GROWING NATURALLY IN ALABAMA: NEEDS AND POSSIBILITIES

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GROWING NATURALLY IN ALABAMA: NEEDS AND POSSIBILITIES

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THESIS ABSTRACT

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The emergence of the term “organic farming” describes a distinct system of agriculture compared to conventional or industrial agriculture. Since October 2002, farmers planning to market their products as “organic” must be certified following USDA procedures. But many farmers avoid certification costs and paperwork by selling their products as “natural” or “pesticide free”. In Alabama, most producers, with small-scale farms, prefer to sell their “natural” or “organically-oriented” products directly to the consumers without USDA certification. But few studies focus on these farmers’ production and marketing needs and possibilities before. This study examines Alabama low-input and organic producers’ needs and concerns. It focuses on Alabama low-input and organically-oriented producers (LIOP) to describe the practices and approaches

currently employed by LIOP; to assess the information and technical needs of LIOP; and to profile the marketing strategies used by LIOP.

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I. INTRODUCTION

Organic Farming

Organic farming has been one of the most popular food trends in recent years. It stands for long-term farming solutions and the production of safe, high-quality food (Bavec 2007). "Wholeness and complexity" is present within the definition of organic farms (Høgh-Jeansen 1998), but organic farming is usually defined by what it does not do (Tamm 2001): planting without synthetic fertilizers, pesticides and genetically engineered seeds, which is a distinct system of agriculture compared to conventional agriculture (Duram 2005). According to the International Federation of Organic Agriculture Movement (IFOAM), organic agriculture "includes all agricultural systems that promote the environmentally, socially and economically sound production of food and fibers. These systems take local soil fertility as a key to successful production. By respecting the natural capacity of plants, animals and the landscape, it aims to optimize quality in all aspects of agriculture and the environment. Organic agriculture dramatically reduces external inputs by refraining from the use of chemo-synthetic fertilizers, pesticides, and pharmaceuticals. Instead it allows the powerful laws of nature to increase both agricultural yields and disease resistance. Organic agriculture adheres to globally accepted principles, which are implemented within local social-economic, geoclimatical, and cultural settings."

To specify the definition of organic farming, Duram (2005) concluded that organic agricultural researchers and producers regard crop rotation (changing the crops grown in a field each season) as a central way to build healthy, fertile soil that has few pest problems (Watson et al. 2005). Organic means using "beneficials" – beneficial insects such as ladybugs that destroy unwanted species like aphids, and beneficial interplanting of certain plants to keep pests away (Lampkin 1990). It means complex farm management decisions about crop choice, planting, harvesting, and marketing (Gaskell et al. 2000). It also means marketing through distinct channels – producers must work hard to identify and maintain their sales outlets, often selling to numerous wholesalers, to brokers, or directly to consumers (Lampkin and Padel 1994). Organic farming also means diversity – growing a large number of crops both for ecological diversity and for sales diversity (Newton 2002). It means independence – staying outside the mainstream industrial agricultural system as much as possible. And most certainly, organic production means innovation – trying new crop rotations or varieties or timing, trying new machinery (often built by themselves), and trying new sales venues to meet consumers' demands (Duram 2005).

With around 20 percent growth rate of demand in U.S. annually since 1990 (Oberholtzer et al. 2005), organic farming expanded dramatically in the last decade, and this expansion continues today. In October 2002, USDA began to implement the National Organic Foods Production Act (NOP). All agricultural products that are sold, labeled, or represented as organic must be compliant with the regulations. Though the standards regulate the organic market, many farmers, especially small-scale farms' producers avoid certification costs and paperwork by selling their products as "natural" or "pesticide

free". In this study, we enlarge the definition of organic production. Those who employ organic methods or avoid using chemical inputs and additives are regarded as low-input and organically-oriented production (LIOP) producers.

Organic Food

In U.S., organic food demand is increasing every year. During the mid 1980s, there was a jump in the demand for organic food and a corresponding increase in organic production (Guthman 2003; 2004a). In 1980, U.S. organic food sales totaled $178 million. By the end of the decade they had reached $1 billion (Wang and Son 2003). In 2000, more organic foods were sold in mainstream supermarkets than in any other venues (with natural foods stores and direct marketing as runners-ups) (Obach 2007). In fact, 72 percent of conventional grocery stores had carried some organic food in 2002 (Dimitri and Greene 2002). According to *Nutrition Business Journal*, fresh fruits and vegetables have been the top selling categories of organically grown food since the organic food industry started retailing products over three decades ago, and they are still outselling other food categories (Dimitri 2003). During the 1990s, organic dairy was the most rapidly growing segment. From 1994 to 1999, organic dairy items increased fivefold (Dimitri and Greene 2002), as consumers sought to avoid genetically engineered hormones used to increase milk production (DuPuis 2000).

Some researchers pointed out organic foods have lower pesticides, less nitrate residues and higher nutrient content than conventional food (Worthington 1998, Duram 2005). For example, organic livestock are fed with organic vegetables and herbs and do not receive antibiotics, which reduces the organic consumers' risk of food poisoning. However, some researchers concluded that organic food does not contain higher nutrients

compared with conventional food, and there is concern that the manure residues on organic food may be also harmful for consumers' health (Ruterberg and Barringer 2000). DiMatteo, president of the Canadian Organic Trade Association stated publicly that "Organic is not a food safety claim" (Juday 2000). In addition, the USDA pamphlet "Organic Food Standards and Label: The Facts" specially notes that "USDA makes no claims that organically produced food is safer or more nutritious than conventionally produced food. Organic food differs from conventionally produced food in the way it is grown, handled, and processed" (USDA-AMS 2002; Dimitri 2003). Though the benefits of organic food's safety and nutrients are inclusive, the good taste of organic food has received confirmation from most consumers. In addition, many customers hold precautionary principle, they would like to believe that organic food is safe and healthy as it is produced without chemical pesticides and herbicides. This is especially true for parents who seek to give their children high quality food.

Organic Production

In 1995, certified organic farmland totaled nearly 1 million acres. Within 10 years, organic farmland acres tripled. In 2005, for the first time, all 50 States in the U.S. had some certified organic farmland. U.S. producers dedicated over 4.0 million acres of farmland – 1.7 million acres of cropland and 2.3 million acres of rangeland and pasture – to organic production systems in 2005 (Organic Production, ERS/USDA Data 2005). In 2005, the total organic farmland used 0.51% of U.S. total farmland. About 4.7% of vegetable crops and 2.5% of fruits were grown by certified organic methods. For grains, these figures are much lower, as only around 0.16% of corn and soybeans are grown organically (Organic Production, ERS/USDA Data 2005).

"The average farm size for the organic sector is much smaller than for the entire United States: 188 acres compared to 469 acres in 1995" (Klonsky and Tourte 1998). Geographic variation is seen among the states. California has the largest certified organic acreage and the largest numbers of certified organic farmers. Midwest states, especially North Dakota, Minnesota, Wisconsin, and Iowa have much larger certified organic acreage than other states, although California has the most organic acres (Greene and Kremen 2003).

Organic Production in Alabama

Alabama, located in the southeast U.S., has appropriate climate for some organic production, but humid summer is a challenge for insects and pests control. With small-scale farms, most producers prefer to sell their "natural" or "organically-oriented" products directly to the consumers without USDA certification. In 2005, among 4.0 million acres of U.S. certified farmland, only 262 acres of Alabama cropland were actually certified as organic, which includes 206 acres of fallow, 4 acres of mixed vegetable crops and 52 acres of unclassified crops (Organic Production, ERS/USDA Data 2005).

According to Guthman (2004), the range of organic production area in California is from 30 to 500 acres. In Alabama, the average organic production acreage in the sample of one survey is 27 acres, and about 70% of the farms are less than 10 acres (Cui 2007). In addition, compared with other states, Alabama has very few certified organic farmers. Among 92 producers in one survey, only 4 farmers were USDA certified organic producers, 21% of farmers were registered with the Certified Naturally Grown organization.

Alabama Sustainable Agricultural Network (ASAN) is a non profit volunteer association fostered by Heifer International to expand sustainable agriculture practices among Alabama farmers. It does so by providing education and training, marketing information, and links between urban consumers and rural producers (ASAN 2008 http://www.asanonline.org/). Other institutions, such as Auburn University also provides producers with useful production techniques. With several agricultural field research centers, such as E.V. Smith Research Center (Tallassee), North Alabama Horticulture Research Center (Cullman), and Winfred Thomas Agricultural Research Center (Meridianville), extension experts periodically release research results to the public, which helps farmers improve proper planting methods in time.

Unfortunately, there are no detailed census and statistical data to examine Alabama low-input and organic production situation. Few studies have focused on these farmers' production and marketing needs and possibilities.

