return in the second year.

The few, relatively small blackberry operations in Mississippi are all U-pick. One has a blackberry nursery in connection with the U-pick operation. This particular operation (Sunshine Berry Farm in Macon, Mississippi) currently has 13 acres for harvest and a three acre nursery for producing blackberry roots.

This operation has netted as much as \$5400/acre of U-pick fruit. In 1986, they sold over 200,000 root cuttings, enough to establish 80 acres of new blackberry plantings.

Blackberry production in Mississippi is based entirely on the Arkansas varieties:

Commanche - a 1974 release that is on the decline in the state

Cherokee - a 1974 release that is grown on a limited basis

Cheyenne - a 1977 release that constitutes about one-fourth of plant sales of Sunshine Berry Farm

Shawnee - a 1985 release, the most popular variety

Potential Problems

The most serious problem with blackberry production in the South is the disease known as double blossom. None of the Arkansas varieties are resistant to the disease, and there are no methods that provide complete control. Wild blackberries serve as a source of inoculum. A combination of rouging wild blackberries, spraying with recommended fungicides and rouging infected plants provide less than complete control.

Economics of Production

1. Cost of Establishment (excluding land and equipment)
\$1000 - \$1500/acre (\$1000/acre with irrigation if water is close)
2500 plants (18" x 12') @ \$.15 = \$375/acre

2. Annual Maintenance Cost

\$750-\$800/acre

3. Yield Potential

5 tons/acre

A 5-quart box requires on the average 45 minutes to harvest

4. Marketing

U-pick

5. Return

5 tons @ \$1500/ton = \$7500/acre

I want to thank Richard Mullenax, John Braswell, Joe Schmidt, James Jarratt, and Tom Miller for contributing the information from which this presentation was prepared.

Recreation—Game/Fee Fishing/Land Lease

John Thomas

Introduction

The problems facing the agricultural industry are known to most of us. They have been identified in terms of higher input costs, lower prices for products, over-production, increased foreign competition, and shifting consumer preferences and markets. The purpose of this session is to address a possible alternative that is available to farmers and ranchers and that may improve their profitability. This alternative is the recreational utilization of their land, water, and wildlife resources for commercial enterprises. In this session, we shall focus on consumptive forms of recreation and consider several important issues related to consumer marketing and to management of wildlife and natural habitat.

Let us first distinguish consumptive from nonconsumptive forms of recreation. Consumptive recreational behavior is characterized by human attempts to actively remove, withdraw, or eliminate a particular resource item. For example, hunting and fishing are consumptive behaviors. Nonconsumptive behavior is generally passive in its relationship to a natural resource. Activity is typically observational and includes, for example, birdwatching, trekking, and nature photography. While this distinction between consumptive and nonconsumptive behavior is admittedly simplistic, it serves us by indicating that the scope of recreational activities can be broad, that each activity may provide a different economic incentive for farmers and ranchers, that recreational participants and their needs may be different, and that management requirements may vary.

Consumer Marketing Considerations

Before farmers and ranchers decide what and how to manage wildlife and habitat, they should first consider the question posed by Margaret Follet at the turn of the century. She challenged companies to ask themselves, "What business am I really in?" How companies answered this question had long-term consequences for business survival and product diversification. Today, this question is put to farmers and ranchers (to whom we shall refer as "landowners").

According to Gramann (1986), one of the most serious mistakes a landowner can make when considering the business of selling hunting leases is to assume that his product is wildlife, or the lease, itself. From a marketing endeavor, these should be viewed as raw materials or resources. In fact, past studies tell us that it is not the trophy but the "recreational experience" that hunters value most (Thomas and Adams, 1982; Stribling, 1986; Gartner, 1986). This experience is the service and the atmosphere--the product, that producers are in the business of providing. As this is the case, landowners must address several issues in their marketing of the recreational experience product. We list and briefly discuss these issues below.

Who are the market segments?

Pride and Ferrell (1977) define a market segment as "a group of individuals, groups, or organizations that share one or more similar characteristics which make them have similar product (experience) needs." It is important that landowners identify by market research who constitutes consumptive and nonconsumptive market segments within the general public (Gartner, 1986). Each segment has unique and specific preferences and expectations regarding a recreational experience.

Information on these market segments can come from several sources. Landowners can fund custom designed studies either as individuals or collectively through cooperatives. They can obtain general socioeconomic data from the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation; the U.S. Department of Interior, in cooperation with the Department of Commerce, has conducted this survey every five years since 1955. Their findings are representative of consumptive and nonconsumptive recreative populations and are reported for each state. For example, Tables 1 through 4 report activity and expense information on hunting and fishing in five selected Southern states. Lastly, landowners can obtain county and state-level data from their extension service, agricultural experiment station and other state agencies which may have conducted hunting and other recreational studies.

What activities and services are to be provided?

An important consequence of identifying market preferences and expectations is the landowner's determination of a single or variety of wildlife recreational activities and services he will provide and to which groups he will make them available. If a landowner is primarily interested in leasing to hunters, his "package" may vary from simply permitting access to existing wildlife such as deer to providing improved roads, lodging, dogs, habitat management, mixed-game management, hunting blinds, and harvest dressing and storage facilities (Gramann, 1986; Stribling, 1986; and Steinback, et al., 1986).

How should the recreational product be promoted?

Landowners have traditionally relied on word-of-mouth as their primary means of lease promotion. However, this can be ineffective and inefficient, particularly when large lease operations are developed with substantial cash and noncash (e.g., equipment depreciation, landowner's labor, opportunity costs, etc.) investments. Such operations will require active marketing and advertising strategies to obtain high client activity, profitability, and stability. These strategies can be expensive relative to other costs since they depend on how large a geographic area from which a producer wants to draw his clientele, the method of advertising (e.g., newspapers, specialty magazines, radio/TV, and computer mail networks), and the frequency of advertising.

Particular attention should be paid to the method of advertising. Studies indicate that consumer and nonconsumer recreational groups not only differ in their background characteristics but also in their tendencies to favor particular forms of media and sources of information such as recreational and hunting trade shows. Therefore, selection of market segments and recreational services by landowners should coincide with their selection of appropriate advertising methods.

Table 1. Total Population and Number of Hunters and Fishermen by Selected Southern States in 1980.

State	Total Population (000's) ^a	----- Hunted or Fished ----- Number (000's)	Percent
Alabama	2,859	1,045	36
Georgia	4,003	1,334	33
Louisiana	3,051	1,025	34
Mississippi	1,792	666	37
Texas	10,536	3,256	31
U.S.	169,942	46,713	28

^aBased on population 16 years of age and older.

Table 2. Number of Hunters and Days by Game Type in the South, 1980.

Game Type and State	Hunters ^a		Hunting Days		
	No. (00's)	Percent of All Hunters	No. (00's)	Percent of All Hunting Days	Mean
Big Game^b					
Alabama	3,165	69.3	42,290	42.1	13
Georgia	3,399	71.4	40,800	52.1	12
Louisiana	2,939	60.5	38,018	52.1	13
Mississippi	2,816	73.2	46,894	42.4	17
Texas	8,383	62.0	66,649	29.4	8
U.S.	118,061	67.7	1,127,883	34.2	10
Small Game^c					
Alabama	3,277	71.7	38,723	38.5	12
Georgia	2,825	59.4	25,819	33.0	9
Louisiana	4,027	83.0	61,459	48.6	15
Mississippi	2,993	77.8	44,885	40.6	15
Texas	8,971	66.4	10,046	44.6	11
U.S.	123,620	70.9	1,512,459	45.8	12
Migratory Birds^d					
Alabama	1,784	39.0	15,491	15.4	9
Georgia	1,505	31.6	8,499	10.9	6
Louisiana	2,018	41.6	19,430	15.4	10
Mississippi	1,516	39.4	11,239	10.2	7
Texas	6,876	50.9	50,641	22.3	7
U.S.	53,108	30.4	429,096	13.0	8

^aHunters were 16 years of age and older.

^bBig game included deer, elk, antelope, moose, bear, wild turkey, mountain goat, and mountain sheep.

^cSmall game included rabbits, quail, grouse, squirrel, and pheasant.

^dMigratory birds included geese, ducks, doves, and other game birds.

Table 3. Days of Freshwater Fishing in the South, 1980.

State	Total Number of Fishing Days (000's) ^a	Days of Freshwater Fishing	Percent of Total	Average Number of Days
Alabama	19,972	19,018	95.2	21
Georgia	25,643	23,803	92.8	20
Louisiana	19,271	30,816	84.4	21
Mississippi	14,178	12,865	90.7	23
Texas	57,745	40,301	69.8	17
U.S.	857,624	710,572	82.9	20

^aBased on population of fishermen who were 16 years of age and older.

Table 4. Fishing and Hunting Expenditures in the South, 1980.

State	Expenses ^a	Hunting		Expenses	Fishing	
		Percent Resident	Percent Nonresident		Percent Resident	Percent Nonresident
Alabama	\$ 78,491	74.6	25.4	\$ 151,528	76.7	23.3
Georgia	63,123	91.1	8.9	148,623	92.0	8.0
Louisiana	82,374	92.6	7.4	153,529	84.3	15.7
Mississippi	81,550	84.0	16.0	91,839	80.1	19.9
Texas	262,080	94.0	6.0	583,567	93.9	6.1
U.S.	\$2,775,684	84.6	15.4	\$7,117,225	78.1	21.9

^aExpenditures were for food, travel, and fees. Dollars are in 000's.

What are various types of land access?

Landowners should be quick to realize that consumers and nonconsumers can gain access to land and wildlife resources by several means. For example, in a 1982 survey of Texas hunters, white-tailed deer hunters used a variety of means--33 percent used land owned by a friend or relative, 15 percent hunted on their own land, 14 percent used land leased by a friend or relative, 10 percent hunted on company owned/leased land, and 8 percent hunted on public land. Of the 1723 deer hunters in the survey (75 percent of the total number of respondents), only 39 percent purchased a lease (Thomas and Adams, 1985). This compares to 35 percent for javalina, 24 percent for duck, 19 percent for quail, and 15 percent for dove. Overall, these percentages suggest there is much informality in the hunting market and that a landowner's market share could be thin among a small leasing population of hunters.

Furthermore, landowners need to be aware that access conditions vary from state to state, particularly in terms of the ratio of privately to publicly owned land. In Texas, 96 percent of the land is privately owned, whereas in Wyoming and Colorado the majority of the land is public. In states where public land abounds, private landowners have to compete against "free access" conditions, which affects negatively lease marketing and pricing. Therefore, private landowners in the South should investigate the availability of public lands and the access policies of the Department of Parks and Wildlife or the comparable agency within their state.

What are the types of leases and pricing?

Before landowners lease land for hunting and fishing, they also need to consult their state regulations. In many areas, they are required to purchase a hunting preserve permit. In Texas, for example, these permits vary from \$20 to \$60, depending on the size of the lease acreage.

There are four general types of leasing arrangements. The first and most common type of leasing arrangement is the annual or seasonal lease. Under this arrangement the landowner provides a hunter or group of hunters the privilege of hunting on the land for a full year or for a particular hunting season. Annual leases often allow the hunters to hunt multiple species within their respective seasons throughout the year. Seasonal leases generally allow hunting limited species during their hunting season. The hunters and the landowner will agree on the services provided by the landowner and harvest quotas for the hunter (within the established state and county game regulations). In addition, this arrangement may also include privileges to engage in other non-hunting activities such as wildlife and nature photography, camping, horseback riding, etc. (Thomas and Adams, 1982; Pope, et al., 1984).

The second type of leasing arrangement is for a day-hunt. Under this arrangement the landowner allows hunters access to wildlife on the land on a per-day basis. Again services provided by the landlord, and hunter and harvest quotas are agreed upon beforehand.

