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## Why is diversification an attractive farm adjustment strategy? Insights from Texas farmers and ranchers

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State agencies have been encouraging the development of different enterprises to diversify farm incomes in an effort to retain farmers in business, attract new entrants to agriculture and promote regional development. Entrepreneurship and farming are known to be driven by a complex set of goals including those which are economic and intrinsic in nature. However, little information is available regarding the set of goals that drive agriculture entrepreneurship, preventing state agencies to adequately target potential diversifiers. This paper provides a better understanding of the range of goals, both financial and nonfinancial, that are important in farmers' decisions to diversify their operations. The generation of additional income, the continuance of farming and ranching, and the enhancement of quality of life are among the most important diversification goals in Texas. A principal component factor analysis performed on the importance ratings of diversification goals resulted in six dimensions: (F1) Reduce Uncertainty and Risk; (F2) Grow and Service Markets; (F3) Enhanced Financial Condition; (F4) Individual Aspirations and Pursuits; (F5) Revenues Enhancement; and (F6) Family Connections. The study also examined the relationship between various entrepreneur and farm characteristics and the goal pursuit dimensions. Operator's age, number of generations the farm had been in the family, household income, number of farm employees, and distance to an urbanized area influence types of goals pursued through diversification.

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**1. Introduction**

Agriculture is an important economic and business activity in Texas, especially as a source of employment. About 5% (4.83%) of all Texas production of goods in 2004 was related to agriculture, and it has been estimated that agriculture is a 10 billion dollars industry in Texas (Texas Comptroller of Public Accounts, 2004). Farm and farm-related enterprises and organizations in 2002 employed about 15% (14.4%) of the state's population or 1,774,817 people (USDA: Economic Research Service, 2005).

However, Texas agriculture is undergoing some significant changes and many farms and ranches are confronting significant difficulties. The area of medium-sized farms has been shrinking about 250,000 acres per year, either because of fragmentation into smaller farms or because they are being incorporated into larger operations that have an intensified production model (Texas A&M University System, 2003). Many small and medium size farms are closing down which is posing a heavy burden to society producing various important and costly negative environmental externalities,

including the loss of open space, disruption of rural landscapes, degradation of wildlife habitats, depletion and pollution of water resources as well as a reduction in crop diversity (American Farmland Trust). State agencies have been encouraging the development of different enterprises to diversify farm incomes in an effort to retain farmers in business, attract new entrants to agriculture and promote regional development. For example, the Texas Department of Agriculture hosts Agriculture Diversification, a program to assist landowners to grow and diversify their revenues through different workshops and conferences on regular basis.

Previous studies have demonstrated the economic value of farm diversification as one alternative strategy that farmers can utilize to survive and even prosper in today's changing agricultural climate. There is a growing body of evidence which suggests that diversification can be employed to help farmers and ranchers to survive and increase farm income (Barbieri, 2006; Turner et al., 2003; Nilsson, 2002; Sharpley, 2002; Ventura and Milone, 2000). As a result, farmers and ranchers in Texas are now becoming more entrepreneurial and are developing different enterprises to confront a changing and challenging agricultural context (Wood, 2004).

Previous studies have concluded that farmers and ranchers make decisions based on a complex set of economic and non-economic

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goals. In one pioneering effort, Gasson (1973) found that these goals are often centered on the importance and intrinsic values of being or remaining a farmer (e.g., belong to a farming community). Other studies have determined that a farmer's or rancher's decision to incorporate agritourism facilities and programs into their farms is related to a broad range of goals (McGehee and Kim, 2004; Getz and Carlsen, 2000). However, there are no studies that have expressly examined the relative importance of various goals in motivating different types of farm diversification including value-added processing, crop and livestock, and new marketing methods. Most of the studies related to the goals that encourage diversification in North America have focused on agritourism (e.g., McGehee and Kim, 2004; Nickerson et al., 2001).