Food Systems

The agricultural food system does not only include the "farm operation, but also the production, transportation, and marketing of inputs to farming, as well as the transportation, processing and marketing of the farm outputs" (Lewontin 2000). In industrial agricultural systems, "farming operation itself now accounts for only about 10 percent of the value added in the agricultural food system, with 25 percent of the food dollar paying for farm inputs and the remaining 65 percent gained by transportation, processing and marketing that converts farm products into consumer commodities" (Lewontin 2000). Indeed, the average food item travels 1,500 miles before reaching our plate (Zens 2008).

On the other hand, a local food system is a community-based model where consumers buy fresh food grown by local producers (Wells et al. 1999). Farming organically, producers often can get inputs directly from the farm in the form of saved seed, manure for fertilizer, and family labor instead of purchasing commercial seed, fuel, synthesized chemical fertilizers and machinery that are used to substitute for labor. Pollution and soil erosion may be reduced, rural communities may be enriched, and small family farms have new possibilities and chances. Most importantly, local food products may not only benefit farmers and communities, but also consumers, who can get fresher and better taste food without paying extra cost for long-distance transportation.

Problems of Organic Farming

Treadmill of Organic Farming

Many researchers have pointed out that capitalism has affected industrial agricultural and has changed agricultural history (Wood 2000, Lewontin 2000, Duram 2005). Less food revenue is retained from farmers and is instead captured by big agribusiness corporations. In the industrial agricultural system, farmers usually play a subordinate role. First, natural resources, such as soil and climate, as well as market demand limit farmers' choice of what to plant, how to plant, and what inputs to use (Obach 2007). Second, agribusiness corporations control the types and price of inputs as well as the price of output (Obach 2007). Marxism asserts that labor and its products thus are alienated from the producer. In addition, government helps industrialized agriculture in order to ensure food security and expand exports, often neglecting small-scale farmers and broader social benefits (Hunger 2007).

The 2002 Farm Bill persuaded farmers to believe that the model of industrial agriculture works, that is subsidies can strengthen the farm economy and preserve the farm way of life for generations. However, the situation may be contrary to the U.S. government and farmers' dreams. Duram (2005) asserted that in the industrial agricultural system, the federal government provides billions of subsidies or half of the taxable income annually to the farmers, but conventional farmers have not gained much benefit from the market side of the industrial agricultural system. On the contrary, most benefits had flowed to agribusiness corporations.

Today, organic farming is experiencing a parallel trend of treadmill production. For example, organic milk has become dominated by a single corporation (Horizon Organic Dairy) that uses ultra-pasteurizing techniques to lengthen shelf life so that the products can be shipped across the country. The dairy corporation claims to rely on small family farms for their milk supplies, but the scale of this corporation is in sharp contrast to the image many consumers have of organic production (Duram 2005).

Some direct effects of this large-scale production link to the declines in rural communities and rural culture (Duram 2005). Like conventional farmers, organic farmers may be controlled by large corporations, not only economically, but also socially. Since organic farmers will also be involved in a vicious circle of production: dependent on specific inputs at set price and specific marketing channel, selling to large corporations under the contract. The rural community would be involved in industrial production and lose their capability to be independent from outsiders. Secondly, due to the fact that profit is the direct motivation for most large agribusiness corporation, food safety cannot be ensured. Likewise, technology will be used again to produce or process food. Duram

(2005) pointed out that technology is not necessarily bad, but the problem is that agricultural science and technology is under agricorporate control and their goal is profit. Hence safety is secondary.

Another result of mass production is a change in organic marketing channels. Small-scale farmers sell their products directly to customers through roadside stands, farmers' markets or community support agriculture (CSA). Large-scale farmers, usually sell their products to supermarkets or food processors under contract. Agribusiness processors conduct a series of post-production processes, such as washing, processing, packaging, and chilling. After that, organic food is sent to conventional supermarkets, such as Wal-Mart through long distance transportation. According to Duram (2005), this process increases externalized costs, and society pays more for environmental damage.

Farmland Issue

Farmland value is based on the expected income from the land, so there's no doubt that commodity payments increase the value of the land being subsidized (Patrie 2005). Current federal subsidies encourage farm to consolidate, since the larger the land, the more subsidies can gain from government. The number of farms, especially farms with acreage between 50 and 499 acres, is declining, while the number of large farms (more than 500 acres) is steadily increasing (Ryan, Barnard 2001). Increasing land values make it more difficult for small and medium-sized farms to expand operations and for new farmers to enter farming (Hunger 2007). As the average age of U.S. farmers continues to rise, supporting new and aspiring farmers will be crucial to the well-being of farming and farm-dependent communities across the United States (Patrie 2005).

Organic Certification and National Standards

Organic Certification

With the expansion of organic market and the increase demand for organic food, uniform, consistent and systematic standards are needed to organize the organic market. In October 2002, the National Organic Certification Standards went into effect. All agricultural products that are sold, labeled, or represented as organic must be compliance with the standards. However, producers who want to be certified must supply paperwork, pay investigation fees, and show three years for transition before certification. Many small producers believe that organic standards primarily benefit larger-scale farms, and work as catalyst to conventionalize organic farming (Obach 2007).

In fact, more large-scale farmers choose to get USDA certification than small-scale farmers. First, large farms have supermarket chains, such as Wal-Mart, Kroger as their main marketing retailers. USDA certification clearly signals about the nature of their products. On the other hand, small-scale farmers mainly sell products directly to consumers through farmers' market, roadside stands or Community Support Agriculture (CSA). Through word of mouth, holding field days or working with customers, small-scale farmers can introduce their products to consumers and establish trust relationships. Thus, USDA certification is not that important to them compared with the large-scale farmers. Second, USDA certification can help farmers raise the product price. The label represents non-chemical and high quality food. Most urban customers trust the label and they would like to pay more for organic food with USDA certification. But it is expensive and time consuming for small scale farmers to register and maintain their certification.

In addition, the word “organic” is defined by USDA regulations, which are regarded as bureaucracy by Max Weber. Small-scale farmers may seek a different term to describe their farming methods (Duram 2005). The current alternative certification labels include, for example, Certified Naturally Grown, Certified Human Raised and Handled, Biodynamic, and Free-Farmed. Farmers often can pay less money and time to get these labels. In some agencies, the certified farmers can become certifier to assess other farms and grant certifications, which means farmers can get recognition from their colleagues. So it is more convenient for them to get certification from these organizations.

Though the certification process is so diverse, various standards are not understood by farmers, customers and experts. According to Obach (2007), though synthetic pesticides, herbicides, and fertilizers are (mostly) banned, the rules did not prohibit ecologically destructive practices, such as monocultures or the use of environmentally damaging inputs. What is more, in the process of defining the national organic standards, attempts were made to include the use of sewage sludge, irradiation, and genetic engineering, practices that fundamentally contradict traditional conceptions of organic (Wallace 1998). In this instance overwhelming consumer pressure resulted in the exclusion of those provisions, but political struggles regarding the definition of organic are ongoing (Organic Consumers Association 2006).

Organic Scandals

According to a 2007 U.S. organic foods market report, 47 percent consumers worried that big companies may not strictly follow organic guidelines (Organic Food Market Report 2007). In October, 2007, the Aurora Dairy Corporation that was cited for milk labeled and represented as organic actually was not produced and handled in

accordance with the National Organic Program regulations. The discrepancies were publicized by the Cornucopia Institute, a Wisconsin-based watchdog group, and the Organic Consumers Association. This event was regarded as the largest scandal in the history of the organic industry by the Cornucopia Institute. It not only harmed consumers' right, but also injured the reputation of more than 1,500 legitimate organic dairy farmers who are faithfully following federal organic rules and regulations (Adams 2007)

In current organic production systems, there are still social, political and technical problems needed to be solved. Alabama owns many low-input and organically-oriented producers, who want to depart industrial agriculture yet gain fair returns for the efforts. These farmers have their own beliefs to choose planting without chemical inputs and have need for extension support in production, post management, and marketing.

Specific Study Objectives

The purpose of this study is to assess the low-input and organic production (LIOP) industry in Alabama state. A better understanding of their production practices, strategies, concerns and problems may help researchers, agricultural extension, farmers' cooperatives and government to better serve the industry.

1. Describe the nature and characteristics of Alabama LIOP farms.
2. Profile LIOP practices utilized by Alabama farmers.
3. Indentify LIOP producers' needs and concerns, including their production problems, information and technical needs, and marketing strategies.