A third type of leasing arrangement is where the landlord charges hunters directly for the animals bagged during a specified period of the season. Charges may differ by sex, size, antler development, or other such characteristics. Often there will be a base per-day or per-season charge for access to the property and an additional fee depending on the animals taken. Where fee-fishing is involved, charges will be based on pounds harvested.

The fourth type of leasing arrangement is where the landowner sells the rights to access his land for hunting or other recreational activities to an outfitter, a recreational or sportsman club, or some other such organization and allows them to manage access to the land for hunting or other outdoor recreation for a predetermined period of time and within an agreed upon set of conditions.

Under all leasing arrangements, the price of the lease depends on the services offered, the game species that can be hunted, the quality and quantity of wildlife, the aesthetic appeal of the land, the number of acres of land involved, the distance from metropolitan areas, economic conditions of the targeted market, tax laws and other such factors. Some services that can be provided by the landowner are lodging, meals, guiding, tree stands, maps of the ranch, target ranges, and campsites. Moreover, landowners interested in deer leasing can build deer-proof fences around their property, provide supplemental feed to the wildlife, conduct population counts to assess a given sex ratio or age distribution, and establish populations of exotic game, or other such practices that help provide a marketable wildlife resource to outdoor recreationists interested in accessing wildlife (Pope, et al., 1984).

In Texas, costs of hunting leases in 1982 varied from \$1 to over \$5,000 (Thomas and Adams, 1983). The average cost of a white-tailed deer lease was \$393. Slightly over 90 percent of the leases bought to hunt primarily white-tailed deer were annual or seasonal leases. The average cost of a mule deer lease was \$902. The average cost of leases to hunt duck and geese was \$626 and \$758, respectively. The cost-of-lease data for dove, quail, squirrel, rabbit, turkey, and javalina varied from \$293 for squirrels to \$647 for quail.

What other regulations are involved in leasing for hunting?

Although landowners control habitat resources, state and county game regulations control licensed hunting, bag limits, and seasonality. Hunters on private as well as public land are required to purchase a license and comply with hunting regulations. The conditions of hunting leases are limited by these regulations. For example, landowners sell hunting leases that allow for the hunting of does to only licensed hunters during regulated doe seasons (Pope, et al., 1984). The regulations do not apply when landowners breed these and other game for commercial hunting. In such cases, they may have to obtain a "game breeder's permit" (about \$100 in Texas) and clearly mark, tag, or brand their game livestock. Generally, when landowners breed game, they enclose their acreage to improve breeding and migratory control.

Wildlife and Habitat Management Considerations

This brings us to our next area of discussion. After landowners get an understanding of the market, its preferences, and governing regulations, they should investigate the complexities of managing wildlife and habitats. Figure 1 illustrates the relationship among these activities as they affect game quality through the implementation of various management strategies.

For animal management purposes, there are three types of wildlife: (1) resident-native game, (2) resident-bred game (introduced by the landowner), and (3) migratory game. Each of these varies by the landowner's legal relationship with the game and his control over the physical migratory patterns of the game. For residential game, the landowner owns the land and water resources on his property; the state owns the wildlife. The migratory patterns of these game may be limited to local areas and may include several farms in their geography. For example, a "management unit" for white-tailed deer is estimated to be 6,000 acres. For resident-bred game, the landowner views them as property and totally controls or confines their migratory behavior. Because of this high degree of control, he can affect breeding quality and number, often difficult to do with non-property game. For migratory game, the landowner controls only land and water resources; the state regulates the wildlife. Ownership is difficult to establish, particularly for migratory game such as waterfowl.

These types of wildlife have two major management activities in common: (1) the need for landowners' understanding of game characteristics and sustenance requirements, and (2) their need to adopt appropriate habitat management methods. Relevant issues for each are identified below.

What are several important game characteristics?

Game and wildlife quality depends on several interactive factors including: (1) size of populations, (2) food requirements, (3) variety and integration of wildlife, and (4) predation. Excessive numbers of grazing/ browsing wildlife and livestock create competition that can result in lower body weights, less breeding frequency, and fewer offspring. Consequently, landowners need to periodically conduct wildlife and livestock population counts and, when possible, carefully control breeding patterns.

Food requirements can vary also among species, with some species being more adaptable than others. For example, cattle prefer grass, but they use some forbs and browse. White-tailed deer prefer forbs and browse, but use some grass. Fallow deer prefer browse, but use large amounts of grass and forbs. In comparison to cattle and deer, exotics (e.g., axis deer, mouflon sheep, and other ungulates) are more flexible and versatile feeders. They prefer to graze where herbage is the dominant forage but can readily browse when herbage declines and/or attains maturity (Stuth and Sheffield, 1986). Therefore, landowners in their selection of various species, in addition to livestock, must consider the forage habits of these species to create and maintain a balanced and compatible forage demand system.

Some work in assessing and estimating specie forage demand has been conducted by Stuth and Sheffield (1986). They grouped animal species into 11 feeding classes based on the relative percent of grasses, forbs, and browse found in each species' year-round diet in primarily herb-dominated and browse-dominated range conditions (Butts, et al., 1982). They assumed the amount of forage used by an animal equaled 2 to 4 percent of its body weight. This percent varied inversely with animal weight. Table 5 presents their results for beef cattle, axis deer, white-tailed deer, and blackbuck antelope. Their data, which were estimated also for nine other species, suggest that the selection of animal species can create either a compatible relationship (e.g., beef cattle and white-tailed deer) or a competitive relationship (e.g., beef cattle vs. axis deer) for forage demand.

In addition to information about population factors, forage demand, and integration of different species, a landowner should investigate the potential impact of predation patterns on game populations in his area. For example, Andelt (1985) reported that nearly 80 percent of coyote diets consisted of white-tailed deer in June coinciding with the fawning season. Sargeant, et al. (1984) reported high levels of red fox predation on various duck species. Any effective management plan will require coping with or reducing seasonal high levels of predation.

What kinds of information are important for habitat management?

After landowners acquire an understanding of interactive animal (livestock and game) characteristics and their sustenance requirements, they should investigate flora and water habitat conditions on their property. Along with estimating the number of animals by species per acre, they need to determine the type and acreage of various range sites and to estimate the number of pounds of annual production by forage class (grass, forbs, browse) on each site. They can then use these data to estimate acreage carrying capacities and pounds of consumable forage (Stuth and Sheffield, 1986).

Landowners can obtain range site guides from the Soil Conservation Service and general production estimates from their agricultural experiment station and extension service. Specific site surveys should be conducted to supplement this general information. Standing crop estimates by forage class should be made in mid-spring, early-summer, mid-fall, and mid-winter. If landowners do not have the time for such surveys, they can conduct a one-time vegetation survey of each site in mid-summer; however, this is a less accurate estimate of forage production (Stuth and Sheffield, 1986).

To illustrate this estimation process, forage supply and carrying capacity information have been prepared for four range types in a hypothetical 2000-acre ranch in the Edward's Plateau area of Texas. Table 6 presents forage production data and Table 7 presents consumable forage data. With these and previous sustenance estimates, the landowner can calculate impacts

Table 5. Average Body Weights, Intake Factors, and Feeding Classes for Selected Animal Species in the Edward's Plateau Region of Texas.

Animal Species	Average Body Weight	Intake Factor	Feeding Class ^a	
			Herb-dominated ^b	Browse-dominated ^c
Beef cattle	900	3.0%	I(90/ 5/ 5)	II(80/ 5/15)
Axis deer	160	3.5%	II(60/25/15)	V(30/20/50)
White-tailed deer	100	3.5%	VI(10/60/30)	XI(10/30/60)
Blackbuck antelope	75	4.0%	III(50/30/20)	V(50/10/40)

^aDietary composition for each animal feeding class.

I	90% Herbage/grass	VII	50–60% Herbage/forbs
II	80–90% Herbage/grass	VIII	60% Browse/grass secondary
III	70–80% Herbage/grass	IX	50–60% Browse/grass secondary
IV	60–70% Herbage/grass	X	60% Browse/forbs secondary
V	50–60% Herbage/grass	XI	50–60% Browse/forbs secondary
VI	60% Herbage/grass		

^bHerbage-dominated range has succulent, non-woody vegetation. Percentages in parentheses are estimated respectively for grass, forbs, and browse proportions of diet.

^cBrowse-dominated range has primarily all woody plant material.

Source: Stuth and Sheffield, 1986.

Table 6. Quantity of Grasses, Forbs, and Browse Available for Animal Use by Range Site on a 2000-Acre Range in the Edward's Plateau Area of Texas.

Range Site	Acres	— — Forage Production (lbs/acre) ^a — —		
		Grasses	Forbs	Browse
Low Stoney Hill	700	1200	450	600
Deep Upland	450	1800	200	100
Rolling Hardland	450	1500	400	500
Shallow	400	1100	350	550
Total	2000	5600	1400	1750

^aDetermined for each range site by clipping and weighing each class of forage on sample-plots, or by using general estimates from the Soil Conservation Service and Extension Service.

Source: Stuth and Sheffield, 1986.

Table 7. Consumable Forage Estimates by Range Site on a 2000-Acre Range in the Edward's Plateau Area of Texas.

Range Site	— Available Forage (000's of lbs) —		
	Grasses	Forbs	Browse
Low Stoney Hill	840	315	420
Deep Upland	810	90	45
Rolling Hardland	675	180	225
Shallow	440	140	220
Total	2765	725	910
Efficiency Factor (%)	25	30	40
Consumable Forage ^a	691	218	364

^aCalculated by multiplying the total of each forage type times its efficiency of harvest factor. Grass is assigned the lowest percent because its high rate of continual growth throughout the growing season results in a reduction of the amount consumed relative to growth.

Source: Stuth and Sheffield, 1986.

on carrying capacities. As shown in Table 8, population densities and forage usage for beef cattle, axis deer, white-tailed deer, and blackbuck antelope have been determined along with acreage carrying capacities. Note with these densities there is a shortage of forbs. At this point, the landowner would determine if there is sufficient alternative forage available (grasses and browse) and/or would seek to control consumption by manipulating population densities. In this example, the landowner would attempt to balance forage supply by increasing the harvest of white-tailed deer. Other strategies or scenarios for range and specie management can be contrived with computer software such as the EXOTIC3 program developed by Stuth and Sheffield (1986) at Texas A&M University.

Finally, landowners need to assess water availability for and demand by species. The selection of some ungulate species, such as eland for either livestock or game, may have a minimal effect on water demand conditions. Eland are indigenous to Africa. Yet, ranchers (e.g., the Y.O. Ranch in Kerr County, Texas) in the Southwest who are hard pressed by dwindling water supply, encroaching tree growth, or overgrazing problems are experimenting with them. Eland can subsist almost entirely without water, except that obtained from leaf-browsing (Lambrecht, 1983). When landowners introduce these and other exotics, or focus on indigenous species, they should estimate minimal water-demand conditions for varying sizes of herds and forage situations.

Landowners interested in other game species such as waterfowl may devote more attention to wetland and pond management than they would for ungulate game. For example, once waterfowl migration is underway, the only factor a landowner may control is the availability and suitability of wetland habitat. Moreover, Southern landowners compete with other landowners along migratory flyways in attracting birds and, depending on where these birds are in their migration, may provide different habitat and food conditions. In many areas of the South, the majority of the waterfowl prefer shallow water areas with some type of vegetation offering loafing and resting cover (Chamberlain, 1984). Landowners can select among several types of millet, smartweed, and duckweed to provide aquatic food. Food quality will vary with the degree of water quality and a landowner's capability to adjust wetland water levels to enhance growth conditions. According to the work of Chamberlain (1984), a landowner's ability to develop a profitable waterfowl hunting enterprise will depend on his having at least 1,000 acres of attractive habitat conditions and a waterfowl population with a high fidelity to the area.

