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THE ROLE OF ALTERNATIVE AGRICULTURAL ENTERPRISES IN A CHANGING AGRICULTURAL ECONOMY

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INTRODUCTION

The search by farmers for more profitable methods of production and enterprises is never ending. The intensity of that search does vary with economic conditions in agriculture. The current financial stress in agriculture has generated widespread interest in alternative agriculture, as evidenced by the following:

- Newspaper and magazine articles about alternative agriculture appear regularly.
- Conferences and seminars attract much attention, such as a Des Moines conference which attracted over 5000 farmers from 42 states to focus on 100 novel ideas for farming, including such topics as growing garbanzo beans and raising edible snails.
- U. S. Department of Agriculture announced the formation of an Office of Small Scale Agriculture.
- A handbook containing information on more than 300 organizations active in research, training, and development related to sustainable agriculture was published in 1985 (Sanzone).
- Departments of Agriculture in many states have initiated projects to promote the production and marketing of unconventional agricultural enterprises (Conway).
- The *American Journal of Alternative Agriculture* appeared in 1986, and more established scholarly journals published articles on alternative agriculture.
- New research and extension projects focusing on alternative agricultural enterprises have been initiated, and more are being proposed.

Despite the fact that much attention and effort is being devoted to alternative agriculture, much of the effort is neither sharply

focused nor capable of generating a systematic base of knowledge. The massive outpouring of writing about alternative agriculture ranges from the anecdotal (most frequent) to sophisticated research findings (Dabbert and Madden).

Concepts

A variety of terms is being used to describe the search for new production methods and farm enterprises, including alternative agriculture, sustainable agriculture, reduced-input farming, and organic farming. We use the term *alternative agriculture* to refer to adoption of production methods designed to use fewer purchased inputs, selection of unconventional farm enterprises, and diversification of enterprises and uses of family resources, including combining agricultural and non-agricultural enterprises under the same ownership or management.

If a factor price remained constant and the product price fell, one would expect a reduction in the use of the factor as the consequence of equating the value of marginal product (VMP) with the marginal cost of the factor (MCF). Reduced-input farming would involve methods which use fewer purchased inputs than would be the case when conventional agriculture adjusts to lower commodity prices through the process of equating VMP with MCF. At one extreme, one may find a "pure" organic farm that uses almost no purchased inputs. At the other extreme, a reduced-input farm may use methods that result in the purchase of inputs almost equal to that of a conventional farm. Non-purchased inputs do have opportunity costs. For example, a shift from more to less capital-intensive enterprises does not imply that labor has zero opportunity cost.

Low profitability for many conventional enterprises such as corn, wheat, and soybeans

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has created interest in growing new commodities such as ginseng, ugli fruit, and angora wool. While these commodities may seem unconventional, the same could be said for such items as silk, indigo, hemp, and coffee which were important in the South during the early colonial period (Gray). Many new commodities embody attributes of recreation (pay fishing ponds), health and nutrition (organic foods), and status (exotic fruits) as well as food to satisfy physiological needs. In fact, many unconventional enterprises satisfy demands for attributes which are largely unrelated to the need for food.

Diversification has been motivated by risk reduction and reduced-input farming. Diversification may take the form of multiple enterprises and crop rotations or use of family labor and capital in off-farm activities related to the farm business (roadside market, home delivery of eggs) or to activities not related to the farm business (part-time farming).

This discussion has provided less than a precise definition of alternative agriculture. Hopefully, the major components of alternative agriculture—reduction in purchased inputs, production of unconventional commodities, and diversification of enterprises—have been clarified.

Overview

The purposes of this paper are to assess the potential of alternative agriculture and to describe barriers to its expansion. Several forces which affect the transition to alternative agriculture are enumerated and likely responses to these forces on farms in the South are analyzed. Impediments to a viable alternative agriculture are then described.

The theme of this paper is that the ebb and flow of agricultural production is driven by changing factor and product prices, changing technology, and changing comparative advantage. We will conclude that the mix of production methods and enterprises will shift toward alternative agriculture. This shift will make agriculture more heterogeneous than it has been in recent years, and the shift to alternative agriculture will be more pronounced in the South. Barriers to entry into alternative agriculture are severe, and some farmers will experience a decline in income after switching, but land-grant universities should have the capacity to mitigate some problems through research and education programs.