II. CONCEPTUAL FRAMEWORK

Theoretical Perspectives

Origins of Organic Production

It is believed that in the 1940s, the publication of the magazine *Organic Gardening* marks the beginning of organic farming (Duram 2005). In the middle of the nineteenth century, traditional agricultural practices changed. In 1913, the first use of nitrogen mineral fertilizer began. After the introduction of urea synthesized from ammonia in 1921 and production of the first herbicide, “chemicals” were introduced to agriculture, which accelerated after 1950 with the addition of modern farming equipment, farm size growth, and the diffusion of hybrids (Bavec 2006). Most of farmers began to follow this trend, since they believe that chemicals and machines can increase yields and decrease labor costs. During the1960s, some scholars and farmers began to reexamine this agricultural system, the production results were seemingly not as positive as the government and agribusiness corporations promised. Farmers still needed government subsidies, their soil quality began to degrade, and the food taste was not as good as before. Overall, farmers faced a series of social and environment problems in front of industrial agriculture.

In 1960s, the book *Silent Spring* energized a social movement toward organic farming. These movements stress the essential link between farming and nature, and to promote respect for natural equilibrium (Bavec 2006). Human beings should not just use

the land, they should keep a harmonious relationship with the land, with nature. Food is thus perceived as natural and in relation with this virtuous cycle. This idea may be akin to Taoism from eastern philosophy. Thus, organic farming practiced to avoid chemicals in pesticides and artificial.

The back-to-the-land movement of 1960s as well as the environmental and health movements of 1970s laid the foundation for the expansion of organic farming (Obach 2007). Since then, the agricultural industry's interest in organic methods along with state support in the form of federal standards, has led to organic farming's rapid growth (Dimitri and Greene 2002).

Ecological Modernization Theory versus Treadmill Production Theory

The quick development of organic farming received both positive and negative assessments from farmers, governors and organic researchers.

Obach (2007) compared two opposite theories referring to organic farming—Ecological modernization theory and treadmill production theory. "Ecological modernization theory provides an optimistic perspective that development of technologies and social practices could protect the environment, while still allowing for growing prosperity within a large capitalist framework" (Obach 2007). While the treadmill production theory offers a much more pessimistic prediction (Schonaiberg 1980, Schonaiberg and Gould 1994): "the competitive quest for profit and the corresponding economic expansion are not consistent with the earth's limited resources, relatively stable ecological systems and basic laws of thermodynamics" (Obach 2007).

First, ecological modernization theory emphasizes the power of technology, which can help humans achieve ecological sustainability. In the late of 1990s, both

USDA and agricultural research institutions began to invest a lot of money and labor to study organic practices, and more funding for organic research recently. More studies had been conducted and hence more last technologies would be used to conduct environmentally friendly agriculture production.

Second, ecological modernization theorists stress “the increasing importance of economic and market dynamics in ecological reform and the role of innovators, entrepreneurs and other economic agents as social carriers of ecological restructuring” (Mol 1997, p.141). In other words, market economics are compatible with environmentally sound production. Unlike treadmill theorists, who regard governments and big agribusiness companies as the destroyers of ideal original organic farming, ecological modernization theorists welcome the intervention of bureaucracy and investment from entrepreneurs into organic farming (Obach 2007).

In the organic sector, standards and certification programs have been created to meet market demand for consumer certainty. Many believe this is beneficial for organic farming and society, since standards can help regulate the organic market and educate more customers to be knowledgeable with organic farming (Obach 2007). Similarly, entrepreneurs and big retailers also help expand the organic market, leading more people to buy organics. Starting in health food stores with the help of motivated entrepreneurs, organic food eventually entered conventional supermarkets and became popular. Hence, with the help of bureaucracy and conscious enterprises, environmentally friendly production methods help protect the environment, or at least slow the speed of destruction in the production process.

On the contrary, treadmill theorists do not hold positive attitudes toward big capital's entry into organic farming. According to treadmill theory, where there is profit, there is capital. Capital is likened to a hungry wolf, seeking every chance to satisfy its infinite appetite. In order to gain more profit, firms will extract more from the labor thus invest more into the next round of production to expand their business. The prospect has attracted agribusiness corporations, wholesalers and conventional retailers into the organic sector. Technology and energy intensity is one of the methods to save labor cost, so chemical inputs and machines may replace the hand planting employed by small farms. Although most chemical inputs are limited in organic farming, greater usage of naturally occurring substances that are regarded as environmentally damaging will inevitably grow, if they prove cost effective. For example, sodium nitrate, a naturally occurring fertilizer permitted under USDA organic regulations but banned in other nations, is commonly used, despite it damaging effects on soil (Obach 2007).

In sum, ecological modernization theory views organic farming from modernization perspective, while treadmill production theory accesses it in terms of traditional community values. Differences between the values of the traditional community and the modernization policy may be one basis for increased factionalism and conflict in the organic development (Truman 1987).

Farming Styles

The concept of farming styles is a useful theoretical perspective to promote and guide extension programs (Mesiti and Vanclay 1997). Farming styles was originally developed by van der Ploeg at Wageningen Agricultural University in Netherlands (Mesiti and Vanclay 1997). "Farming styles regards to a cultural repertories, a composite

of normative and strategic ideas about how farming should be done…Therefore a style of farming is a concrete form of praxis, a particular unity of thinking and doing, of theory and practice" (van der Ploeg 1993). Vanclay and Lawrence (1994) defined farming styles as farmers develop different ways of doing about the production and management of their farms. Thomson (2002) defined farming style as a pattern of beliefs, motives and attitudes about farming that is manifest in particular pattern of behavior. By understanding the attitudes, motives and beliefs of farmers within particular styles, it is possible to predict behaviors, forecast the rate of adoption of practices, and target communications more effectively (Thomson 2002). Hence, farming practices are socially constructed since the decisions are not solely based on technical needs, but a combination of social and cultural factors (Mesiti and Vanclay 1997).

Organic farmers have diverse beliefs and motives to choose grow organically. During the 1960s to 1970s, when the popularity of organic farming began to grow, farmers undertook organic methods in response to concerns about food safety, soil quality, and the environment. Growing organically is an ideology and a lifestyle for organic farmers, they want to be back to the nature and be independent from industrial farming. "If you plant the right crops in the right area, you do not need a lot of chemicals to keep them going. And I just feel it's the right way to be in the world", said Sanford, an organic farmer who applies Taoist philosophy to his farming. But when more and more people caused to be familiar with organic farming and organic food, some farmers began to cater intentionally to customers' need. Ideology was no longer the only motive to farm organically. Market demand, price premium began to play important role in production decision for some pragmatic farmers.

Compared with conventional farmers, organic farmers are innovative (Duram 2005). Since the 1930s, U.S. government paid subsidies for farmers who plant special commodities – corn, wheat, cotton, rice and dairy products. These subsidies aim to stabilize prices and farmer livelihoods. However, this policy favors larger farms, since the bigger they are, the more subsidies they can receive. “Get big or get out,” the often quoted advice of former Secretary of Agricultural Earl Butz to American farmers in the 1970s, has been the prevailing model for success in U.S. (Hunger 2007). The 2002 farm bill still inherited the framework of previous subsidies policies. Ironically, the subsidies did not help farmers, otherwise it stagnated the agriculture economics and depressed rural community. In the 1930s, there were more than six million farms in the United State and farming employed 25 percent of working Americans. Agriculture accounted for nearly 7 percent of the nation’s gross domestic product (GDP). However, in 2000, only two million farms remained and production agriculture contributed less than 1 percent of the nation’s GDP. Only about 1 percent of population was employed in on-farm activities in 2005 (Dimitri and Effland 2005). In addition, the policy specified land that is registered for growing commodity crops cannot be used to plant fruits and vegetables (Hunger 2007). Apparently, the regulation discouraged farm diversification.

Compared with conventional farmers who rely on subsidies and plant specific program crops, organic farmers stand out of the traditional agricultural system. Growing organically, small-scale farmers try to diversify their crop types (most of the crops are not eligible for subsidies), seek out different marketing venues and employ advanced research results and technology. Rather “out” of business, organic farmers have gained great development in U.S.

Conceptual Model

Low-Input and Organically-Oriented Production (LIOP)

Low-Input and Organically-Oriented Production (LIOP) is the focus of this study. In Alabama, there are very few USDA certified organic farmers. However, farmers who choose sustainable agriculture practices avoid pesticides, herbicides, and chemical fertilizers are described as employed a low-input approach. Some employ a mix organic practices, such as crop rotation, interplanting, hand weeding, etc. Thus, LIOP is a hybrid aggregate of production with a commitment to a distinct farming style linked to beliefs about soil health, chemical avoidance, and concern about impacts on human health.