Conclusion

To briefly summarize our discussion, we have identified several factors that landowners should consider and investigate if they plan to develop a recreational enterprise involving wildlife as a game resource. We suggested that their plan begin with a market study to identify various consumer segments and the preferences for services by each of these segments. Accompanying such a study, landowners should contact appropriate state and county agencies for regulations and fees affecting their operation. With marketing and regulatory information in hand, landowners should then assess the characteristics of indigenous and alternative wildlife to determine levels of compatibility with each other and livestock. Next, they should assess existing land and water habitat conditions to determine carrying capacities available for different combinations of game and other wildlife species. Finally, landowners should develop marketing and management strategies aimed at providing a rewarding experience to consumers and high quality game (Steinback, et al., 1986).

This level of effort and the financial commitment to developing recreational alternatives (and supplements) to agriculture may vary from landowner to landowner. At one extreme, landowners can operate an access-only operation where they primarily sell leases, provide little to no wildlife and habitat management, and provide few support services to consumers. Profits will be primarily short-term with long-term negative impacts on the ecology of a land resource. At the other extreme, landowners can develop marketing strategies, carefully select and

Table 8. Impact of Range Forage for Selected Ungulates, Their Stocking Densities, and Acreage Carrying Capacities on a 2000-Acre Range in Texas.

Species	Density AC/HD	Total No. of Head	—Forage Use (000's lbs. air dry)—		
			Grass	Forbs	Browse
Beef cattle	45	44	350	44	44
Axis deer	40	50	67	19	10
White-tailed deer	5	400	51	307	153
Blackbuck antelope	80	25	19	5	3
Total Forage Demand (D)			487	374	209
Consumable Forage Supply (D)			691	218	364
Remaining Forage (S-D)			204	-156	155
Balance Per Acre			102	- 78	78

Source: Stuth and Sheffield, 1986.

manage game species, enhance habitat, and provide a variety of services. Profits may be delayed until startup costs have been recovered, yet they may be more sustainable in the long-term with a more satisfied clientele. Moreover, long-term impacts on the ecology of a land resource will be positive.

Some research on the economic returns of recreational leasing has been conducted in central and southwest Texas (Steinback, et al., 1986). For a no service-type operation, break-even charges vary from \$.67 to \$1.88 per acre. For a modest service-type operation, the break-even charges vary between \$3.36 to \$4.25 per acre. For intensively managed operations with multiple services, break-even charges vary from \$6.62 to \$9.37 per acre. All of these charges include cash and non-cash operating costs. Cash costs ranged from 12 to 40 percent of the break-even charges. Overall, these numbers indicate that financial risk exists. This risk could be compounded by the possible presence of small market segments, resulting in higher lease costs to fewer consumers. Moreover, the new tax laws and depressed economic climate in most of the South will have a strong downward influence on potential hunting revenue. Therefore, landowners should not ignore conducting marketing research, regardless of their level of involvement in this recreational alternative to agriculture.

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Vegetables as Alternative Crops

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Vegetables are potential alternative crops for farmers in many areas of the U.S. However, vegetables and other possible alternative crops cannot replace the vast acreages of program crops that are currently in oversupply. National farm policies are much debated, with complicated economic, social and political issues and no easy solutions. Pressures to assist farmers in the production of alternative crops will continue as long as world economic conditions and national farm policies remain unchanged.

Oklahoma agriculture is primarily wheat and beef. Because of low wheat prices and changes in the peanut program, with increasing frequency, farmers have been requesting information and assistance in the production of vegetables and other alternative crops to supplement their farming operations.

Numerous publications for these clientele have been prepared by extension and research workers. Many were written primarily for the small farmer considering vegetables as alternative crops. Other publications provide detailed production and enterprise budget information needed by the agronomic crop producer planning to grow vegetables as an alternative or supplemental enterprise. A list of these publications is included at the end of this paper.

Numerous alternative crop farmer meetings have been held at the county and area levels to provide information to interested farmers. One state-wide alternative crops program was conducted. Attendance at these programs was good, and followup requests for additional information and assistance taxed the personnel and resources available to provide the assistance.

The Marketing Development Division, Oklahoma Department of Agriculture, conducts two programs to assist fruit and vegetable growers. The first is a direct marketing program for fruit and vegetable marketing. They work with local leaders, producers and potential producers to develop new farmers' markets, organize farmers' market associations and expand and improve existing farmers' markets. Some markets have permanent facilities while others use open lots.

Since the inception of the farmers' market program in 1983, 22 markets have been organized or assisted throughout Oklahoma. In 1986 alone there were 12 farmers' markets organized. With each market there has been a fruit and vegetable growers' association organized with 20 to 30 members to support the market. Consumers are taking advantage of the quality and variety of fruits and vegetables available. The markets are viable outlets for small farmers to sell their produce, and the grower associations assist in educational programs to promote production of quality fruits and vegetables for the markets.

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The second program conducted by the Marketing Development Division assists producers in promoting Oklahoma-grown fruits and vegetables. Individual growers or grower groups are placed in contact with chainstore and other wholesale produce buyers. They also promote the consumption of Oklahoma-grown fruits and vegetables by consumers through various forms of advertising.

Three Rivers Produce, located at Atoka, Oklahoma, began operations in 1984 to enable more southeastern Oklahoma farms to grow vegetables. Three Rivers Produce has grading, packing, and marketing facilities to perform services on a fee basis to area producers. They have fulltime staff people working in field production, grading and packing house operations, and in vegetable marketing. In 1987, 300 to 400 acres are scheduled to be produced for packing and marketing through their facility. Prior to Three Rivers Produce, most vegetable production in the area was marketed through roadside stands. Asparagus production has been promoted as an alternate crop in Oklahoma over the past eight years. As a result there are about 600 acres now in production. The average producer is a small farmer with five to eight acres of asparagus. The largest grower in Oklahoma has 70 acres. About 100 more acres will be planted in 1987, and expansion at a slow rate is expected to continue. With most growers having only small acreages, much of the asparagus is direct marketed or wholesaled directly to grocery stores and roadside markets. Only a few growers have enough production to pack and ship to out-of-state wholesale markets or to supply chainstore distribution centers in Oklahoma. The local market is becoming saturated, and new producers considering asparagus as an alternative crop are advised to investigate their markets carefully before planting.

Making asparagus a viable alternative crop in Oklahoma took persistent effort by extension and research workers. Variety and several cultural trials were planted at the vegetable research station in 1978. As data were being collected in 1979, the first field day was held. A production bulletin was published in 1979 providing detailed planting, growing, harvesting and handling information. Enterprise budgets were prepared which provided cost and return information to prospective growers and lenders.

To sustain interest and disseminate field production information in asparagus and other vegetables, two field days have been held each season at the vegetable research station. Asparagus variety demonstration plantings were established at three additional locations in the state during the last three years.

Cercospora needle blight was an unexpected pest problem that developed after three years' production in Oklahoma. Applied research was conducted to determine economic control methods. An extension fact sheet that provided disease identification and control procedures was published to disseminate cercospora and other asparagus disease information to farmers.

Not all attempts to develop new crop alternatives for Oklahoma farmers have been a total success. Spice peppers were investigated and promoted on a trial basis but on a smaller scale than asparagus, over the same time period. A processor that was importing spice peppers was a potential buyer for paprika and pungent peppers. Some success has been achieved with pungent peppers, and production is expected to increase; there is currently no commercial paprika acreage in Oklahoma. Suitable commercial varieties of paprika were not found that were machine harvestable and also provided economic yields of suitable quality for the buyer. Without time consuming variety improvement research, paprika production will not become established in Oklahoma. Tumeric, lovage and rosemary have also been evaluated, and as time and other resources permit, other potential alternative crops will be evaluated for production in Oklahoma.

In the alternative crops meetings for farmers, in extension publications, and in mass media releases several important points are made clearly so that farmers understand the issues involved in alternative crops:

1. Vegetables are viable alternative crops for only a small percentage of the Oklahoma farmers considering them as alternatives.
2. Vegetables, as well as many other alternatives, are not a way out of a debt crisis situation for a farmer.
3. Vegetable production profits are potentially high if: yield is good, quality is good, price is good, and **all** is marketed. Potentially high profits will diminish quickly if any of these four factors becomes a problem.
4. Vegetable crops are much more labor and capital intensive than traditional agricultural enterprises in Oklahoma.

When evaluating alternatives, producers are encouraged to examine their physical and financial resources, management issues, and marketing concerns.

Physical and Financial Resources

Physical and financial resources can restrict the ability to add vegetables to individual farms. Land, water for irrigation, equipment, facilities for handling crops, and capital all may limit opportunities for vegetable production. Each of the limiting factors is discussed below:

Land: The amount of land needed is less for vegetables than for agronomic crops. However, in Oklahoma, only the best quality and most productive soil should be used for vegetables. This is due to the greater investment of resources in vegetables and the need to reduce as many risk factors as possible. Specific soil textures are very important for some vegetables. Topography and exposure can also be important considerations. Soil acidity, surface and internal drainage, perennial weed and other potential pest problems can influence production. Natural wind shelter is an advantage in vegetable production.

Irrigation: The capability to supply supplemental water through irrigation is mandatory in most instances. Even short periods of water stress can drastically reduce yield and quality, which leads to reduced prices and profit. Profits or even the entire investment can be lost without irrigation. To eliminate this risk, an adequate source of good quality irrigation water and a method to apply the water to the vegetables are required. If irrigation is not available, effort must be made to determine availability and the costs that would be incurred to develop a water source and distribution system.

Labor: For small farmers, availability of family labor may be an important consideration. Vegetable production offers an opportunity to market family labor. Labor availability may be seasonal due to school, other obligations and farm enterprises. Age may limit tasks that they can perform. The quantity and type of labor available for hire must be considered. Laborers may consider the jobs associated with vegetable crops difficult. If labor is not available, additional machinery can be used for some operations. Additional machinery to substitute for labor may substantially increase capital needed for investment and operating costs of the alternative enterprise, especially for small-scale producers.

Equipment: Some vegetable crops require specialized equipment not usually found on farms growing wheat. Row crop farmers generally have some field equipment that can be used in growing vegetables. However, specialized seeding or transplanting equipment as well as harvesting equipment is usually not available. A small-sized operation may operate by substituting additional labor for the equipment or possibly making the equipment in the farm shop. However, this is usually not possible with larger-sized operations where timeliness may be most important. Used equipment can sometimes be purchased from major vegetable production areas. If available in the area, custom hiring or renting of needed equipment may be possible. Availability of equipment and possible sources and the cost should influence the alternative crop selection decision.

Facilities: Needed facilities for grading, packing, cooling, holding and possibly storing are generally not available or are available in less than optimum condition. A new grower of alternative crops often must "make-do" with marginal or temporary facilities. Should an alternative, through experience, prove to be a viable operation, then resources to acquire or improve needed facilities can be more easily justified. Investment in facilities can be sizable and should be fully considered when selecting vegetable crops for production. For small-scale producers it may be necessary to form marketing organizations that perform some of the grading, packing, cooling, and storing functions.

Capital: Selection of the vegetable crops to grow has a large influence on capital needs as well as cash flow on the farm. Producing vegetables during a time of low cash income can improve overall cash flow and reduce borrowing of capital. Most vegetable enterprises are more capital intensive than agronomic crops. Consequently, the farmer must consider the alternative enterprise along with other capital needs. Cash flow planning is essential for all crops considered. Availability of capital for alternative crops may be limited. Cost and availability of capital will depend on the lender's attitudes about the risk of the enterprise and the duration of need.