PREMISES

Major trends affecting agriculture have been analyzed (Havlicek). For purposes of this paper, four trends or forces which are particularly relevant to the shift to alternative agriculture are adopted as premises with little questioning of their validity. These forces/premises are continued financial stress in agriculture, changes in the pattern of food consumption, continued large and unpredictable shocks from macroeconomic forces, and acceleration of technology development.

Financial stress is the most important reason for the current interest in alternative agriculture. This stress is assumed to persist as a result of pressure to reduce expenditures for agricultural programs and slow recovery of export markets.

Increased consumption of fruits, vegetables, and poultry and decreases in red meat consumption (Capps) are assumed to continue. Away-from-home eating will expand. More affluent consumers and larger numbers of persons from varied ethnic and cultural backgrounds will expand the demand for new and exotic foods. Medical research and technology will raise the health consciousness of consumers. Consumption of food considered nutritious, low in calories, free of chemical and pharmaceutical substances, and low in substances associated with heart and circulatory problems will expand.

Macroeconomic forces have increased market risks for agriculture. These higher risks are one incentive to diversify enterprises. The shocks to agriculture from these forces are not expected to subside.

While the development of biotechnology and information technology will accelerate, there will be a lag in the impacts of new technology. In addition to time required for widespread adoption, it will take several years for some developments to be marketed because of testing for approval and litigation. These technologies will generally favor those farms with the superior management required to realize the full potential of the technology (Kalter). As a result, larger and more specialized farms will tend to realize greater benefits from technology developments.

ADJUSTMENTS IN SOUTHERN AGRICULTURE

The history of southern agriculture is one of continual response to economic and technological forces. Slash and burn agriculture

shifted to organic agriculture (use of marl and manure, crop rotation, moving cattle pens) about 1750 (Gray) and evolved to conventional agriculture about 1940. The prevalence of monoculture and diversified agriculture has shifted back and forth. Changes in farm enterprises have not only been continuous since early colonial days, but the location of production of a particular crop has shifted over time, generally from east to west. The only thing new about future adjustments in southern agriculture is that they will probably be made more quickly.

Farm Enterprises

Except for the Pacific region, the South has more alternative enterprises available to it than do other regions. Longer growing seasons also favor southern agriculture. Yields in the South are adversely affected by less productive soils and greater risk of damage from pests and disease. Overall, there are more feasible alternatives that can be adopted by farmers in the South. In spite of the fact that soybean acreage in the South exceeds cotton acreage at its peak, farming in the South is more diversified than in most other regions. This history of producing and marketing a large number of different crops will make the expansion of alternative enterprises less difficult.

Southern agriculture should benefit from changes in consumption patterns such as increased purchases of fruits and vegetables, exotic produce, ornamental plants, and farm-based recreation (Hamm). For much of the South, there are large numbers of consumers close at hand, and population growth will be relatively high. The composition of consumers will assure a diverse market for the new and unusual products. Little is known about the demand for existing and new products of alternative agriculture. It is likely that the income elasticity of many of these products will be high and that they will be consumed close to where they are produced. They will satisfy many needs other than the need for food. The emphasis of this paper on supply considerations, about which more is known, should not be misinterpreted. Demand, including the identification of niches and unsatisfied needs, will be the driving force for alternative agriculture.

Many of the alternative enterprises are labor intensive. More labor will become available in the South as textile and other labor-intensive industries face competition

from firms in other countries which have lower labor costs. In addition, the migration of retired persons who seek at least partial employment will provide labor for alternative agriculture. Retirement, government services, and manufacturing now produce much of the income for rural counties in the South (Henry, Drabenstott, and Gibson). Greater involvement in alternative enterprises may bolster that income, but returns to labor may not be high enough to reduce the rural-urban income gap which has widened in recent years. For some, alternative agriculture may be their best option. Others may obtain non-pecuniary benefits. The non-farm labor market dominates the market for agricultural labor. Non-farm earnings and opportunity costs will continue to be decisive in allocating labor to farm and non-farm uses.