Based on a decision-tree model, Darnhofer et al. (2003) classified Austria farmers as five types: the “committed conventional”, the “pragmatic conventional”, the “environmental-conscious but not organic”, the “pragmatic organic”, and the “committed organic”. LIOP producers represent four types of farmers – the “pragmatic conventional”, the “environmental-conscious but not organic”, the “pragmatic organic”, and the “committed organic”. In this study, some conventional farmers are treated as LIOP producers, since they employ some of the organic planting methods, such as crop rotation to diversify their products. They also use many of the techniques associated with alternative agriculture – using fewer chemicals on their land (Young 1998). This type of farmer was called “pragmatic conventional” by Darnhofer et al (2003). “Pragmatic conventional farmers do not have a fundamental stance opposing organic farming. However, they point out that a conversion can entail a substantial amount of risk…They are likely to be more open to conversion once technological uncertainties have been resolved through the experience of organic farmers in the area, and once the market for

organic products has been established" (Darnhofer et al. 2003). "Environment-conscious but not organic" type comprises most LIOP producers in Alabama. "They do not subject themselves to organic regulations and controls, these farmers retain a measure of flexibility (e.g., to manage only some farm enterprises following organic guidelines and/or to use some synthetic inputs on crops in case of need), thereby reducing their risk…Others might follow the organic standards very closely, but be wary of the bureaucracy and paperwork involved in certification and/or participation in the agri-environmental program" (Darnhofer et al. 2003). In this study, this kind of farmers employ the following methods, "Avoid pesticides, use inorganic fertilizers", "Avoid pesticides, use non-synthetic/organic fertilizers", "Follow USDA organic rules, not certified" and "Follow USDA organic rules, Certified Naturally Grown or in process".

Very few LIOP producers in Alabama seek USDA certification, some of them find other certification alternatives or labels to market their products. Certified Naturally Grown is one of the alternate certification programs tailored for small-scale, direct-market organic farmers. Certified Naturally Grown program (CNG) strengthens the organic movement by preserving high organic standards and removing financial barriers that tend to exclude small farms that sell locally and directly to their customers. CNG's certification standards are based on the USDA organic standards, but are reasonable and affordable for small-scale farmers. This program is non-profit, farms that are intended to get CNG certification usually are inspected by other volunteer farmers. Certified Naturally Grown provides these small, local growers with an alternative label and certification system that consumers can quickly come to trust and understand.

As for “pragmatic organic” farmers, “health, ethical, or sustainability aspects are not dominant motivations for conversion. This type of farmer tends to perceive organic farming as offering a good prospect for securing an income” (Darnhofer et al. 2003). The “committed organic” farmers “are deeply rooted in the founding philosophy of organic farming, which is based on the rejecting of synthetic fertilizers and pesticides, while seeking closed nutrient cycles and improved soil health. Economic considerations are secondary and these farmers are willing to risk foregoing some of their income…They are pioneers” (Darnhofer et al. 2003). They have selected organic farming for reasons of producer and/or consumer health as well as ethical and lifestyle considerations (Tovey 1997; Michelsen 2001). In this study, USDA certified organic farmers belong to this type.

Environmental Concern

Environmental concern is one of the primary factors that motivate producers to employ LIOP practice methods. Chemicals used in industrial agriculture often have compromised the environment, from air quality to underground water quality. In U.S., runoff of soils and synthetic chemicals make agriculture the largest source of water pollution in the country. Every summer, rains carry eroded soils and fertilizer runoff out of Midwestern fields draining 1.2 million square miles of watershed into the Mississippi River, down to the Gulf of Mexico. It is estimated that only 18 percent of all the nitrogen compounds applied to fields in the United States are actually absorbed in plant tissues (Mckenney 2000). Chemical runoff into fresh water causes eutrophication which depletes the level of oxygen in the water, leading to a less bio-diverse water column and poor water quality. Chemical fertilizer application also may compromise the soil quality by diminishing the role of nitrogen-fixing bacteria, which, in turn, speeds up the

decomposition of organic matters. As organic matter decreases, the physical structure of soils changes, it becomes less able to hold soils together and absorb nutrients. Thus more chemical inputs are needed. Meanwhile, topsoil can be easily eroded by water, which is the result of degrading water quality (Mckenney 2000). Such process is involved into an environment various cycle.

In the early 1980s, Lockeretz et al. (1981) investigated both the social context and the field methods employed by organic farmers in the Corn Belt region. Mailed questionnaires from 174 organic farmers indicated that 80 percent of them had started in conventional farming, as opposed to being newcomers to agriculture. Their most common reason for shifting to organic methods was concern about chemical use (Duram 2005).

Hypothesis 1: Farmers with more concern about environment are more likely to avoid pesticides and chemical fertilizers.

Yield Concern

The most obvious change from conventional production to organic production maybe the yields, this is true especially for producers who initially convert to LIOP methods. The productivity of organic farms is, on average, 10 to 30 percent lower than conventional farming systems (FAO 2003; Stanhill 1990). However, much higher crop losses are commonly reported. For example, in U.S., organic wheat was reported to yield 43 percent less than conventional wheat (Lockeretz 1981). The critical reason why conventional farmers are reluctant to convert to organic methods is that industrialized agricultural gives high yields at low cost. They are convinced that high yields are only possible through using synthetic fertilizers, pesticides, and fungicides as needed

(Darnhofer et al. 2003). Both the government and traditional farmers are involved in the philosophy that the more production, the more profit. For farmers, greater production could help them get more subsidies. For government, more production could guarantee the nation food security as well ensure export income. Meanwhile, agribusiness corporations assert that organic farming cannot feed the world. Thus, conventional farmers may be afraid to take innovative production practices.

Hypothesis 2: Farmers with less concern about yield are more likely to avoid pesticides and chemical fertilizers.

Price Premium

Organic products often sell for higher prices than conventionally produced goods. Though yields may decline in the organic production, price premium helps to compensate organic farmers for lost productivity. Price premium results from higher production and distribution costs for organic food, as well as consumers' willingness to pay extra for organic food. As long as demand increases faster than supply and prices of conventionally produced food remain constant, organic food will continue to sell for higher prices (Stacey 2004).

Some organic farmers admitted that economic attraction is a main reason for their transformation. Steve Porter, a New York organic farmer, who fed cattle for more than 20 year shifted to organic production in 1990 due to economic downturns in the livestock market (Druam 2005). There are many organic farmers like Steve, profit is their primary motivate for organic production. According to George Siemon, CEO of Organic Valley, “there is the romance and glamour of small family farms, but we need to make sure that

these farms thrive, and that the economic viability of these new models – of CSAs, or organic farming – is there" (Georgia Organics Winter 2007-08).

Hypothesis 3: Farmers with more concern about price premium are more likely to avoid pesticides and chemical fertilizers.

Market Demand

Market demand is correspondent with price premium. Where there is market demand, there is profit. With an average 20 percent increasing rate in demand, organic food market has reached 13 billion in 2003. The trend has been increasing steadily over the past decades and will continue in the following decades. According to 2007 U.S. organic foods market research, 52 percent of American consumers purchased organic food in the past year (Organic food market report 2007).

Hypothesis 4: Farmers with more concern about market demand are more likely to avoid pesticides and chemical fertilizers.

Enjoyment

Enjoyment is a lifestyle chosen by producers. It is also an ideology and philosophy. Unlike price premium and market demand, enjoyment is an inner motivation to make LIOP farmers avoid employing chemical inputs initiatively.

Hypothesis 5: Farmers who take organic production as enjoyment are more likely to avoid pesticides and chemical fertilizers.

Part-time Farming

For full-time farmers, working on the farm is their only channel to make money. In order to maximize farm income, full time farmers would like to avoid chemical inputs to carter to the market demand. However, part time farmers can rely on other off-farm

works to make a living. Meanwhile, some LIOP farmers are retired, growing organically is just their way to spend time. They take it as an identity based activity with less concern about maximizing economic returns.

Hypothesis 6: Full time farmers are more likely to avoid pesticides and chemical fertilizers than part time farmers.

Food Safety

According to Lockie (2002), personal health is more commonly cited as the chief motivation from customers for buying organic products. Conventional farmers convert to organic production methods also in order to meet consumers' needs. In 2003, Flaten and Lien (2004) surveyed Norway organic dairy farmers, both early entrants and late entrants farmers ranked food quality as their central motive for conversion.

Hypothesis 7: Farmers with more concern about food safety are more likely to avoid pesticides and chemical fertilizers.

Philosophical, Spiritual Reasons

According to a 2002 Manitoba Organic Report by Wuerch, Urbina and Diachun (2002), "financial gain is not the most important reason for farmers to engage in organic farming. The environment and personal beliefs are ranked one and two as the main reasons for going organic." Kaktins (1997) interviewed Canadian organic farmers, some of them expressed their desire to farm in an "ecologically sound, socially just and economically viable" manner. Some of them stated that "the future of mankind is dependent on every human being intimately associated with half an acre of ground". Another asserted "we are for the earth and aim to pass it on to our children in as good or better condition as when we received it" (Kaktins 1997).