Much of the literature on this topic recommends a comprehensive understanding of the motivations behind entrepreneurial and agricultural diversification (e.g., Ilbery et al., 1998; Kuratko et al., 1997; Lynn and Reinsch, 1990). Having a better understanding of the composite goals that lie behind decisions to diversify farms and ranches is important to understand farmers' responses to agricultural change (Ilbery, 1991). It is also important in facilitating and assessing goal accomplishment providing insights regarding the adequacy of diversification as a farm adjustment strategy. Knowing diversification drivers in Texas may be important in promoting the development of new enterprises to retain farmers as well as attract new entrants to agriculture. This is especially important taking into the account the role that public initiatives may play encouraging diversification adoption among farmers (Turner et al., 2006). This study assesses the relative importance of several economic and non-economic goals in promoting diversification, and the relationship between these goals and various farm and farmer characteristics.

## **2. Theoretical background: definitions and goals behind farm and ranch diversification**

### **2.1. Farm and ranch diversification**

Farm and ranch diversification has been defined as the reallocation and recombination of farm resources (i.e., land, labor or capital) into new unconventional crops/animals or into non-agricultural enterprises developed on the farm or ranch (Ilbery, 1991). The on-farm centered approach of this definition excludes off-farm employment, a trend found in recent studies of agricultural diversification in the US and Europe (Barbieri et al., 2008; Turner et al., 2003). A more recent definition integrates two requirements: (1) the enterprises developed have to be incorporated into a *working* farm or ranch and (2) the primary purpose of the strategy needs to generate additional income or add to the farm/ranch value (Mahoney et al., 2004).

The employment of different definitions across studies due to an nonexistent widespread definition of agricultural diversification (Turner et al., 2003; Daskalopoulou and Petrou, 2002) has promoted different typologies. Undoubtedly, the current composition of agricultural diversification is more complex than a mix of traditional farm enterprises (Turner et al., 2006). Six different types of diversified enterprises have been traditionally recognized on the literature, mostly pertaining Europe. One type of diversification is the introduction of non-traditional crops, livestock or the adoption of unusual agricultural practices, such as organic agriculture and free-range pastures into the farm (Barlas et al., 2001; Damianos and Skuras, 1996). A second type involves the utilization of a variety of direct marketing and merchandising activities, and the use of a mix of communication and promotional media designed to make ranch and farm products and services more readily accessible to different markets (McNally, 2001; Ilbery, 1991). This also consists of the use of on-farm retailing and the Internet to advertise and sell farm

products. The integration of recreation, tourism and hospitality enterprises offered on farms and ranches constitutes a third type of diversification (Barbieri and Mshenga, 2008; McGehee and Kim, 2004; Bowler et al., 1996). This includes the direct purchase of agriculture products on-site (e.g., on-farm markets), recreational self-harvesting of the farm products (e.g., fruits, flowers), participation in recreation activities and events (e.g., tours, festivals and weddings), dining at on-farm restaurants and stays in various types of farm and ranch accommodations (e.g., bed and breakfasts and cottages). The lease, rental, easements and timeshares of the farm and its resources (i.e., land, buildings and equipment) is a fourth type of diversification (Mahoney and Barbieri, 2003; McNally, 2001; Ilbery, 1991). Examples include the rental of vineyards for weddings, ranch timeshares, as well as recreation and conservation easements. Farmers and ranchers providing contract services (e.g., plowing, planting, caring for horses, farm management) is a fifth type of diversification (Turner et al., 2003; McNally, 2001; Bowler et al., 1996). Value-added is a sixth type of diversification that includes the processing or packaging of the agriculture product, such as the freeze-drying of flowers, and holiday gift packaging of regional farm products (Mahoney and Barbieri, 2003). Besides increasing revenues, value-added reduces direct price competition and extends the shelf life of harvests.

A recent study pertaining enterprise diversification in North America has expanded the traditional six diversification categories to include historic preservation and education and consulting activities (Barbieri et al., 2008). Historic preservation involves the restoration of old buildings, structures and farm equipment and adaptive re-use as part of revenue producing or supporting activities. This includes, for example, the conversion of old barns into theaters, sheep herder shacks into cottages, or the use of vintage tractors to power hayrides. Consulting and educational programming includes classes (e.g., herbs growing), workshops (e.g., wine making), internships and apprenticeships on the farm.