Pressures to change enterprises arising from changes in farm programs and comparative advantage may be greater in the South than in other regions. Government payments do represent a smaller percentage of farm income for southern states than for the United States as a whole; however, the payments are relatively low for soybeans and the costs of programs for sugar, peanuts, and tobacco are borne largely by consumers in the form of higher prices rather than by direct out-of-treasury payments. Substantial increases in soybean production could occur in other countries, and the United States may be losing comparative advantage for that crop. If this occurs, the impact may be greatest in the South which probably has a U.S. comparative advantage in soybeans. Tobacco, peanuts, and sugar are important southern crops that may be drastically affected by changes in farm programs. Financial stress is now as severe for farmers in the South as in any other region, based on the percentage of farmers who went into bankruptcy and the percentage of farmers whose debts are up to their practical limits. Financial stress could easily become relatively more severe for southern farmers. To the extent that these major cash crops suffer, the South may have less choice about the shift to alternative agriculture than other regions.

Diversification has long been promoted to reduce risks and to conserve soil fertility. For the South, diversification also provides an important means to control disease and pests. A 1918 farm management text for southern agriculture stated in bold print, "No system of agriculture can succeed on one crop" (Benson and Betts, p. 5). Risk reduction is still a major

reason to consider diversifying enterprises, but it does not ensure achievement of that objective. First, the alternative enterprises may have greater variance in returns because of natural (weather) or market causes. This would make diversification riskier and less attractive if the mean of returns was not higher, based on a mean-variance criterion. For some farmers, average returns will be lower (Estes). Second, if returns for two or more enterprises were perfectly, positively correlated (+1), there would be no reduction in risk through diversification. To minimize risk, one would try to find two enterprises that were perfectly, negatively correlated (-1). Portfolio theory could be used to select enterprise combinations with highest expected return for any degree of risk or the lowest degree of risk for any expected return. While diversification does not assure risk reduction, it can be used effectively for that purpose. With high and increasing levels of risk, many farmers will attempt to diversify. Specialized farms will persist, however. They may decline in number, but not necessarily in volume of output. Higher returns from specialization may outweigh the greater risk. As previously suggested, biotechnology developments are likely to produce greater benefits on specialized farms.

A non-farm type of diversification is likely to become more important. Part-time farming is primarily a diversification of family labor, which is often less than fully utilized for a large part of the year in conventional agriculture. It is not likely to subside. Alternative agriculture will encourage greater diversification of family labor and capital into off-farm activities related to the farm business, but this will be guided by opportunity costs. Farmers who come from the ranks of retirees or displaced workers may bring special skills for the off-farm activities to the family business. For example, a person with skills to start a specialty shop might also operate a farm and link the two. The linkage of farm and non-farm activities may reduce variations in returns (risk), but average returns may not be higher.

The transition to alternative agriculture will produce substantial changes in the number of enterprises and the output of existing enterprises. The production of soybeans, tobacco, sugar, and even peanuts is likely to diminish, though the size of farms producing these commodities may increase. A substantial increase in the number and output of unconventional

enterprises is expected. These enterprises will be based on advantages related to growing conditions, location of markets, and labor availability.

Purchased Inputs

As previously mentioned, one consequence of lower commodity prices is a reduction of purchased inputs by farmers using conventional production methods. Lower commodity prices and financial stress also generate incentives to adopt alternative production methods that use fewer inputs. Various forms of reduced-input farming have yields that are lower than those under conventional methods, but cost reductions will offset some of the income loss associated with yield reduction (Buttel et al.; U. S. Department of Agriculture). While most studies have found that net income is somewhat lower for reduced-input farming, differences in net income between reduced-input and conventional farming methods are quite variable and depend on soil erosion constraints, time after change to reduced-input farming, and other factors (Domanico, Madden, and Partenheimer). If commodity prices decline relative to purchased input prices, net income from reduced-input farming will probably increase relative to conventional methods. This outcome will be influenced by the production functions for conventional and alternative agriculture and by the implied demand functions for purchased and nonpurchased inputs. At this time, little is known about production functions for alternative agriculture and related factor demands.