Management Issues and Operating Strategies

If yield, quality, and price are good, and all is sold, then potential profits from vegetables can be very high. However, if any one of these four important factors is lacking, then large losses are possible. Due to the greater resources required to produce an acre of vegetables compared to most traditional crops, the potential loss is much greater on a per acre basis with vegetables. In addition, there are significant risks in the production and marketing of alternative crops. There are no government price support programs, so "farming the program" as sometimes occurs in program crops is not possible. Movement and prices for vegetables are based on supply and demand. A market may not exist at any price for vegetables, while a cash market at some price is always available for grain and livestock. Perishability of vegetable commodities at maturity also increases risk. Many vegetables require immediate harvest and cooling at market maturity, or yield and quality loss will result.

The high profit potential and great risk of vegetables highlight the need for new producers to deal with a large number of management issues. The manager and his attitudes, selection of operation size, crop selection, pest control, quality and weather all influence the profitability and riskiness of vegetable enterprises and can be influenced to greater or lesser degrees by the manager. Each is discussed separately.

Management and Attitudes: Most vegetable crops require more time and different expertise than agronomic crops. The farmer must have the time to manage vegetables. Timing of pest management practices, irrigation and harvesting are often critical to success. Successful timing requires at least daily crop inspection during the growing season. If the farmer has raised other horticultural or related crops where cultural practices and marketing were very precise, management skills may be available. If expertise is lacking, the farmer must be willing to work with others when a problem arises. Marketing expertise is very important and may be the management skill that is most deficient in the new alternative crop farmer. In some instances hired expertise may be available if the operation is large enough to justify the expense. If experience is lacking, many new cultural and other production and marketing practices will need to be learned quickly. In order to learn as much as possible from each experience, record keeping from the beginning of the alternative enterprise cannot be overemphasized. If what was done and how it worked or did not work is not recorded for future use, very valuable information is lost.

The manager's attitude may be the most important factor influencing success. Age, health, and willingness to learn and follow recommended practices are related characteristics. Younger

farmers generally have an advantage over older farmers with respect to attitude. Flexibility and willingness to change crops in the farming operation have become less of a strain for farmers the past few years. In Oklahoma, this change may be related to more severe farming operation problems and to the fact that peers are considering or even attempting to produce alternative crops in their neighborhood.

Crop Selection: Vegetable crops encompass many different types of crop plants, and they vary considerably in growing and marketing requirements as well as risks to the farmer. Crop selection must consider existing enterprises and all resources available to the farmer from land to labor, capital, equipment and grading, packing, and marketing facilities. Generally, growing more than one vegetable crop can reduce risk and be a more efficient use of resources. However, too many new crops can overtax the farmer's management ability and increase the likelihood of failure. Often, through crop selection and timing of production, more efficient use of existing resources may be possible.

Size of Operation: Resources available for alternative crops will control the size of the alternative crop operation. The amount of risk that the farmer can assume is another important factor. How much can the farmer afford to lose and remain in business? Management ability and time available to manage alternative enterprises are factors differing with individual farmers and are sometimes difficult to assess. Marketing methods can also influence size of operation. Marketing through a broker may require a minimum volume of production, while marketing through a local farmer's market or independent store is possible with smaller production volumes. In many instances, starting small is recommended since risks are reduced and the farmer is better able to learn production practices, assess markets, and evaluate how well particular vegetable crops match available resources.

Pests: Weeds, insects, diseases, nematodes and animals can all be pests which contribute to the risks in vegetable production. If one or more of these types of pests are present but not recognized or ignored, then devastating crop yield and quality losses are likely to occur. Farmers growing alternative crops for the first time must learn to recognize the pests and their signs or the crop symptoms caused by the pests. In addition, the appropriate preventive or corrective action must be known and taken in a timely manner to avoid complete crop loss. Until farmers become knowledgeable of the pests on their crops, they should not delay in contacting cooperative extension personnel, chemical suppliers or other persons that can provide correct information.

Quality: Marketing any vegetable is made much easier if high quality is present. Although quality is sometimes only cosmetic, producers must recognize the importance of marketing and realize they must produce to the buyers' standards and not their own. Quality begins with the selection of the correct variety for the production area and market. If information is needed concerning variety selection, the farmer should contact potential buyers and/or agricultural extension agents for recommendations. All aspects of production can influence quality. Pest control and harvesting at the correct stage of maturity are most important in bringing high quality out of the field. Handling, grading, packing, cooling and transportation are postharvest activities that must be conducted properly to maintain high quality when produce is delivered to buyers and consumers. Markets sometimes exist for less than top quality vegetables; however, the lower quality will likely be sold at substantial discounts.

Weather: A major factor in Oklahoma that adds to the production risks is weather. While most weather factors are not subject to manager control, prudent business management can help minimize weather's impact on the survival of the farm. Unseasonably high temperatures can reduce yield and quality of cool season vegetables in spring and fall plantings. Warm season vegetables are sensitive to chilling and frost injury, and if temperatures are too high they fail to set fruit. Strong winds can be very damaging to vegetables in all growth stages. Individual vegetable crops differ in their susceptibility to wind damage, but most young plants are damaged by wind and wind-blown soil. "Wind scar" can develop on many vegetables and is

a defect caused by wind. Individual vegetables also differ in their susceptibility to hail damage. Damage is generally more severe if hail occurs near time of market maturity or when plants are young. Excessive rainfall can impair crop development and lower quality. Methods of minimizing weather risks include diversifying crops throughout the spring, summer and fall production seasons, having ample irrigation available, providing wind breaks, and selecting land with good surface and internal drainage to minimize crop loss due to excessive rainfall.

Marketing

Vegetable farmers may have numerous alternatives for marketing fresh produce. Each of the alternatives has characteristics that make it more advantageous for different types of producers. Volume of produce grown, location of the grower, time available for marketing activities, and quality of the produce are a few of the important factors to consider when choosing a market or combination of markets to use. Farmers may be able to use or develop more alternatives if they know the major characteristics of each marketing alternative and plan their marketing strategy before they begin production.

Marketing alternatives are classified as direct or non-direct markets. The direct markets involve producer interaction with consumers and include pick-your-own operations, roadside stands and farmers' markets.

Non-direct outlets involve farmer interaction with market intermediaries. The non-direct markets include terminal markets, grower cooperatives, peddling to grocery stores and restaurants, and selling to wholesalers/brokers.

All of the alternatives discussed are generally cash market sales and do not involve prior contracts with buyers. However, it is generally advisable for farmers to contact non-direct buyers before they decide what varieties to plant. In this way the grower can learn about special quality standards and packaging guidelines which must be followed. This reduces the risk of having the produce rejected when delivered but does not guarantee acceptance or any specific price.

Selecting the best outlets for produce not only depends on the characteristics of the outlets but also on the characteristics of the farmer. Successful produce marketers know the buyers' needs and requirements. For both direct and non-direct outlets, knowing the buyers' quality requirements is extremely important. Packaging requirements are most important for the non-direct outlets.

The farmer also needs to understand that use of different outlets requires different time commitments. Many farmers may not have the time or expertise to operate their own outlets or to peddle produce on routes.

The farmer may not be producing sufficient volume to make long hauls economically. Quality of produce may restrict him from using particular outlets. Successful marketing requires that producers understand their production abilities, especially with respect to quality, volume of production, and timing of delivery.

The farmer needs to match production and marketing abilities with outlet selections. The farmer may diversify by using more than one type of outlet or more than one outlet of each type. This may be especially true for a farmer with a variety of crops or different qualities or sizes of the same crop.

Other Concerns

In addition to those factors controlled within the individual farm, two other aggregate concerns are potentially important.

First, given the large number of states involved in promoting alternative crops (often vegetables), the impact of aggregate output on prices should be evaluated. If all of the efforts promoting alternatives are successful, prices may fall, and it is possible that few of the new producers will be able to make a profit.

Second, the infrastructure needed for sustained vegetable production must develop in nonvegetable production areas. This infrastructure includes: (1) suppliers of specialized equipment and spare parts, chemicals, containers, ice and other growing, packing and marketing supplies; (2) services of professional vegetable production consultants; and (3) brokers to market the vegetables. The potential for local markets is often not developed. Local extension personnel are usually trained in the traditional agricultural commodities of the production area, and availability of one-on-one assistance from district and state specialists will be limited. As production begins and expansion occurs, the infrastructure needs will be met. However, the first vegetable producers will operate with less than optimum support.

Summary

Vegetable production by new producers is an activity that will require a change in farming practices, farming strategies and marketing attitudes for many producers considering vegetables as alternative or supplemental enterprises. While the profit incentives can appear to be large for vegetable enterprises, new producers will have a great deal to learn and may face substantial production and marketing risks, especially during the learning process while developing these enterprises. From a marketing perspective, producers will need to learn to produce to their buyer's specifications, which requires that market planning take place prior to planting. From a production perspective, vegetable enterprises require more intensive use of capital, labor, technology and management than required by most traditional agronomic crops.

Determining Commercial Marketing and Production Opportunities for Small Farm Vegetable Growers

Jack L. Runyan, Joseph P. Anthony, Jr., Kevin M. Kesecker, and Harold S. Ricker
in cooperation with Charles W. Coale, Jr. and Charles R. O'Dell

Many farmers are considering growing vegetables for the commercial fresh market as an alternative or addition to their present production enterprises. Before undertaking commercial vegetable production, farmers should be aware of production and marketing requirements and opportunities for their region. They must learn the needs of the commercial vegetable market and meet those they are most capable of meeting with respect to management and/or resources.

The problem studied is as follows: How can small farm vegetable growers who want to compete in the commercial fresh market identify market opportunities and requirements, and overcome market entry barriers?

The research was conducted in the southside and southwest areas of Virginia. Both areas are similar in that agriculture is the primary industry, and most production units are less than 150 acres, but they have dissimilarities such as climate, terrain, and types of products produced.

The general objective of this study was to develop a methodology for determining production and marketing opportunities and requirements for small farm vegetable growers.

Accomplishing the objectives of the study required the collection and analysis of both primary and secondary data. The primary data were collected by surveying vegetable growers, potential vegetable growers (those who had expressed an interest), packers, brokers, wholesalers, and retailers. The grower and potential grower surveys were conducted by local agricultural extension agents, and Virginia State University and Virginia Polytechnic Institute and State University extension personnel. The packers, brokers, wholesalers, and retailers were surveyed by members of the U. S. Department of Agriculture study team.

Secondary data were used to determine market potential in four terminal market areas--Atlanta, Baltimore-Washington, Dallas, and New York. These data were obtained from the Market News Branch, AMS, USDA, and consisted of historical price and unload data from the four terminal market areas.

Research Method

Local instate buyers were surveyed to determine their attitudes and receptivity toward Virginia vegetable production, and to see if the market could be reopened. We visited six retail chain headquarters, including two cooperatives, five produce wholesalers, plus three produce packers and shippers to determine their attitudes and viewpoints. The firms surveyed represented a cross section of Virginia produce buyers.

¹Respectively, marketing specialist, agricultural economist, and deputy director, Market Research and Development Division, Agricultural Marketing Service, U. S. Department of Agriculture.

²Respectively, extension economist and extension horticulturist, College of Agriculture and Life Sciences, Virginia Polytechnic Institute and State University.

The formation of a growers' cooperative or growers' association provides an opportunity for pooling resources, and for establishing a reputation and identification for marketing a quality vegetable product that will help to open more marketing opportunities for local production. Buyers or their field representatives would be more receptive to meeting with and discussing their needs with groups of local growers than with individual growers, unless the latter had substantial acreage of a particular commodity.