Hypothesis 8: Farmers with higher philosophical or spiritual reasons are more likely to avoid pesticides and chemical fertilizers.

Extension Support

In a 1983 study, 58 organic producers and 32 consumer members of a Kansas organic organization were surveyed about their technical information needs (Foster and Miley 1983; Duram 2005). This early study depicted the lack of information sources available to organic farmers – 95 percent of the farmers would not contact extension agents, USDA, or university researchers for help with farm practices (Duram 2005). One possible reason is that organic farming was a fledging industry in the U.S. in 1980s, most of conventional farmers who shifted to organic methods were motivated by the environmental concern and spiritual reasons. Many felt their approaches could not be accepted by their peers. Similar, neither extension systems nor universities were prepared to provide useful information for organic farmers.

Organic Farming Research Foundation's 1997 national survey also suggested that "college-educated farmers with smaller acreages, more than half their acreage in horticultural production, and extensive experience with organic production methods, have the greatest diversity in their insect management portfolios" (Lohr and Park 2002). If farmers had access to reliable organic production information, they would employ more alternative management techniques.

Hypothesis 9: Farmers that are more familiar with extension support are more likely to avoid pesticides and chemical fertilizers.

Production Problems

Duram (2000) and Rigby *et al.* (2000) identified problems such as yield reductions, higher weed, pest and disease pressure, reduced livestock performance, few marketing opportunities, no premium prices, refusal of loans or insurance for organic production and lack of legislation, subsidies and certification bodies.

Anxiety about weed and disease problems is a critical barrier for farmers to convert to organic methods. Worries about weeds and other technical problems were major reasons preventing interested farmers in New Zealand in going ahead with the conversion to organic farming (Midmore et al. 2001). Darnhofer et al. (2003) also indicated that "unfavorable climatic conditions lead to high fungi incidence and total crop failure, the effectiveness of organic methods is limited once there is a high pest incidence." Fairweather (1999) concluded that dealing with issues of technical and economic viability of organic production more comprehensively would overcome a major stumbling block for conventional producers, and result in higher rates of conversion (Midmore et al. 2001).

Hypothesis 10: Farmers with few production problems are more likely to avoid pesticides and chemical fertilizers.

Length of Farming Organically

Walz (2003) pointed out that today's organic farmers are different from the farmers decades ago who tried to survive economically in an increasing competitive market (Cuddeford 2003; Pollan 2001). The 2002 National Organic Farmers' Survey indicated that over half of the respondents were conventional farmers who converted to organic. There is an indication that the industry is becoming dominated by formerly

conventional growers, who had demonstrated little prior commitment to ecological sustainability (Obach, 2007).

Thus, we will classify LIOP farmers as two groups, growing organically for less than 10 years and for more than 10 years. We can examine motivations and beliefs of these two groups as well as the relationship between their motivations and practices employed.

Hypothesis 11: Farmers that are farming organically longer are more likely to avoid pesticides and chemical fertilizers.

Innovation

Compared with conventional farmers, organic farmers are innovative (Duram 2005). Innovation has been defined as a renewal by means of technology, but it can also refer to renewal in terms of thought and action (Poutsma 1987). Kirton (1976) contended that everyone is located on a continuum ranging from an ability to do things better or an ability to do things differently. He called the two extreme ends of the continuum adaptors and innovators respectively. Mesiti and Vanclay (1997) regarded innovative growers as highly capital intensive and adventure, often with a high debt to try new technology and new practices. They also seek out information from a wide variety of sources and would like to be updated with current research and production ideas. They are heavily involved in the industry. In the study, growers classified themselves into 5 categories: innovator, early adopter, early majority, later majority and one of the last to use new crop management practices and technologies.

Hypothesis 12: Farmers who are more innovative are more likely to adopt more advanced planting practices and avoid pesticides and chemical fertilizers.

Business Structure

Business structure affected farmers' decisions of employing different LIOP approaches. Farmers adopting cooperatives, partnership and corporations business structures are usually more powerful than family farmers to negotiate with grocery stores, supermarkets, hospitals and schools. So they are more likely to be certified with USDA regulations or with other popular agencies, such as Certified Naturally Grown.

Hypothesis 13: Farmers with higher business structure are more likely to adopt more advanced planting practices.

Aggregate Effects

The hypotheses will be tested by examining bivariate associations. The overall and independent effects of the variables on the dependent variable will be examined by ordinal regression analysis.

Hypothesis 14: The independent variables together predict the dependent variable.

III. METHOD

Sample and Data Collection

The study examines data from mailed survey of Alabama low-input and organically-oriented production (LIOP) producers. The survey's objectives are to describe their current employed planting or feeding practices and approaches, to assess their information and technical needs, and to profile their marketing strategies.

Since there are few studies about Alabama organic production, we do not know the exact number of LIOP farmers in the state. We identified LIOP farms using membership of the Alabama Sustainable Agriculture Network (ASAN). The lists provided a relatively complete inventory of naturally and organically-oriented farms in Alabama. The registration of several years of annual organic vegetable production conferences also supplemented the lists.

The instrument, developed with assistance of local farmers and ASAN specialists, had mailed in November, 2007. We conducted five mail contacts, consisting of : (1) a prior notification postcard; (2) an initial survey and cover letter; (3) a follow-up thank you/reminder postcard; (4) a second survey and cover letter was sent to non-respondents; and (5) a third survey and cover letter to remaining non-respondents.

Overall, 172 copies of questionnaire were sent, 131 questionnaire were returned. However, 39 were returned uncompleted as some reported that there was no low-input or

organic production (LIOP) on their croplands or they were no longer in operation. The remaining 92 questionnaires gave an effective response rate of 69% (92/[172-39]).

Measures

The dependent variable, LIOP intensity, which includes seven types of planting practices, was measured as a binary value, whether the farmer employs this method or not. A dichotomous measure was used because some farmers may employ several methods out of these seven approaches. The seven types of LIOP approaches included: (1) use conventional pesticides or inorganic fertilizer, (2) avoid pesticides, use inorganic fertilizers, (3) avoid pesticides, use organic fertilizers, (4) follow USDA organic rules, not certified, (5) follow USDA organic rules, certified naturally grown or in process, (6) follow USDA organic rules, certified or in process, and (7) other approaches.

In the following regression analysis, we regard the dependent variable as ordinal level. If the producer employed more than one approach, he or she will be regarded as using the most advanced approach in this study.

We choose environmental concern, yield concern, price premium, market demand, enjoyment (pride in production), food safety concern, philosophical or spiritual reasons, familiarity with extension support, production problems, LIOP organization membership, employing new crop management practices, business structure, farming full time or part time, and LIOP farming years as independent variables.

Environmental concern, yield concern, price premium concern, market demand concern, enjoyment (pride in production), food safety concern, and philosophical or spiritual reasons, were measured with “1=None, 4=Very important”. We operationalized extension support using the measure of farmers’ rating of familiarity with public agency

programs (1=Not familiar, 4=Very familiar). Other independent variables, such as self-rating innovative of employing new crop management practices and technologies, was measured with "1=Innovator, 5=One of Last to try new things".

Control variables include race, gender, education, and familiarity with computers. We regard "familiarity with computers" as a control variable since Internet can provide knowledgeable producers with some production techniques or marketing information. If producers can better take use of computers for useful information, they would be more likely to employ advanced LIOP strategies.

Analysis

First, descriptive statistics profile Alabama producers' production practices, the reasons they apply LIOP methods, their production problems, marketing strategies and information resources. The producers' personal background: race, education, use new crop management and familiarity with computers, also are examined.

The hypotheses are tested by examining the correlation between the dependent variable and independent variables. If the coefficient is more than 0 means there is a positively relationship between dependent variable and independent variable. Otherwise, the independent variable is negatively related to the dependent variable. We will find significant relationships between variables.

Ordinal regression analysis is used since we regard the dependent variable as an ordinal level factor. For example, planting with USDA rules and certified is regarded as a higher production strategy than employing conventional farming method. In model 1, we will assess the coefficients of selected independent variables to get the equation between

independent variables and dependent variable. We will add control variables in model 2 to reexamine whether selected variables can predict dependent variable very well.

VI. RESULTS

This chapter tests the hypotheses developed in Chapter two. Ordinal regression is used to examine the aggregate effects of the independent variables on the intensity of low input and organic production practices.