Technology developments are likely to favor conventional farming methods, in part because reduced-input farming will be more diversified. Many technology products involve traditional farm enterprises (dairy, swine, grain) which are more likely to be produced on specialized farms. Good management is a critical factor in capturing gains from technology (e.g., correct feed levels with the use of bovine growth hormones).

The effects of reduced commodity prices and the introduction of new technology should have about the same impact on adoption of reduced-input farming methods in the South as in other regions. In some states such as Florida, there is a high risk of contaminating the water supply using conventional farming methods. Regulations in such areas may spur the use of less chemical-intensive farming methods.

Farm Structure

The structure of southern agriculture will be affected by the projected shift to alternative agriculture. The number of farms is expected to be greater than that under conventional agriculture because there will be more part-time farms and more smaller farms. The number of large, specialized farms is not expected to change much. New technology will do much to sustain these farms.

Reduced-input production methods, diversified enterprises, and unconventional commodities are not restricted to small farms. For example, organic farming does not appear to be limited by scale economies and is used by farmers operating 1500 acres (U.S. Department of Agriculture). Some very large farms in California and Florida are quite diversified and produce many unconventional commodities. We can thus expect to find both large and small farms that have shifted to alternative agriculture. The shift to alternative agriculture will result in a more heterogeneous agriculture with respect to size, degree of specialization, production methods, and enterprises.

There are major impediments to the success of alternative agriculture. These impediments relate to information, entrepreneurial skills, human capital, coordination, infrastructure, venture capital, and environmental and social concerns which are described next. Land-grant universities have been one of the chief purveyors of information, education, and research which determine what is produced on farms and how it is produced. The shift to alternative agriculture and its continued viability will be influenced by the role public institutions play.

IMPEDIMENTS

Several conditions or situations are likely to slow the shift toward alternative agriculture and will cause failure of some farms that do shift. Some of what we identify as impediments may be reduced to the extent that the land-grant system is responsive in providing information to facilitate this shift. It does seem apparent, however, that much of the needed information will require new and re-directed efforts on the part of the land-grant system.

While many of these efforts will be directed toward farmers and on-farm activities, the viability of alternative agriculture probably depends more on performance of markets and effectiveness of the non-farm sector. For con-

ventional agriculture, the value added by farm production is only about 10 percent of the food expenditure by consumers (Polopolus et al.). This percentage will likely be much higher for alternative agriculture because of reduced purchases of inputs, less processing, and forward integration by farmers into some off-farm activities. Nevertheless, the value added by the farmer who enters alternative agriculture will average substantially less than half of the consumer price, and the success of these farmers is strongly linked to those serving agriculture.

Information

Information regarding production practices and methods of marketing alternative agricultural enterprises is not readily available, often because it is non-existent. Through years of heavy investment in research and educational efforts, the land-grant system and public and private organizations have developed an information base and delivery system which provides excellent information on the production and marketing of conventional enterprises. Much of this information is neither transferrable nor useful in understanding the production and marketing of these new alternatives. As this move toward unconventional enterprises continues, demands for research and extension services directed to the specific needs of this segment of American agriculture will increase. To date, much of whatever information exists comes from newspaper articles and other popular press sources. Much more than this will be required for alternative agriculture to be a success. Enterprise-specific costs and returns data, efficient management practices, marketing alternatives, and market outlook information will be needed, perhaps even more critically than for conventional enterprises where there is more experience. Efforts are now underway in several southern land-grant universities to provide research results to facilitate the search for economically viable alternative enterprises. State Departments of Agriculture are becoming increasingly involved in this effort and may be expected to play a larger role in gathering and delivering information on marketing alternatives, production practices, and financing options. The best efforts of all participating agencies will be required to ensure that good factual information, rather than "boosterism," forms the basis for decisions.