Broccoli--Market windows for broccoli exist in both the Atlanta and Baltimore-Washington terminal markets. The Atlanta terminal market appears to have a higher minimum (low) price during the October to December harvesting period for Virginia-grown broccoli. However, shipping to either market would yield a favorable return to growers. Windows also exist for spring broccoli from the warmer Virginia study area. A word of caution should be given at this time: the supply and demand relationship on a market may be so sensitive that an extra tuckload of product may reduce the price to below production and transportation costs. Therefore, growers should be in contact with dealers on the terminal markets to assure themselves they will have a buyer and receive an acceptable price.

The major broccoli supply region for both terminal markets is California, with Texas, Arizona, and New Jersey being the only other supply areas. The great distance between the major supply area and the terminal markets, together with the large gap between production plus transportation costs and the minimum prices, implies that with proper merchandising and quality control, Virginia broccoli producers should be able to profitably capture a portion of the terminal markets' sales.

Cauliflower--Based on the analysis of the price data, there are windows for Virginia-grown cauliflower at both the Atlanta and Baltimore-Washington terminal markets. In fact, there are year-round windows for cauliflower at both markets. The area between the minimum price and the production plus transportation cost lines is greater for the Atlanta terminal market than for the Baltimore-Washington terminal market. This implies there is a potential for greater grower returns by shipping Virginia-grown cauliflower to the Atlanta terminal market.

Aquaculture—An Alternative Farm Enterprise

Thomas L. Wellborn

Intensive aquaculture, such as catfish farming, is a high investment-high risk enterprise that requires a high degree of managerial skills. Unless one is willing to invest large sums of money and is willing to work 24 hour days, one should look at another enterprise.

Before making a decision to go into intensive fish farming you should consider the following factors.

1. Investment and production costs vary depending on the species of aquatic animal being raised. For catfish the investment cost is about \$3,000 per acre, and annual production costs run about \$2,500 per acre per year. These costs are lower for most of the other species raised. Actual costs will have to be determined by each individual and situation.
2. Can you afford to forego income until the first crop is sold, usually about 18-24 months after starting pond construction?
3. Are the topography of the land and the soil type suitable for fish ponds? Building levee-type ponds on rolling land is more expensive than on flat land. The soil must hold water. Otherwise the project is doomed from the start.
4. Is adequate water of a suitable quality available? A well is the best and safest source of water and should have the capacity to pump at least 25 gallons of water per minute for each surface acre of pond area to avoid serious management problems.

Water from lakes and streams can be used but usually results in disease and trash fish problems. Also, there may be problems from pollutants that can get into lakes and streams.

Run-off is not a dependable source of water, and if used, stocking rates must be kept low to avoid catastrophic losses due to water quality problems.

5. Before making a decision to commercially produce any aquatic animal, determine what the market is, the price you can get, and how you will get it to the market. Most processing plants will not send trucks further than 50 miles one-way because of the cost. Also, the market for most aquatic animals demands they be delivered alive and in good condition regardless of whether they are to be processed for food, used as bait, or stocked for recreational purposes.
6. Check to see what permits or licenses are needed to raise the animal desired and the laws pertaining to its sale in the state or states where it will be sold. Also check to determine the permits needed for drilling a well, using well water for aquaculture, or pumping water from a lake or stream for commercial fish production.
7. Anyone planning on going into fish farming should find out where they can get the technical assistance and training so essential to a successful operation.

Fish farming can be a profitable alternative agricultural enterprise, although it is not for everyone.

Small Livestock—Goats/Rabbits/Quail

Glenwood F. Hill

I appreciate the opportunity to talk to you today about the prospects of rabbits, quail and goats as alternative opportunities for small and part-time farmers.

Agriculture in America faces its worst economic crisis since the Great Depression. The rapid growth and relative prosperity of the 1970s have faded to widespread stagnation and financial stress in the 1980s. Depressed international markets for traditional U.S. farm products have replaced the strong export-led growth of the 1970s. Despite large increases in government payments, many farmers face severe financial problems.

These conditions tend to lead individual farmers to intensify their search for profitable alternative enterprises. Too often, they turn to an enterprise that appears to have an alternative profit potential without making a thorough investigation of the market demands, amount of producer interest and price spread. While additional production of a speciality enterprise by one or even a few producers may improve their cash flow, high levels of production could leave all of them worse off. Thus, what could work for a few farmers may or may not be the answer for large numbers of people.

I plan to examine the potential of rabbits, quail and goats as alternative enterprises. Then, I will make some general remarks that are essential to providing economic stability for new alternatives.

RABBITS AS AN ALTERNATIVE ENTERPRISE

Rabbits have been sought by man as an alternative enterprise for a number of years. Their utility as food, fur, research and pets are well documented. They can be adapted to small farms or urban areas where the production of other livestock is impractical.

Most domestic rabbits are raised for meat production. These come primarily from small backyard operations, as well as a small number of commercial rabbitries.

Breeders can select from a large number of breeds for show or pet purposes. The American Rabbit Breeders Association list standards for 28 breeds, and about 77 varieties of these breeds. The standards cover type, color, size, and other breed requirements.

In the United States, the principal breeds of rabbits are:

- (A) American Chinchilla--Show and fur; nine to 12 pounds; surface fur, gray; underfur, deep blue-gray; belly, white.
- (B) Californian--Meat and show; eight to 10 and a half pounds; body, white with colored nose, ears, feet and tail.
- (C) New Zealand Whites--Meat, show, and fur; eight to 12 pounds; body, solid white.

Factors That Affect Rabbit Production

A. Foundation Stock:

The foundation stock will have a great effect on the success of a rabbit production operation.

New breeders should visit with producers who have been successful, have the respect of their fellow breeders and have a good set of production records that can be studied from an economic standpoint. These records should show:

- (A) Good production: eight or more uniform size bunnies per litter.
- (B) High dressing percentage: 57 percent or better.
- (C) Good milking ability: 10 or more teats, weaned litter weights of six pounds plus at three weeks.
- (D) Steady rate of gain: 1.25 pounds or more, at four weeks; four pounds by eight weeks.
- (E) Good feed conversion.
- (F) Good health: free from disease, parasites, major flaws, buck teeth, yellow fat.
- (G) Good coat quality: not wooly or off-color.

B. Housing

Housing used will depend upon local building regulations, climatic conditions, size of operation and amount of money you can invest.

In mild climates hutches can be placed out-of-doors in the shade of trees or buildings, or be placed under a lath super-structure. Sunlight will help maintain sanitary conditions.

However, rabbits should at all times have a choice between shade and sunlight.

During extremely hot weather, some cooling measures must be provided in addition to shade. This can be accomplished by using sprinkler systems and proper ventilation.

C. Feed and Feeding

Rotations should be selected to fit the needs of the rabbits. Know the requirements of those particular groups, then feed to meet requirements.

Rabbits must have clean, fresh water at all times. During warm weather, a doe and litter will drink about a gallon of water per day.

It should be noted that feed is one of the largest items of expense for rabbits. The kind of feed will have a big influence on the amount of labor needed for the operation.

D. Breeding

It is important that a rabbit be well grown before breeding, so that its body size, organ development and hormonal and physiological processes are optimal for reproduction. Generally, the ideal age for a doe's first mating is five months. Bucks ideally are first used for breeding at six months.

Age, rather than the size or weight of the doe, should be used as the criterion for breeding readiness, but she must be of proper size and weight to be able to produce good sized litters without lessening her own condition or reducing birth weights or weaning weights.

There are several accepted rabbit breeding programs. Among the most common programs are the five-cycle (73 day); six-cycle (42 day); seven-cycle (35 day); and the eight-cycle (45 day) breeding programs. In the United States the (a) five-cycle breeding program (see Figure 1) and (b) the eight-cycle breeding program (see Figure 2) are used most often by rabbit breeders. Each system derives its name from the number of reproductive cycles in a year's time.

E. Sanitation

Careful sanitation is the final element of a good rabbit program. Simple good housekeeping precautions will help keep a rabbitry healthy and disease-free. It is much less costly to prevent an outbreak than to try to stop it once it starts.

In 1977, the U.S. Department of Commerce, Office of Minority Business Enterprise, funded a proposal entitled "Production, Processing, and Marketing Potential of Domesticated Rabbit and Other Grain Feeding Animals as a Major Food Service." This grant was awarded to the Peach County Economic Development Corporation. Their results, though limited in scope, suggested that rabbit production beyond the backyard concept was too costly for farmers to consider as an enterprise.

Another rabbit research project was funded through the U.S. Department of Agriculture, CSRS Research at the Research Station of the Fort Valley State College. This project also studied the impact of earthworms as a protein source through recycling rabbit waste. This project was terminated in 1982. No conclusive data are available.

The conclusion drawn by the Peach County Economic Development Corporation is further supported by livestock enterprise budgets prepared by the Georgia Cooperative Extension Service Agricultural Economic Departments (See Figures 4, 5 and 6). Figures 4 and 5 show negative net returns to land and management. However, Figure 6 shows a positive return to land and management when a 3.7 to 1 feed conversion is achieved.

QUAIL AS AN ALTERNATIVE ENTERPRISE

Quail can be raised successfully in confinement. A few farmers have found it profitable to stock their farmlands and sell hunting rights. Still others have found it advantageous to raise quail strictly for sale.

Quail are protected by state game laws, and anyone raising them for sale must obtain a license to sell them from the state wildlife and natural resource department. Laws tend to vary from state to state.

The production of quail either as a small hobby flock or commercial enterprise requires extensive planning and preparation as well as an understanding of good management practices.

There are five distinct species of quail in America, but the best known of all is the bobwhite. It has the widest distribution of them all, ranging from southern Minnesota to Texas and Mexico, to Florida and throughout the South's rural areas.

State and federal wildlife agencies have done an excellent job of preventing rapid depletion of these birds. Finding a place to hunt can present problems. These problems have been linked directly to the following:

- (A) Approximately 75 percent of the nation's land is privately owned;
- (B) More land is being used for industrial and highway purposes; and
- (C) Population growth from urban centers.

These problems will continue to plague our society well into the 21st century. It is therefore believed that answers to many of these problems lie in the hands of landowners who are interested and who have the ability to successfully operate private and public hunting preserves.

Factors That Affect Successful Quail Farm Opportunities

A. Management

The difference between a profit or a loss is health management. It is well documented that a majority of the health problems associated with the production could have been prevented if farmers would have paid closer attention to daily details.

It is cheaper to prevent diseases than it is to treat them. Often there are no proven treatments available, and even where treatments are available, there is no guarantee they will work.

B. Food

The importance of food for bobwhites can't be overstressed. The objective should be a dependable year 'round supply of choice food (see Figures 7 and 8).

Feed usage will vary from farm to farm. Where poor management is practiced, feed will be wasted by the careless producer, by the bird because the trough is too full, and by rodents and other bird species because they are not controlled. Figure 9 provides a feed consumption guide for quail producers by age.

In the wild, about 85 percent of the quail diet is vegetable matter, with the remaining 15 percent coming from animal matter, mostly grasshoppers, locusts, beetles, snails, ants, caterpillars and slugs.

Normally, quail feed from dawn to mid-day and from 3:00 to 4:00 p.m. or until early dusk. During the mid-day hours they find heavy cover in which to rest.

C. Water

Water is an attraction for quail. It is controversial whether it is necessary. Some producers claim that released quail will leave a locality if water is not available.

Quail do not need free water such as is obtained from ponds, springs and streams in order to survive. They can obtain their necessary water requirements from dew, and by eating succulent seeds, berries, and fruits.

D. Cover

Cover is very important in quail propagation. Quail cannot maintain themselves without a place to hide.

One difficulty in maintaining proper cover is that it tends to become too dense. It may become so dense that the quail will desert it and seek another cover. Controlled burning will keep this problem to a minimum.