Characteristics of Alabama LIOP Producers

The characteristics of 92 LIOP producers' practices and background in the sample are shown in Table 1. It shows that 30 percent of LIOP producers follow USDA organic rules, but are not certified. About 45 percent producers say they avoid pesticides or use organic fertilizers. In this sample, about 20 percent of the producers have naturally grown certification or are in the process of being certified. Among 92 LIOP producers, only 4 follow USDA organic rules and are certified. In order to avoid fees, record keeping, and save time, most LIOP producers, especially those small-scale farmers choose to follow the organic rules, but avoid the certification process.

Food safety concern was ranked as the most important reason by LIOP producers to choose planting organically. Enjoyment and environmental concern were respectively ranked as the second and the third important reasons for LIOP production by Alabama producers. Philosophical reasons were also critical on producers' decisions. Market demand concern and price premium concern were ranked comparatively lower than other reasons of choosing LIOP production by Alabama producers.

Access to approved fertilizers and feeds was ranked as the top production problem for LIOP producers. About 50 percent of LIOP producers indicated that it is hard to find organic fertilizers and feeds. Weed control was a further problem for LIOP producers. Among 92 LIOP farmers, 47 percent of them felt that weed control is not effective on their cropland.

When asked “How much influence has each of the following conditions had on your efforts to use LIOP methods”, drought was ranked the highest influence on LIOP use in 2007. “Hard to control weeds” was still the second most serious problem for LIOP producers.

In this study, the average farm size is 27 acres and 70% of farms are less than 10 acres. Most Alabama LIOP producers are not familiar with extension support and most of them (75%) are not county, state or national LIOP organization members. As for business structure, 77% of the LIOP producers are single family farmers. 60% of LIOP producers are part time farmers, and their average LIOP time is 9.3 years. Most producers are white. On average, producers are college graduates.

LIOP Products

Table 2 shows that in this sample, most LIOP farmers are vegetable (70%) and fruit (53%) producers. Their major vegetable crops include tomatoes (63%), squash (55%), peppers (52%) and cucumbers (49%). Almost half of the LIOP producers plant blueberry as their major fruit crop. Flowers is the most frequnet herb crop for Alabama LIOP producers, about one third of producers grow flowers. However, in this study, very few LIOP producers report planting crops such as hay, wheat, soybean, millet, oats or peanuts.

Table 1. Descriptive Statistics for Selected Background and Experience Variables, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

Variables	N	Minimum	Maximum	Mean	Standard Deviation	Percent "yes"
Dependent						
Use conventional pesticides or inorganic fertilizer (1=No, 2=Yes)	91	1.0	2.0	1.12	0.33	12.1
Avoid pesticides, use inorganic fertilizers (1=No, 2=Yes)	92	1.0	2.0	1.23	0.42	22.8
Avoid pesticides, use organic fertilizers (1=No, 2=Yes)	92	1.0	2.0	1.23	0.42	22.8
Follow USDA organic rules, not certified (1=No, 2=Yes)	92	1.0	2.0	1.29	0.46	29.3
Follow USDA organic rules, certified naturally grown or in process (1=No, 2=Yes)	92	1.0	2.0	1.21	0.41	20.7
Follow USDA organic rules, certified or in process (1=No, 2=Yes)	92	1.0	2.0	1.04	0.21	4.3
Other approaches (1=No, 2=Yes)	92	1.0	2.0	1.08	0.27	7.6
Independent						
Environmental concern (1=None, 4=Very)	88	1.0	4.0	3.61	0.67	
Price premium (1=None, 4=Very)	85	1.0	4.0	2.82	0.97	
Market demand (1=None, 4=Very)	85	1.0	4.0	2.95	0.94	
Enjoyment (1=None, 4=Very)	87	1.0	4.0	3.71	0.53	
Food safety (1=None, 4=Very)	89	2.0	4.0	3.83	0.46	
Philosophical, spiritual reasons (1=None, 4=Very)	86	1.0	4.0	3.02	1.13	
Production Problems						
Access to approved fertilizer, feeds, etc (1=No, 2=Yes)	81	1.0	2.0	1.51	0.50	50.6
Weed control not effective (1=No, 2=Yes)	81	1.0	2.0	1.47	0.50	46.9
Insect control not effective (1=No, 2=Yes)	81	1.0	2.0	1.32	0.47	32.1
Poor soil fertility/quality (1=No, 2=Yes)	81	1.0	2.0	1.21	0.41	21.0
Low yield (1=No, 2=Yes)	81	1.0	2.0	1.19	0.39	18.5
Disease control not effective (1=No, 2=Yes))	81	1.0	2.0	1.16	0.37	16.0
Other problems (1=No, 2=Yes)	81	1.0	2.0	1.11	0.32	11.1
Extension Support						
Familiar with public agency programs (1=Not familiar, 4=Very familiar)	89	1.0	4.0	1.91	0.97	
LIOP organization membership (1=No, 2=Yes)	88	1.0	2.0	1.25	0.44	25.0
Business structure(1=Single family, 5= Corporation, other than family)	90	1.0	6.0	1.49	1.11	
Use new crop management (1=Innovator, 5=One of the Last)	90	1.0	5.0	2.18	1.17	
Full time or part time (1=Full time, 2=Part time)	89	1.0	2.0	1.61	0.49	

Table 1. Continued

LIOP farming years	87	0.0	34.0	9.32	8.75
Control variables					
Race (1=Black, 5=Other)	88	1.0	5.0	2.15	0.62
Gender (1=Female, 2=Male)	90	1.0	2.0	1.66	0.48
Education (1=Some high school or less, 6=Masters degree or more)	90	1.0	6.0	3.74	1.40
Familiarity with computers (1=Not familiar, 4=Very familiar)	91	1.0	4.0	3.30	0.80

Marketing Strategies

Table 4 shows Alabama LIOP producers' marketing strategies. Most producers (91%) sell products locally. They primarily sell directly on farm (72.7%), in farmers' market (44%), through a website (25%), and through CSAs (24%). Through these market venues, farmers are able to directly contact customers and introduce products to them, thus producers do not need third party certification. Likewise, buying on the farm, consumers become conscious of where and how the foods are produced. In this way, customers build confidence with their food suppliers. So these markets channels are an example of "power-resistance reciprocity" (Moore, 2005), suggesting that selling locally through farmers' markets reduces the power of experts and bureaucrats, since farmers do not need to sell products with formal certification. For example, selling in a farmer's market is "a dialogical process of verification, which allows space for small, locally oriented, self-defined chemical-free producers to exist" (Moore, 2005).

Table 5 shows that 41% farmers would like to offer product or farm advertising to attract customers. Selling through a website is a useful strategy to introduce farms and products to the public. Calling potential buyers is the most direct way to send information to customers. Only around 18% of LIOP farmers use organic or natural certification labels on their products.

Table 2. Descriptive Statistics for LIOP Products, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

LIOP Products	Number	Percent
Vegetable crops	64	70.3
Fruits	48	52.7
Herb crops	39	42.9
Eggs	24	26.4
Beef	19	21.6
Poultry	16	17.6
Other products	15	16.5
Lamb/sheep/goat	12	13.2
Pork	7	7.7
Dairy products	5	5.5

Table 3. Descriptive Statistics for LIOP Main Products, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

LIOP Products	Number	Percent
Tomatoes	58	63.0
Squash	51	55.4
Peppers	48	52.2
Cucumbers	45	48.9
Blueberries	45	48.9
Beans	42	45.7
Sweet corn	30	32.6
Flowers	30	32.6
Other products	29	31.5
Potatoes	27	29.3
Carrots	26	28.3
Grapes	21	22.8
Strawberries	14	15.2
Hay	11	12.0
Asparagus	10	10.9
Apples	5	5.4
Raspberries	4	4.3
Soybeans	3	3.3
Wheat	2	2.2
Bananas	1	1.1
Millet	1	1.1
Oats	1	1.1
Peanuts	1	1.1

Table 4. Descriptive Statistics for Marketing Approaches, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

Marketing Approach	Number	Percent
Sell locally	81	91.0
Sell regionally	17	19.1
Sell out of region	6	6.7
Sell directly on farm	64	72.7
Sell in farmers markets	39	44.3
Sell through a website	22	25.0
Sell through CSA	21	23.9
Sell to restaurants	20	22.7
Sell to grocery or retail store	19	21.6
Sell only to family, friends, neighbors	17	19.3
Other marketing channels	15	16.9
Sell from roadside stand	13	14.8
Sell to local school	2	2.3

Table 5. Descriptive Statistics for Marketing Strategies, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

Marketing Strategy	Number	Percent
Product or farm advertising	35	41.2
Your own farm product website	27	31.8
Call to potential buyers	27	31.8
Other	25	29.4
Media publicity about your farm	23	27.1
Organic or natural certification label	15	17.6

Information Sources

Table 6 shows that producers get production information primarily through books, other LIOP farmers, and the internet. On average, LIOP producers rate extension programs as less important than four other information sources. Producers are more familiar with Alabama Sustainable Agricultural Network (ASAN) than with public extension agencies. National or state institutions, such as USDA Agricultural Research Service, USDA-NRCS personal, and private consultant were rated as less important than ASAN by Alabama LIOP producers.