Entrepreneurial Skills

Entrepreneurial skills relate to the ability to adjust quickly and efficiently to changing conditions. Entrepreneurs assess trends and conditions which will give rise to future opportunities and are willing to assume the risks required to obtain the rewards presented by those opportunities. A grain farmer who decides to try something else simply because grain has become less profitable may be courting disaster. The entrepreneur will be searching for opportunities which can be developed that will best utilize the resources he or she commands. Each family may possess some unique resources which make it particularly suited to engage in some sort of farm/non-farm activities. These resources may be the product of both farm and non-farm experiences and may relate to functions such as production, finance, and merchandizing. Entrepreneurial skill is probably the factor most critical to success in alternative agriculture.

The environment within which success or failure occurs is likely to be vastly different from that which characterizes much of conventional agriculture (Conway). Government payments which constitute a large proportion of farm income today are not likely to be a part of the alternative agriculture scene. Much of today's farm program payments has been developed with strong influence by specific commodity groups. Given the pressures which now exist to reduce the overall level of government payments to farms, it is unlikely that the "new entrepreneurs" will possess either the political or economic influence to direct payments to this group. Other forms of financial assistance from government sources will also be limited. Thus, producers of these new alternatives will be more dependent on their own skills and creativity in finding and designing efficient production and marketing systems (Conway). In the absence of any government purchases or guarantees, these entrepreneurs will find it necessary to create markets for their products. This may require different approaches than that required in traditional agriculture.

Human Capital

In much the same way that existing information may not be useful in the production of unconventional enterprises, the managerial skills necessary in conventional agriculture may not be sufficient or transferrable to the needs of alternative agriculture, which may include non-farming enterprises as well as

new agricultural enterprises. New ways of marketing, producing, and organizing will be called for, and the successful farmer will need a full measure of ingenuity and creativity.

In a similar vein, conventional agriculture is supported by a large number of persons in agribusinesses who have specialized skills and knowledge regarding such things as credit, risk management, transportation, storage, tax management, marketing outlets, grades and standards, and financial management. Much of this human capital may not be directly transferrable to alternative agriculture. The diversity and smaller total volume of alternative enterprises may place limits on the investments which can be justified to develop appropriate human capital. For example, consider the number of experts on grain futures who are available to assist farmers. How many such experts could we have for broccoli? The needs for human capital development related to alternative agriculture will be large. Land-grant universities and other public agencies will need to analyze the allocation of their limited resources to these many new demands and to the maintenance of human capital to support conventional agriculture.

Coordination

Unlike many conventional enterprises, the coordination of markets and market channels is not well developed. In many cases, we simply have no knowledge of the site or nature of the market for dramatically increased production of unconventional enterprises (Estes). For traditional enterprises, markets are well developed and understood by buyers and sellers. In the case of conventional commodities, we are usually dealing with small or marginal changes, especially on a percentage basis. Compare this situation to unconventional enterprises for which we may not even have existing market institutions. While we may conceive of an individual operator finding a market for five acres of elephant garlic, how do we market 500,000 acres, and at what price?

We do not imply that it is impossible to develop new markets and institutions. Consider the recent appearance in New York and other eastern restaurants of alligator meat. While such success stories appear promising, we should not assume that markets can be easily found for large volumes of exotic or unconventional products (Estes). Even if markets can be developed, this will require new

institutions. For some unconventional enterprises, the markets will likely be local in nature and depend on proximity to urban consumers. Location will thus be an impediment to success in these enterprises for farmers not close to urban centers. For others looking toward a more regional, national, or international market, warehousing, transportation, and financing methods and facilities will need to be developed.

Infrastructure

To the extent that southern agriculture shifts to unconventional alternatives, we may find that much of the existing infrastructure in the production and marketing of conventional enterprises will not serve the needs of this new and diverse agriculture. Grain elevators, processing facilities, and other equipment and facilities represent large financial investments which have limited alternative uses. It may well be that expensive new facilities will be required, which will call for financial capital from off-farm sources. Those with investments in existing infrastructure will be reluctant to write off or liquidate their investments at a low salvage price. This reluctance coupled with the need for major new investments in infrastructure, particularly for commodities requiring processing, will likely slow the movement to alternative enterprises. New demands on state and local governments to make significant expenditures for marketing and processing facilities will likely be forthcoming as changes in southern agriculture take place. States will need to evaluate carefully the impacts of such undertakings.