E. Marketing

Marketing quail is an individual project for each farmer. He must choose his own field and build his own market.

Quail is one of the most popular game birds found in most Southern states. Quail and quail hunting are big business. For example, in Georgia, the following statistics in Table 10 depict their importance.

GOATS AS AN ALTERNATIVE ENTERPRISE FOR SMALL AND PART-TIME FARMERS

Goats are not new to man. Records show that man had tamed goats nearly 9000 years ago in Asia and in other parts of the Eastern Mediterranean region.

There are about 300 breeds of domestic goats, many of which are commercially important. One of the most important breeds is the Angora, which is raised for its fine, silky wool. Saanen and Toggenburg goats are leading milk producers, while the Pygmy goat is raised primarily as a source of meat.

If you have a few acres of land, good fences and some shelter, goats may be a viable enterprise. They require less labor than do most domesticated livestock and serve as another way to make use of land that would otherwise be nonproductive.

A. Getting Started

Before you go into goat production, talk to farmers in your area who are raising goats. Find out: a) How well are they doing? b) Where do they get their hay and other feed? c) Is there an available market? d) How much does it cost to acquire breeding stock? When you get the answers to these questions, you can decide if you want to raise goats.

B. Pasture and Feed

Goats are browsers by nature. They like coarse weeds and woodland and can help clear land of brush and small trees.

Goats need about a half acre of good pasture. A combination of Ladino clover, rye or orchard grass should meet their nutritional requirement. However, goat needs will depend to a large extent on the kind and amount of pasture available to them and on whether they are fresh, pregnant or dry.

C. Housing and Equipment

Goats do not need any special kind of housing or expensive equipment. Any well-built barn or shed that is dry and free from drafts will do.

Straw, leaves, sawdust, wood shavings or peanut hulls make good bedding for goats.

D. Controlling Diseases and Parasites

Goats are generally hardy and do not have as many diseases as some animals. Cleanliness, however, is important in preventing disease and parasites.

The major disorders of goats are mastitis, enterotoxemia, plant poisoning and pneumonia. Other disorders include foot rot, brucellosis or tuberculosis.

E. Breeding and Reproduction

Goats are in their prime when they are four to six years old. Young does should be bred when they weigh 85 to 90 pounds.

Does are seasonal breeders and come in heat regularly, about every 21 days, between September and January. After this time, they usually cannot be rebred again until late summer.

SUMMARY

Farmers are faced with severe financial problems which require that resource use and management be as effective as possible in meeting their goals. Opportunities for innovative use of resources and ways of organizing and managing production and marketing must be found to alleviate financial stress on producers. Factors to be considered are new uses for products, new products, new and/or expanded markets, alternative production systems and alternative sources of income.

Individual farmers have a long list of possible specialty enterprises they might grow or raise to increase their income. Some have shown widespread interest in horticultural crops. Others have sought alternative livestock projects such as sheep, goats and fish production. All of these new options have one thing in common--high risks. While specialty enterprises are not the answer for every farmer, they surely are for some.

Thus, it is important for individual farmers to examine and answer the following before deciding on a new enterprise.

- (1) Is the land suitable for the enterprise?
- (2) Assess costs accurately.
- (3) Can it be adaptable at a reasonable cost?
- (4) How does it affect the business overall?
- (5) Give special attention to marketing.
- (6) What are the market barriers?
- (7) Can the farmer assess the market?
- (8) Closely monitor information indicating the number of farmers who may be producing the same commodity.
- (9) Project possible price effects due to increased production by other farmers.

Specialty Crops—Muscadines/Herbs/Ginseng

Howard (Bud) Kerr

We live in a special time--the era of specialization. Thus, it certainly is appropriate that the planners of this conference have included a session where the focus is on specialty crops.

I appreciate very much this opportunity to participate in this important conference on "Alternative Farming Opportunities for the South." Today, together, we can challenge the present status of the agricultural industry and also look ahead to its future. I want to spend my allotted brief time with you as a facilitator of special crops, to share with you and learn from your individual experiences the particulars of the three specialty crops--herbs, shiitake mushrooms, and ginseng.

Specialty crops encompass a rather broad area; from avocado to zucchini and I might add--all of the preponderance of crops in between A and Z. Specialty, alternative, optional and niche are some of the many names used to describe agricultural diversification that is occurring at an increasing rate throughout America. Each of us here, by attending and participating in this and other sessions of the conference, make our mark on the developing blueprint of America's agricultural future.

In December 1986, nearly 6,000 people attended the Des Moines, Iowa, "Adapt 100" conference that was sponsored by the publishers of **Successful Farming**. The focus was agricultural diversification. It was a splendid event and indeed very timely. There were farmers communicating to farmers about new enterprises, new crops, innovative systems and new hope for a better farm life in the future. The message was ... by modifying or adapting, the farm business could potentially gain by making the transition. A mutual goal or hope of all was to attain or share new economic life for the farm. Specialty crops "from asparagus to zinnias" were included and, of course, herbs, shiitake and ginseng were discussed and, I might add, discussed very thoroughly--much better than I could ever hope to present. Each was an expert on the topic of their respective responsibility. In this presentation, I will draw heavily upon their knowledge and share it with you.

As defined by Mr. Webster, the word specialty means "(1) a distinctive mark or quality; (2) a product of a special kind or of special excellence; (3) something in which one specializes." Together, let us "specialize" in how herbs, shiitake and ginseng can serve the needs of a changing Southern agriculture. By exploring these crops, we may develop answers for some farmers. Regardless, whatever judgment we may pass on any particular specialty item, that is--our analyses, projection or revelation--it is clear that the times are ripe for all sorts of startling changes in America's number one industry--agriculture.

Program Director, Office for Small-Scale Agriculture, USDA, Washington, D.C.

I have always considered looking into the future to be a little like charting unexplored territory. It creates great exhilaration and immense uncertainty. The historic currents of our time and the directions in which they are taking America's agriculture industry certainly call for something like an explorer's strength, understanding, and boundless optimism as we jointly embark upon our journey into the production and marketing of agricultural specialty crops.

Herbs

On December 9, 1986, Secretary of Agriculture Richard E. Lyng, announced the formation of the U.S. Department of Agriculture's Office for Small-Scale Agriculture. In response to this action, the Department has received many letters supporting the Secretary's action. With a specific reference to herbs, one letter captured my attention and honed the real meaning of a vibrant domestic herb industry. "This is the most positive step that you could have taken to prevent the demise of the family farm. The concepts and methods that you can develop in this office can have a major impact on both our domestic scene and our balance of payments.

My interest is in teaching herb production as an alternate method of farming. Since we, as a nation, import 96 percent of our herbs and spices, you may just be doing more to reduce the balance of payments than anyone in government." The point--herbs, a specialty crop (and there are so many, many different plant types) can be much more important in the future of American agriculture.

Both small farmers and herbs have been in existence for thousands of years. Today, farmers--small and large--and their herb growing and/or marketing as an agricultural business is thriving and expanding with each passing year. Just this past year, July 1986, over 700 people from all parts of the United States gathered at Purdue University to participate in the First National Herb Growing and Marketing Conference. And, herb growers are no different from other farmers; they have problems, i.e., marketing, quality factors, pests, and so forth. However, perhaps the biggest problem today is competition. You must look at some pressing issues when considering herbs as an alternative crop.

Today, prices are already depressed from the lovely highs that fresh cut herbs were getting only two years ago. As usual, once large scale growers got a "cents" of money to be made, they jumped in. My good friend, Ms. Portia Meares, editor and publisher of **The Business of Herbs**, told me, "Herbs, both fresh cut and potted for the nursery trade, are being shipped in from Mexico, Puerto Rico, etc., and in winter we are seeing quantities of basil and tarragon from New Zealand as well as from Hawaii. I get frequent calls at **The Business of Herbs** from research analysts for venture capitalists wanting any statistics and information I have about the profitability of growing herbs."

Most people who get into a commercial herb business, begin as a hobbyist. One of the reasons herbs are so good for small part-time farmers is that not much land is required. Still another important consideration: it is labor intense. The farm operators accustomed to growing and harvesting hundreds of acres of corn, soybeans, grains, etc., with huge equipment might find it too difficult to scale down to a few acres of an herb that for the most part must be handled. As far as I know, no U.S. farm equipment manufacturers have offered suitable harvesting equipment for herb farmers. Also, quoting Ms. Meares, "To date there is only one herbicide registered with EPA for use on culinary herbs, and no pesticides or fungicides are approved." She went on to say "many buyers insist on organically grown culinary herbs. That market segment is growing as is certification criteria and enforcement to ensure compliance."

There is an excellent market "out there" for fresh cut herbs; however, it is a sophisticated clientele. Because herbs are fragile, they are far more susceptible to harvesting damage than more commonly grown crops. Heat and humidity are the worst enemies--far worse than insects. Herbs require special handling, i.e., they must be rinsed, immediately cooled down, and kept cool between harvesting and selling. The customer demands quality, and this is what marketing is all about!

I discussed the potential of organically grown medicinal herbs with several people. The consensus of opinion was "once medicinal herbs enjoy even more popular support, the market will open up. Many medicinal plants have yet to be domesticated; many are perennials that require up-front capitalization and several years of waiting before any return or investment can be expected."

At the USDA, I have a good friend in Dr. James A. Duke, an expert on herbs. He is from the South and has been the herb expert for Agricultural Research Service for several years. I spoke with him about good advice to potential Southern herb producers. He told me two things that I want to pass on to each of you. They were the following:

1. "Play the herb market like the stock market, diversifying your portfolio, spreading your risks. The speculative herbs might put you on the top of a new market in a year or two, but may fall flat.

CONSERVATIVE

Evening Primrose: for GLA

Garlic (or elephant garlic):
for essential oil, spice
and "medicine"

Echinacea: for immunostimulant
medicine

Feverfew: for migraine

Flax: for benzadelhyde,
podophyllotoxin

INTERMEDIATE

Ginseng

Goldenseal

Cornsilk

SPECULATIVE

May Apple: for cancer studies

Sweet Annie: for malaria Market

Bloodroot: for antiplaque
ingredients

Milk Thistle: for hepatotoxicity

Pilocarpus (only if it can be
grafted onto Poncirus): for
xerostomia

2. Locate a potential market and learn about the herb before you plant your seed."

Additionally, Dr. Duke gave me lists of the important culinary herb imports and medicinal plants, keyed to show which could be grown in the temperature zone. I have made and distributed copies for your information.

Shiitake Mushrooms

Southeast Asia is the natural habitat of shiitake, but it has been domesticated and now is cultivated in Japan, China, South Korea, and Taiwan. These mushrooms are Japan's principal agricultural export, worth more than \$1 billion annually, and this represents a portion of the \$50 billion export surplus that Japan enjoyed in trade with the United States in 1986.

The popularity of shiitake as a delicate and/or gourmet food is worldwide and gaining yearly. The latter is particularly true here in the United States. Although the yearly U.S. consumption of the white button type mushroom is approximately two and a half pounds per capita, the consumption of shiitake is expected to approach one pound per capita in the not-too-distant future. Thus, the potential of shiitake as an alternative crop for U.S. farmers, either as a part-time or principal occupation, looks very encouraging.

In the early 1940's, the Japanese discovered a way to isolate shiitake spores for cultivation, and this led to an explosive increase in the production of shiitake in Japan after World War II. The discovery was truly a major turning point because the new inoculation technique spawned the development of commercial shiitake farms in Japan.

Shiitake is relatively new to U.S. farmers. It was only in 1972 that fresh shiitake was allowed into the U.S. Prior to this time, quarantine restrictions prevented the importation of the fungus into the U.S. The fear was that the organism would spread to living trees and cause pathological problems equivalent to Dutch Elm disease. Since that time, growers have become increasingly interested in establishing this new crop in the U.S.