Table 6. Rating of Sources to Gather Information about Organic Farming, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

Source of Information	Importance	
	Mean	Standard Deviation
Books or magazines	3.22	0.84
Other LIOP farmers	2.90	1.05
Internet websites	2.72	0.99
Buyers	2.71	0.97
Alabama Sustainable Agricultural Network (ASAN)	2.57	1.02
University researchers	2.56	0.89
State or county extension personnel	2.33	1.01
USDA agricultural research service	2.21	0.95
USDA-NRCS personnel	2.17	0.94
Private consultant	1.54	0.84

1= ‘not important’ to 4= ‘very important’.

Most LIOP producers (91%) would like to receive low-input and organic production information through print materials. This is consistent with their rating of books or magazines as the most important information source. Group meetings or

seminars were the second most important information source for LIOP producers, since they can not only learn the most recent scientific research results from public extension, but also can receive information from other LIOP farmers. Only a few LIOP farmers (8%) prefer to contact private consultants when they experience production problems.

Table 7. Preference of Receiving LIOP Management Information, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

Preference of Information Source	Number	Percent "yes"
Print materials	83	91.2
Group meetings or seminars	59	64.8
From other LIOP producers	52	57.1
Direct contact with public agency representatives	35	38.5
Direct contact with private consultants	7	7.7
Other	7	7.7
Do not want or need information	3	3.3

LIOP Problems

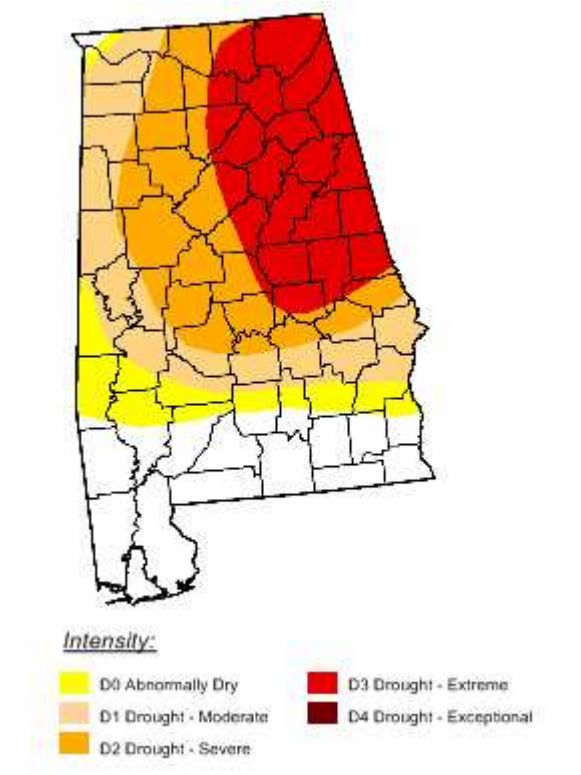
During the process of LIOP production, farmers encountered several problems, from production difficulties, technique needs, financial supports, to marketing conditions. In this study, the respondents were asked to rate typical problems, which were adapted from the literature and based on the Alabama situation. Table 8 shows that drought was rated as the most serious problem in the production process. 2007 and 2008 appear to be record drought years for southeast areas, including Alabama. According to the National Weather Service, current rainfall has averaged 12 to 14 inches. With localized amounts over 15 inches in the extreme southeast sections. In March 2008, rainfall has averaged three to four inches. Normal rainfall for March in Central Alabama averages from 5.5 to 6.5 inches.

Of all the organic production practices, weed control is the greatest challenge for organic growers (Klonsky and Tourte 1998). In this survey, there are nearly 50 percent low input and organically-oriented producers (LIOP) claim weed control is not effective. Hard to control insects and diseases was another technical hazard, although they were generally rated as less important than weed control. Yield concern was also rated higher than most of other problems by LIOP producers, since yield is directly related to the producers' income.

Lack of product market is the sixth most severe problem. Besides economic reasons, lack of knowledge about organics and uncertainties about organic labeling may be other factors underlying slow organic development in Alabama. In addition, most Alabama LIOP farmers are small-scale family producers, they usually lack power and resources to negotiate with big markets and corporations. As a result, they might lose their market share as well as premium prices, since LIOP production expanded too rapidly.

Financial obstacle is another problem for LIOP producers. Relatively high costs of inputs, such as organic seeds, labor as well as certification fees for the annual inspection are also seen as problematic.

Figure 1. U. S. Drought Monitor, Alabama, April, 2008



Source: National Weather Service Drought Monitor

Table 8. Rating of Problems that Producers Faced, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

Problems	Severity Rating	
	Mean	Standard Deviation
Drought	2.42	0.76
Hard to control weeds	1.94	0.74
Yield concern	1.74	0.72
Hard to control insects	1.73	0.78
Hard to control disease	1.65	0.76
Lack of product market	1.61	0.78
Lack of cost-share funds	1.54	0.77
Low product prices	1.47	0.61

1=’low’ to 3=’high’.

Table 9 shows correlations between the dependent and independent variables. Some are statistically significant relationships. Environmental concern (0.27) is positively related to the dependent variable (LIOP intensity). Farmers who are more concerned about the environment would like to avoid chemical inputs as much as possible. Philosophical, spiritual reasons (0.445) is also positively related to LIOP intensity, which means that the producer who employs LIOP methods for philosophical reasons may be more reluctant to use pesticides or chemical fertilizers. There is also a positive relationship (0.384) between familiarity with extension support and LIOP intensity. Producers who follow USDA rules are more familiar with extension support than those who are following low-input or organic production regimes.

The relationships between production problems – hard to control insects, hard to control diseases and hard to control weeds – and LIOP intensity are negative. These associations suggest that the greater perceived severity of these problems, the lower the intensity of LIOP practices. In other words, conventional producers experience more production problems than low-input or organic producers.

LIOP organizational membership is positively related to LIOP intensity (0.379). Producers who are members of county, state, or national LIOP organizations tended to adopt higher level of LIOP practices.

Farming full time or part time (1=full time, 2=part time) is negatively related to LIOP intensity (-0.263). Full time producers were more likely to avoid pesticides and chemical fertilizers. Part time producers seemed more likely to use conventional approaches.

Education is positively related to LIOP intensity (0.215). Producers with higher education levels adopted higher level of LIOP practices.

Table 9. Correlations between LIOP Intensity and Selected Independent Variables, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

Factors	LIOP Intensity
Environmental concern	0.274*
Price premium	0.030
Market demand	-0.023
Enjoyment	0.163
Food safety	0.035
Philosophical, spiritual reasons	0.445**
Familiar with extension support	0.384**
Low product prices	-0.087
Lack of product market	-0.098
Hard to control insects	-0.288**
Hard to control diseases	-0.274*
Hard to control weeds	-0.262*
Lack of cost-share funds	-0.027
Low yield	-0.048
Drought	-0.108
LIOP organization membership	0.379**
Innovation	-0.166
Business structure	0.080
Full time or part time	-0.263*
LIOP farming years	-0.048
Gender	0.036
Race	0.132
Education	0.215*
Familiarity with computers	0.153

*p<.05; **p<.01

Table 10 shows an ordinal regression of LIOP intensity on selected independent variables. The results in Table 10 were obtained using descending variable inclusion option; the probabilities being modeled are P (Y≥category j). The proportional odds assumption for this model is not upheld, as can be seen in the row of Table 10 labeled "score test." This suggests that the pattern of effects for one or more of the independent variables is likely to be different across separate binary models fit according to the Cumulative Odds pattern (O'Connell 2006).

The model fit chi-square indicates that this full model is performing better than the null model (no independent variables) at predicting cumulative probability for LIOP methods. The Chi-square χ^2 compares the actual versus predicted cell frequencies. The lower the χ^2, the better the model fit to the data.

LIOP intensity was measured in six categories with outcomes as 1, 2, 3, 4, 5, 6. With the descending option, the threshold estimates in Table 10 correspond to predictions of the cumulative logits for farmers who have a score of 1 on the complete set of independent variables; α_6 corresponds to the cumulative logit for Y≥6, α_5 corresponds to the cumulative logit for Y≥5, and so on, until α_2 corresponds to the cumulative logit for Y≥2. Because all farmers will have Y≥1, the first threshold is not included in the descending cumulative logit model.