Venture Capital

The movement toward alternative agriculture will create new and different demands for financing. While it is possible and in some cases likely that alternative agriculture may be less capital intensive than conventional agriculture, this will not always be the case. Certainly those enterprises which use fewer purchased inputs, especially fertilizer and other chemicals, will require less production credit. To the extent that alternative agriculture is more labor intensive, the need for financing expensive machinery may be less than in conventional agriculture.

Nevertheless, alternative agriculture will have significant capital needs and will not likely have access to some of the traditional agricultural credit sources. New enterprises are usually viewed as high risk by lenders. As

previously discussed, production and marketing information is extremely limited; thus, traditional agricultural lenders will find it difficult to judge the expected profitability of these new enterprises. This lack of information will create uncertainty for the potential lender and will likely make financing more difficult and expensive. It is also likely that many of the producers of alternative enterprises will not have the experience or knowledge of sources of finance which is found in many conventional producers.

Given the inherent risk and uncertainty associated with new types of agricultural operations, producers may have to rely more heavily on sources of venture or equity capital. Such forms of financing are common for new business ventures or new technologies in other sectors of the economy. They have not been widely used in most of conventional agriculture. New sources of venture capital will need to be identified and cultivated and many producers will not be familiar with the sources or methods involved.

If state governments wish to encourage the development of alternative agriculture, they may be able to play a role in bringing together farmers and sources of venture capital. State governments have provided some financing and loan guarantees for the development of new technologies and new products. Like other suppliers of venture capital, they will be involved in both glowing successes and dismal failures. Land-grant universities could generate information for the public and private sectors concerning financing needs and opportunities, and assessments of probable consequences.

Environmental and Social Concerns

Environmental and social concerns will cut both ways with respect to the shift to alternative agriculture. Concern over pollution from agricultural chemicals and pesticides will lend support to a movement toward an agriculture less dependent on chemicals. Also to the extent that alternative agriculture results in the maintenance of small farms using family labor, especially in the urban fringe, it will find support from individuals and groups who value these things highly. On the other hand, much uncertainty will accompany the transition to alternative agriculture. As new enterprises develop, it is likely that new and unexpected environmental problems will accompany them. Whether or not alternative agriculture will lessen or increase the problems of

erosion and agricultural runoff remains to be seen. Since many of the production practices of alternative agriculture and their effects are as yet unknown, public agencies will need to monitor these closely.

SUMMARY AND CONCLUSIONS

A rather broad concept of alternative enterprises in a changing agricultural economy has been presented. Some of the major forces driving the search for profitable "new" enterprises or combinations were discussed, and it was our conclusion that these forces are unlikely to abate in the foreseeable future. There are both supply and demand related factors which may cause faster changes in the South than in other regions.

Interest in agricultural and non-agricultural alternatives will remain high and likely increase in the foreseeable future. Changes which are already underway will likely occur even more rapidly. Some of the more likely general changes have been identified, but little confidence could be placed on projections of specific commodities which will be grown at different locations. There will continue to be many localized success stories with new or unconventional enterprises, and there will likely be even more failures. The extent to which entrepreneurs succeed will be largely

dependent on the quantity and quality of the information base, which is currently inadequate for formulating sound decisions. It is obvious that more and better production and marketing data are needed in order to assess the feasibility of alternative enterprises.

Much uncertainty about the future mix of enterprises in southern agriculture remains, but it is certain that the future will be different. More unconventional enterprises, more non-farm/non-agricultural enterprises combined with agricultural operations under the same management, and a different set and level of inputs will all be a part of that future. These changes will present demands for new sources of capital, new infrastructure investment, and a more demanding set of entrepreneurial skills. While many successes and many failures will attend the changes in southern agriculture, it would be unwise to think that alternative enterprises will solve the low income problem associated with small, limited-resource farm families. At best, alternative enterprises will offer some limited opportunities for supplementing farm and off-farm income.

While the future will contain both successes and failures, it will certainly provide exciting opportunities and challenges for producers, consumers, and those who serve them, such as agricultural economists.

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