In the past, consumers of Oriental foods have most likely, however unknowingly, enjoyed this mushroom. Shiitake "has a porklike texture and a fullbodied, robust flavor that greatly accents the dishes in which it is used." Now, the popularity of fresh shiitake is gaining with American consumers; thus, it is only natural and certainly not surprising that America's farmers should look closely at the culturing of shiitake as a new farm crop.

Much has been published about the cultivation of the shiitake mushroom. My colleague, Dr. James P. San Antonio, a scientist at the Beltsville Agricultural Research Center, U.S. Department of Agriculture, Beltsville, Maryland, gave leadership to the fledgling new industry in the late 70's. Specifically, he looked at the cultivation of shiitake as a new small farm enterprise. In this paper published in *Hort Science*, Vol. 16(2), April 1981, he said, "Depending on climate and available tree species, shiitake mushrooms could be an advantageous supplementary crop for small farms. The materials and practices of shiitake mushroom cultivation are closely related to woodlot and fire wood operations. Establishing this mushroom crop in the United States, however, probably will depend mostly on the availability and development of markets."

More recently (1985) in their paper, "An Evaluation of the Potential for Shiitake (*Lentinus edodes*) Mushroom Cultivation in Appalachia," San Antonio and F. B. Abeles, a scientist at the Appalachian Fruit Research Station, Kearneysville, West Virginia, stated, "Domestic production of shiitake represents both decreased need for importing this mushroom, as well as a potential source of employment and forest utilization in this country." The latter statement is certainly relevant to much of the South as there are many areas with an abundance of underutilized second growth hardwoods with favorable climate and topography that is conducive to shiitake cultivation. Thus, commercial or part-time shiitake mushroom cultivation as a specialty crop has an excellent potential for some Southern farmers and/or wood lot owners.

The Forest Resource Center, Route 2, Box 156-A, Lanesboro, Minnesota 55949, is an excellent source of shiitake information. This is a non-profit corporation working to improve the rural economy, and the Center is a nationally recognized information clearinghouse for the production and marketing of shiitake mushrooms. I might add, the Center's leadership is quick to emphasize that "shiitake are a new forest product and the mushrooms can be grown in low grade hardwood logs which are abundant across the country." Joe Deden, director of the Forest Resource Center, was very pleased to provide copies of *Shiitake News* for your information. Please pick up a copy from the table in the rear of the room.

Also, I have brought with me and made available on the table in the rear of this room two information papers that were supplied by my friend Dr. San Antonio. The papers provide you with "Questions and Answers about Shiitake Cultivation," and "Cultivating the Shiitake Mushroom--Sources of Public Information; Seminars or Grower Cooperatives, U.S. Research Groups, and Spawn Suppliers and/or Consultants." I encourage you to take a copy for your reference.

As indicated earlier, there is much published information about specialty crops, and when I was preparing for this segment about shiitake, it became quite evident that authors draw heavily upon the writings of earlier authors. Thus, rather than try to rework the words of my predecessors about production methods, I have utilized the writing of Ric Zarwell, Coordinator of the Geode Wonderland Resource Conservation and Development Office, 3002 Winegard Drive, Burlington, IA 52601, as he reported on this topic at the recent "Adapt 100" conference.

"Shiitake mushroom cultivation can, and should be, a business enterprise in balance with nature. When managed properly, the process turns underutilized wood or waste wood into a gourmet food. When hardwood trees are cut for sawlogs, thinning is often required to improve production. It is the logs that are cut for thinning which can be used for shiitake. Thus, the small woodlot owner benefits two ways. He gains quicker growth on his sawlog trees, and the mushroom has high economic value in comparison to the small-diameter, renewable logs on which it can be grown.

Successful production of shiitake is neither difficult nor terribly complex. As with other ideas or methods which are new to us, it requires serious thought and attention to detail. Fortunately, the latest printed materials are correcting the descriptions of cultivation techniques which appeared

in earlier publications and public presentations. Inaccurate details resulted from imperfect translations and interpretations of Japanese techniques. Improved methods are inevitable also, as shiitake cultivation is pursued by more growers.

It should always be remembered that one is trying to harness and improve on a process that evolved in nature. Shiitake mushrooms are dependent on the environmental conditions similar to those found in reading good reference materials, and innovative thinking (remembering a log in the forest) will serve as a guide in solving production problems.

There are six basic steps involved in cultivation of shiitake, and each is important for an economically successful operation. They are: 1) ordering good quality seed culture, which is called spawn or inoculum (this should be done three months prior to cutting logs); 2) obtaining suitable logs; 3) inoculation of the logs (this should be done between one and three weeks after cutting to ensure maximum moisture content); 4) the spawn run, or incubation to allow shiitake to colonize the wood; 5) mushroom fruiting; and 6) crop harvest, packaging, storage, transport and marketing."

A statement in the 1982 published paper, "Cultivation of Shiitake, the Japanese Forest Mushroom, on logs: a potential industry for the United States" by Gary F. Leathman, Research Microbiologist, USDA Forest Service, Forest Products Laboratory, P. O. Box 5730, Madison, Wisconsin 53705, is a very good summary on cultivation. "The cultivation method is not difficult, but to avoid contamination by competitive micro-organisms and to ensure optimal mushroom production, cultural practices must be carried out correctly. Logs are cut from the trees, aged, and then inoculated with an actively growing fungal culture. After the fungus has colonized the logs, they are restacked to favor fruiting. Soaking logs in water may be used to stimulate the production of mushrooms." Further, he concluded his paper by saying, "Considerable room for market expansion exists in the United States for both fresh and dried shiitake." I would agree.

Ginseng

Over the years, ginseng has been considered as a special herb crop. The unique plant has a rich world history. Some say that ginseng possesses a power to intrigue while others say that its use generates allurements, and still others find the name alone conveys an exotic meaning. Just like the old saying, "beauty is in the eye of the beholder," this perennial herb plant has to the user one or more unique attributes. By any of its many envisioned uses or names, it is indeed a special crop and is generating substantial interest around the country in the 80's decade as a potential alternative crop.

However, to the unaware, a caution flag must be hoisted. This particular agricultural crop is very difficult to cultivate, and I am told that the failure rate for novice growers is very high because of a multitude of basic and subtle facts and realities.

Reviewing the literature, I learned that the Orient has always been the hot-bed of activity for ginseng for several centuries. However, in the United States, the growing and commercial harvesting of ginseng as a crop only began in the early years of the 20th century. The State of Wisconsin has always been a major producing area, and currently more than 90 percent of the ginseng cultivated in the United States is found in Wisconsin. The boundaries or natural habitat for ginseng in the United States is land north of Maryland and east of the Mississippi River.

Ginseng is found growing in the wild in some areas of Appalachia. Also, ginseng is cultivated by some enterprising individuals in the South who frequently consider the crop as a part-time agricultural enterprise. The most limiting factors to getting into the commercial ginseng business, besides the obvious limitations of improper climate and topography, are the high labor and capital requirements. "Six hundred hours of labor and \$20,000 per acre per year represent initial investment," says Dr. Leo J. Martin, University of Wisconsin, who is an expert on all aspects of commercial ginseng production. The ginseng plant requires substantial shade, and it is both very expensive to construct artificial shade, and the labor requirement is substantial. Of course, the year-round shade maintenance is another time-consuming and costly requirement.

The specialized equipment is another big ticket item, and there is the ever ongoing battle of problems--diseases, insects, and other pests. Each and all add to the costs, and require labor and special management skills. In a recent article, Dr. Martin noted that "other consensus include poor seed germination and theft of roots near or after harvest. There generally is no insurance available. Because of disease inoculum, ginseng is never planted back in the same field." Add up all the above, and quickly it becomes very evident that ginseng as an alternative crop is not for the faint of heart.

Of great concern to all ginseng producers is one specific term--uncertainty. The word conveys many meanings. What will the market for ginseng be this year, next year, or three or four years down the road? Government regulations require state export approval, and this means paperwork. Some producers can't cope. Also, there are required federal permits, and when considering the use of a pesticide, one must always first check for EPA approval. Independently or combined, these uncertainties make cultivated ginseng indeed a very special alternative agricultural crop.

Now, if you are still interested in becoming a ginseng producer, the very first prerequisite is to read the literature. Second, visit on-site the farm of a successful ginseng producer. And one final suggestion: be sure to inquire of your host how many generations of his or her family have been in the business. Experience is the best teacher for this special crop!

Summary

Millions of dollars worth of agricultural crops come into the U.S. every year. Specialty crops such as herbs, shiitake mushrooms, and ginseng can be grown here. So why do we continue to import? There are perhaps several answers to this question. Some say, "We don't have our act together." However, I must quickly add: maybe not yet, but be assured, it is a rapidly changing act, and these three specialty crops are quickly gaining the center stage that is called alternative agriculture.

Resource Information

Bibliographies for Herbs, Shiitake Mushrooms, and Ginseng are available in the Quik Bibliography Series of the National Agricultural Library. The citations are a substantial resource for recent investigations on a given topic. They also serve the purpose of bringing the literature of agriculture to the interested user who, in many cases, could not access it by any other means.

To request a copy of a bibliography in this series, send the title and self-addressed gummed label to: U. S. Department of Agriculture National Agricultural Library Public Services Division, Room 111 Beltsville, Maryland 20705.

Nursery Products

Dewayne L. Ingram

There is tremendous diversity among the ornamental crops suitable for production in Southern states. However, most require more intense and specialized management, higher capital and labor inputs and have a greater element of risk than most traditional crops in the South. Associated with this relatively high risk of crop failure is a favorable profitability potential. This potential is dependent upon the crops produced and the specific markets targeted.

Nursery and greenhouse crops differ greatly in terms of turnover cycle, production methods, and capital and labor requirements. Woody landscape plants generally require the longest production period. Trees and shrubs are traditionally propagated by cuttings or seed and remain in the nursery for 12 months to five or six years, depending upon the size of plant to be marketed. Tropical foliage plants require protection from chilling temperature and are characterized by production cycles from 6 weeks to 2 years, depending also on plant selection and marketable plant size. Floricultural crops require structures for optimum climate control and are characterized by rapid crop turnovers (13 to 18 weeks), intense management and labor inputs, and they also have a high potential return on investment.

One extremely important consideration for the nursery or greenhouse operator is plant quality. Although threshold insect populations or disease infection levels have been determined for yield of many agronomic crops, the visual evidence of any insect or disease damage or infestation can render an ornamental plant nonmarketable. The quality of some ornamental plants can also be irreversibly reduced by water, temperature, nutrient or light stresses, or defoliation. Therefore, intense management, routine crop monitoring and possibly a preventative pesticide program are necessary in the ornamental plant industry.

Woody Landscape Plants

Container production of landscape plants has become increasingly popular in the last 30 years, with over 80 percent of plants currently being grown and marketed in containers in Southern states. Most plants grown in the field are marketed as larger specimens or dug bare-root at a relatively small size for mass market outlets. Specimen plants may be balled and burlapped for marketing or may require the use of wire baskets around the root ball to stabilize the soil. Fabric field-grow containers have also been introduced for field production of trees and shrubs. Root growth outside the fabric container is restricted by the pore size in the fabric.

Nursery plants may be propagated in beds, flats or individual containers. Plants ready for the production phase are called "liners" and are transplanted into containers, moved up to larger containers or transplanted into the field. Proper light conditions must be provided. The optimum light level differs with plant species and cultivar. Screen or lath shade structures are common means of reducing the light in production areas for plants sensitive to full sunlight. Although irrigation for field-grown plants is considered optional in some locations, an elaborate, flexible irrigation system is required for container production.