Table 10 shows that farmers who adopt LIOP methods due to philosophical reasons practice more intensive LIOP (OR=2.87). In other words, farmers who regard philosophical reason as a very important factor for LIOP decisions are more likely to adopt LIOP methods. Similarly, a perceived lack of product market (OR=3.19), and being a member of any low-input and organic producer associations (OR=6.01) have positive

coefficients in the model and corresponding ORs that are significantly more than 1.0. These characteristics are associated with a farmer being in more advanced LIOP strategy categories rather than in lower categories. On the other hand, finding it hard to control weeds (OR=0.29) is negatively associated with higher LIOP strategy categories, which means certified organic farmers have less weed control problem than conventional LIOP farmers.

Table 10. Logistic Ordinal Regression of LIOP Practice Intensity on Selected Background and Experience Variables, Model 1, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

	LIOP Intensity	
Variable	Coefficient (Standard Error)	Odds Ratio
α_6	-9.36 (4.15)	
α_5	-6.56 (4.09)	
α_4	-4.03 (4.04)	
α_3	-1.80 (4.02)	
α_2	0.06 (3.99)	
Environmental concern	1.23 (0.58)*	3.42
Price premium	-0.65 (0.48)	0.52
Market demand	0.27 (0.50)	1.31
Enjoyment (pride in production)	1.25 (0.69)	3.49
Food safety	-1.41 (0.77)	0.24
Community values, tradition	-0.04 (0.42)	0.96
Philosophical, spiritual reasons	0.93 (0.31)**	2.53
Familiar with public agency programs	0.78 (0.38)*	2.18
Low product prices	1.04 (0.65)	2.83
Lack of product market	1.39 (0.50)**	4.01
Hard to control insects	-0.39 (0.85)	0.67
Hard to control diseases	0.26 (0.78)	1.30
Hard to control weeds	-1.39 (0.58)*	0.25
Lack of cost-share funds	0.18 (0.54)	1.20
Low yield	-0.71 (0.57)	0.49
LIOP association membership	2.13 (0.77)*	8.40
Use new crop management practices	-0.06 (0.25)	0.94
Business structure	-0.79 (0.34)*	0.46
Full time or part time	-1.76 (0.75)*	0.17
LIOP farming years	-1.24 (0.73)	0.29
R_L^2	0.09	
Cox and Snell	0.63	
Negelkerke	0.65	
Somer's D	0.76	
Model fit[a]	χ^2=59.82 (p<0.0001)	
Score test	χ^2=181.95 (p<0.0001)	

a.Likelihood ratio test *p<.05; **p<.01

After adding control variables, we see some improvements in the likelihood ratio and pseudo R^2 statistics as well as Somers' D, which is a rank order correlation statistics used to assess the strength of the correspondence between observed outcomes and predicted probabilities (O' Connell 2006). Environmental concern (OR=3.70), enjoyment of LIOP production (OR=6.61), planting due to philosophical, spiritual reasons (OR=2.05), and lack of product market (OR=3.70), being LIOP association membership (OR=6.13) all have positive coefficients in the model and corresponding ORs that are significantly more than 1.0. These characteristics are associated with a farmer being in advanced LIOP strategy rather than in less advanced LIOP strategy. On the other hand, hard to control weeds (OR=0.27) and being in higher business structure (OR=0.19), farming part time (OR=0.07) are negatively associated with LIOP strategies. Other variables are not associated with LIOP adoption in this model.

Table 11. Logistic Ordinal Regression of LIOP Practice Intensity on Selected Background and Control Variables, Model 2, Alabama Sustainable and Organically-Oriented Farmers (N=92), 2007

	LIOP Intensity	
Variable	Coefficient (Standard Error)	Odds Ratio
Environmental concern	1.31 (0.62)*	3.70
Price premium	-0.66 (0.51)	0.52
Market demand	0.06 (0.56)	1.06
Enjoyment (pride in production)	1.89 (0.76)*	6.61
Food safety	-1.43 (0.82)	0.24
Community values, tradition	0.14 (0.45)	1.15
Philosophical, spiritual reasons	0.72 (0.36)*	2.05
Familiar with public agency programs	0.67 (0.41)	1.96
Low product prices	0.79 (0.76)	2.20
Lack of product market	1.31 (0.56)*	3.70
Hard to control insects	0.13 (0.94)	1.14
Hard to control diseases	-0.44 (0.87)	0.64
Hard to control weeds	-1.31 (0.67)*	0.27
Lack of cost-share funds	0.17 (0.59)	1.18
Low yield	-0.43 (0.70)	0.65
LIOP association membership	1.81 (0.88)*	6.13
Use new crop management practices	-0.20 (0.29)	0.82
Business structure	-0.92 (0.36)*	0.40
Full time or part time	-2.64 (0.87)*	0.07
LIOP farming years	-1.38 (0.85)	0.25
Gender	-0.78 (0.72)	0.46
Race	1.17 (0.68)	3.21
Education	0.34 (0.31)	1.41
Familiar with computers	0.70 (0.55)	2.01
R_L^2	0.10	
Cox and Snell	0.69	
Negelkerke	0.72	
Somer's D	0.78	
Model fit[a]	χ^2=69.62 (p<0.0001)	
Score test	χ^2=162.21 (p<0.0001)	

*p<.05; **p<.01

V. CONCLUSION

This chapter summaries the main findings of the study. It also considers implications for theory, research, and public programs that serve low-input and organic vegetable producers.

Characteristics of Alabama Low-Input and Organic Production

Compared with other states' organic farms, Alabama farms are smaller. In this study, the average Alabama LIOP farm size is 27 acres, about 70 percent of the farms are less than 10 acres. Most LIOP producers choose planting without pesticides and use organic fertilizer but do not seek USDA certification. Avoiding certification maybe more beneficial for small-scale farmers, since it can save the application costs and the record-keeping necessary for certification. Many small-scale farmers select LIOP strategies based on ideological motivations. Their concerns about environment, food safety and community values connect to social rewards, and intrinsic satisfactions that are not otherwise available to conventional producers.

Though capitalism has invaded the organic sector, Alabama small-scale farmers rely on different market channels and extension support to resist corporate involvement and try their best to stay out of the industrial agricultural system. Selling locally through farmers' market, directly on the farm, or through CSAs, LIOP producers directly contact

with consumers, they may inform them where their food comes from, thus establishing a special bond and trust with the consumers. Consumers also may receive added confidence in food quality. In this process, Alabama LIOP growers can receive reasonable income and social recognition. Production does not follow the conventionalization process as it did in California organic agriculture (Guthman 2004). At the same time, the bureaucratic power may be reduced.

In addition, we cannot find evidence that the new transferred LIOP farmers are less concerned about environment than those experienced farmers who have been planting organically for more than 10 years. Among 59 new LIOP entrants, 41 producers expressed that environmental concern is a very important motivation for choosing to plant organically.

Local Food Systems

According to the farming style perspective, farmers make rational choice in selecting farming practices (Vanclay 1994). At the same time, rationalized farming needs to be supported by conscious consumers. Only through collaborating between farmers and consumers, the whole society can benefit. Buy local, buy fresh is one slogan that captures the idea. “If enough people organize to mobilize local resources, a local or regional food system becomes possible” (Henderson 2000). Buying locally is not only purchasing the food, but also represents the social reward for the organic farmers, who can thus receive esteem, income and self-directed working conditions. It just as Henderson (2000) said, “Every direct purchase from a local farmer becomes an act of fair trade, and every square foot of home garden, every family-owned farm, and every value-

adding cooperative becomes a small piece of liberated territory in the struggle for a just and sustainable society".

Informal interviews conducted by Rigdon (2007) among Alabama producers show that many customers in Alabama do not care whether their products are organic or not. So many producers think it is not worthwhile to provide organic food in the public market. Ecological modernization theory asserts that market economics are compatible with environmentally sound production. Besides LIOP farmers, conscious consumers play an important role as social carriers of ecological awareness. Increasing demand may attract more producers into the organic sector to cater to customers' needs.

Overall, Alabama LIOP producers regard industrialized agriculture as undesirable. They would eschew conventional approaches to advance low-input and organically-oriented production. However, LIOP requires support from local consumers since market demand was taken as an important reason for LIOP producers to employ organic practices.

Extension Support

Located in the Southeast U.S., with humid weather, Alabama LIOP producers have many production problems. Weed control is the most serious planting challenge, followed by insect and disease control. Although LIOP producers rated books and internet as the most important information sources, agricultural extension agents are able to connect farmers about LIOP production techniques. Augmenting extension networks with better information about LIOP approaches can improve Alabama organic production. Meanwhile, more sources could be devoted to organic research.

LIOP producers are widely dispersed across Alabama and meet the needs of local networks of regular customers and other direct sales to consumers. Future research can clarify the ways networks of producers can augment their access to consumer markets while retaining the values and ecological benefits of LIOP approaches.

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