One, three, five, and seven gallon containers are most common in the nursery industry, although containers with capacities greater than 150 gallons are used. Almost all the smaller containers are plastic, with some of the larger containers constructed of metal or wood.

Fertilizers are commonly applied to container-grown plants through the irrigation system or as slow-release products. Nutrient levels can fluctuate greatly in container media; thus monitoring nutrient status and making needed adjustments are necessary to optimize plant growth and quality. Pruning is necessary to train plants into the proper shape. Proper timing and the use of skilled labor are required for production of quality plants.

The average container nursery requires one laborer per acre of production. This is approximately 30 percent of production costs. Sixty percent of labor is used to move inputs and products; therefore, nursery layout and design with time and motion efficiency in mind can reduce production costs.

Badenhop (1) in 1979 estimated production costs of one gallon juniper plants in a five-acre nursery to be \$1.05. Sixty-three cents of this was considered variable costs. Overhead accounted for \$0.32 of the cost, and \$0.10 was considered fixed costs. The capital investments of \$97,000 were allocated as \$10,000 for land, \$43,000 for buildings and \$44,000 for equipment.

The capital investment for a 50-acre field nursery with 33 acres in production was estimated in 1979 to be \$206,050 (5). Land purchase accounted for \$100,000 of this, while buildings and equipment were estimated to be \$49,200 and \$56,850, respectively. Costs were based on producing 4,114 pin oaks per acre; 2,914 trees as five to six feet bare-root, 800 as six to eight feet balled and burlapped (B&B) and 400 as eight to 10 feet B&B trees. The total cost per plant was estimated to be \$4.10, with \$1.48 per plant from variable costs. Seventy-seven percent of fixed costs was for general overhead.

The majority of nursery plants produced in the Southern states are marketed in the South. However, a substantial portion of woody ornamentals are shipped to New England and Midwestern states. A small portion of production is marketed in Western states. Southern nurseries can compete with nurseries in more Northern climates in production of plant species adaptable to both climatic regions. Production time and costs can be less in Southern states (2,3). The degree of this competitive edge differs with climatic zone in the South and with energy costs for overwintering and transportation.

In view of the devastating freezes in recent years in Southern states, winter protection for many woody plants is required. The root systems of container-grown plants are exposed to rapid temperature fluctuations and temperatures below air temperature in some cases. In most regions of the South and for the majority of woody landscape plant species produced in containers, it is too risky not to provide some means of winter protection.

Tropical Foliage Plants

Tropical foliage plants are generally injured by chilling temperatures. Therefore, they must be produced in enclosed structures. Growth of many tropical plants is inhibited by temperatures

below 65° F, and the majority will be damaged by a six-hour or longer exposure to temperatures below 50° F.

Most foliage plants produced in the U.S. are destined for interior use. Therefore, plants must be produced in relatively low light or acclimated to lower light conditions before being sold. The majority of foliage plants are marketed in containers with a diameter less than 10 inches. Some specimen plants are grown in larger containers or produced in the field and containerized or placed in burlap-lined wire baskets before shipping. Most larger specimen tropical plants are used in commercial buildings such as shopping malls and hotels.

Fifty-four percent of the \$468 million U.S. foliage plant production in 1985 was grown in Florida (4). Other Southern states account for less than 10 percent of the U.S. crop value. The California foliage plant industry accounted for \$70 million of the U.S. production. Tropical foliage plants are marketed throughout the U.S., and European markets have been developed for selected plants, especially larger specimens.

Foliage plant production increased dramatically during the 1970s and has leveled-off in recent years. Although the markets remain generally strong, increased demand does not seem likely. There is definitely more competition between growers now than in the 1970s. Profit margins have decreased significantly in the last 15 years, with most plants selling at or below prices in the early 1970s. As in most ornamental crops, the greatest potential appears to be with specialty crops or crops for which unique markets exist or could be developed.

Leatherleaf fern comprised 86 percent of all U.S. cut foliage in 1985. Sixty-three million dollars of the \$64 million cut foliage crop value in 1985 was from Florida growers (4). Leatherleaf fern can be severely damaged by freezing temperatures, and thus most of the production is in central Florida.

Increased production of leatherleaf fern in Central America and the Caribbean means increased competition for U.S. producers for U.S. and European markets. Most production in Central America has traditionally been marketed in Europe. Penetration of the cut foliage market is a significant obstacle for new enterprises.

Floricultural Crops

Floricultural crops are generally herbaceous plants, the majority not capable of withstanding freezing temperatures. In fact, growth and flower production and quality may be reduced significantly in environments with minimum temperatures below 45° F. These crops require intense management. Cultural conditions must be controlled to initiate flowering and maintain the desired rate of development in order to be marketable at the right time. The critical nature of crop timing is illustrated by the fact that poinsettia not in flower for the Christmas market will not be sold, and Easter lilies after Easter are of little value.

The U.S. floricultural industry (\$70.6 million in 1985) has undergone significant change within the last decade (4). Foreign competition in cut flowers, especially chrysanthemums, roses and carnations, have required floriculturists to alter their crop mix. Bedding plant and potted flowering plant production has increased during this period. Many new plants have been introduced to U.S. growers, and some have been accepted by the industry and U.S. consumers. The introduction of new plants and promotion for their acceptance are the key elements in the future health and potential growth of the U.S. floriculture industry.

General Conclusions

The key factor in the success of any nursery or greenhouse business is market assessment and market development. The days when growers could sell everything they produced without giving adequate attention to marketing details are gone. Markets should be identified before crop production is planned. Consideration must also be given for market development through promotion and advertisement. The successful nursery or greenhouse manager must give at least as much attention to marketing as production, especially during the beginning years or expansion years of the business.

Nursery businesses successfully marketing their plants will have quality plants at the appropriate time, provide a fast, dependable service to their customers, have competitive prices and develop a mutually beneficial relationship with their customers and other growers. Because individual relationships appear to be important in this industry, it can be difficult to penetrate established markets. The best way for a beginning nursery to break into the markets is to do so by producing plants that fill identified voids in the market.

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The Road Ahead

R. J. Hildreth

This conference can be viewed as the story of a trip over a road. What is the nature of the road on which we are traveling? The objectives of the conference provide some description of the road: "The purpose of the meeting is to identify and examine current activities in the Southern region related to cost-effective alternative farming opportunities that enhance farm profitability. Specific objectives of this conference are as follows:

- to provide a forum for information exchange that benefits the agricultural community,
- to identify possible alternative farming opportunities for producers to consider, and
- to discuss marketing opportunities and limitations."

While we did much to achieve the objectives, we did not complete the trip. The road stretches out ahead of us. How is the road ahead different from the road on which we have traveled in the past decades, and how is it the same?

Let me start with how it is the same. The history of the land grant university and the colleges of agriculture in the South is the application of science and education to the development of alternative enterprise opportunities. Examples include the introduction of cotton in the Delta and the High Plains, soybean production in the Mid-South, broilers and the production of cattle in the Southwest. At one time all of these were alternative enterprise opportunities. Don Jones, the former superintendent of the Lubbock Substation of the Texas Agricultural Experiment Station, told me much about the tension that existed between the ranchers and the cotton farmers on the High Plains in the 1920s and '30s. Many of the ranchers were not interested in cotton farming and were, in fact, against it.

So, in a way, agricultural science and education have always been about the introduction of new crops and enterprises and always have had to deal with tensions of the "new".

But the road ahead is different. In the past we often had decades to develop the "new." Why do we have less time now to develop and make the adjustments? First, the markets in the past were domestic and often local--not even national. Now the markets are international. Import competition is real for tobacco and some fruits as is competition for export markets for grains.

Second, the rate of development and adoption of new practices in U. S. agriculture and competing countries is much faster.

Managing Director, Farm Foundation

Third, agriculture used to be a relatively high labor/low capital activity, and the capital markets were relatively local. Now agriculture is a relatively high capital/low labor activity with national and international capital markets.

Fourth, the road ahead in the next few years has many "pot-holes" of financial stress for farmers and the input industries. Farmers want and need help now.

Fifth, the road ahead has more risk for traditional as well as new enterprises. Farmers and lenders need to think hard about the things that John Holt and James Rathwell talked about.

The Agricultural Science and Education System will not have decades to develop alternative enterprise opportunities as they had in the past for these reasons.

The expectations of society for colleges of agriculture and the universities are changing. The report of the Commission on the Future of the South, "Halfway Home and a Long Way to Go," has one of its ten regional objectives: "Increase the economic development role of higher education by 1992." Southern political leaders have a view of the publicly supported university as a device for economic development, importantly including agriculture.

I am struck with how many thoughts leaders and political leaders are expressing in one way or another the view: 1) that society does not exist to serve the university; and 2) the criteria of how the university serves society well is different than that of the faculty and administration of the university. For example, more emphasis is put on undergraduate education and extension versus research discovery for its own sake. Agricultural science and education are not exempt from these tensions.

Let me now list some observations on navigating the road ahead that have occurred to me from listening to the excellent presentations at these conferences.

1. Alternative enterprise opportunities will not solve all the farm income and financial stress problems. But at the margin they can help improve individual farmers' income and financial stress problems.

2. The timely evaluation of alternative enterprise opportunities and provision of information for their adoption will require a higher level of scholarship by extension and research than traditional enterprise analysis and provision of information in the past. With the expected short response time, careful thought and wise use of theory are more important than when we had time to develop the data and experience.

3. The successful development of alternative enterprise opportunities will often require the cooperation of various public agencies and private firms. We heard examples of the muscadine industry development in Mississippi, sweet corn production in Alabama and the financing of most alternative enterprise opportunities.

4. Some alternative enterprise opportunities are directly competitive with existing production and "markets take away." For example, the increasing production of watermelons in Georgia and the Carolinas take away the market window from Florida. But some alternative enterprise opportunities have less "take away" than others. It is possible that the more the alternative enterprise opportunity provides rural amenities and/or recreational opportunities to an urban population, the less the "take away". Such opportunities should not be overlooked. However, different strategies are required depending upon the degree of "take awaysness."

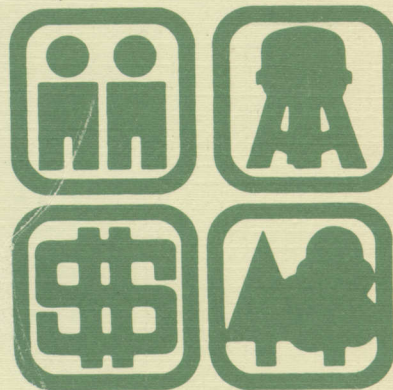
5. The larger the number of farmers and the volume of production of the alternative enterprise opportunity, the more a systems approach is needed.

6. The advice of Mr. Coffey is wise for individual farmers: "Go slowly in the development of alternative enterprise opportunities." Let the opportunities grow up around you. Get on a learning curve about production and marketing of the new opportunity. This advice is also probably as applicable for group action such as the formation of marketing cooperatives for new enterprises as it is for individual farmers.

7. Don't overlook mixing off-farm income opportunities with alternative enterprise opportunities and traditional enterprises. Perhaps we should focus more on the survival and improvement of the well-being of farm families than the survival and well-being of the family farm.

With hard work, careful scholarship and good luck, we who work on alternative enterprise opportunities can play a significant role in the revitalization of rural America.

The SRDC is one of four regional rural development centers in the nation. It coordinates cooperation between the Research (Experiment Station) and Extension (Cooperative Extension Service) staffs at land-grant institutions in the South to provide technical consultation, research, training, and evaluation services for rural development. This publication is one of several published by the Center on various needs, program thrusts, and research efforts in rural development. For more information about SRDC activities and publications, write to the Director.



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