The literature reveals a changing variety of diversification as new challenges and opportunities emerge. Both North American and European literature have reported a tendency to increase the incidence of agricultural diversification in terms of number of farms and number of on-farm enterprises (Barbieri, 2008; Turner et al., 2003). Hence, the eight forms of diversification mentioned are not intended to be exhaustive but demonstrative of farm diversification as suggested by Ilbery (1991). In addition, some entrepreneurial activities fit into different categories. For example, wine tasting is considered agritourism but it is also a very popular form of direct marketing.

### **2.2. The role of goals in farm and ranch diversification**

Goals are internal representations of desired outcomes, events or processes (Austin and Vancouver, 1996) that govern individual and entrepreneurial behavior (Hornsby and Kuratko, 2002; Gasson, 1973). Both external and internal stimuli can influence goal construction. External stimuli might include changes regarding macro economic factors (e.g., declining demand/prices), the political environment (e.g., new rural policies) and societal structure (e.g., increasing role of women in society). Fiscal, management, personnel and technological factors, as internal firm stimuli, can also influence production and marketing processes, levels and types of investment and decision-making (Bowler et al., 1996; Ilbery et al., 1998; Damianos and Skuras, 1996).

Two characteristics of goal structure – hierarchical organization and importance/commitment dimension – are important to this study. Goals are hierarchical in nature in that these are sequentially organized with few higher-order goals at the peak and several lower-order goals at the bottom (Austin and Vancouver, 1996). The importance/commitment dimension refers to the degree of

attachment and enthusiasm to pursue the accomplishment of a goal. The greater the degree of attachment the less likelihood that a person will abandon the quest to achieve a goal (Slocum et al., 2002; Austin and Vancouver, 1996).

Since farm and ranch diversification is entrepreneurial in nature (Alsos et al., 2003), it is not surprising that a complex set of goals drive the decisions and actions of agripreneurs. Farms and ranches are businesses and as such have economic and financial goals including increasing revenues, maximizing profits and debt alleviation. Bowler et al. (1996) determined that the most important reasons for the development of alternative enterprises among English farmers were: (1) maintaining or increasing the income generated by the farm business; (2) reactions toward a market opportunity; (3) better exploitation of an under-utilized farm resource; and (4) employment generation for a family member. A more recent study in the same region confirmed the economic factor, defined as a supplementary source of income, as an import driver of agricultural diversification (Turner et al., 2003). McGehee and Kim (2004) and Nickerson et al. (2001) also found the generation of additional income and the full utilization of farm resources to be very important in agritourism diversification development.

Research suggests that farmers' relationship to farming and their connection with the farm are important in guiding their decisions and behaviors. Rob and Burton (2004: p. 9) contend that: "Farmers want to farm. It provides them their identity and a sense of achievement (...). Farmers see themselves as food producers". Similarly, Getz and Carlsen (2000) found that the economic goals (i.e., Revenues Enhancement) behind agritourism were not an end in themselves, but a means to support rural lifestyles. The significance of non-economic goals for farm diversification was explained by Gasson (1973), who argued that farmers may choose to maximize *satisfaction* within a given preferences system rather than maximizing income.

Intrinsic goals also have an important role in farm diversification decisions. Getz and Carlsen (2000) found that lifestyle was by far the most important goal factor among Australian farmers offering tourism and hospitality services including living in the right environment and enjoying a good lifestyle. Meeting interesting people was also an important goal for more than two-thirds of these Australian farmers (Getz and Carlsen, 2000). Studies conducted in Montana and Virginia (US) showed that educating consumers was an important goal in the farm tourism diversification process (Nickerson et al., 2001; McGehee and Kim, 2004, respectively). Some goals associated with the entrepreneurial nature of diversification, such as providing a challenge, being their own boss, and becoming financially independent, have also been identified (Getz and Carlsen, 2000).

Some studies suggest an association between various reasons why farmers develop alternative enterprises and various farm/firm internal characteristics, such as farmer's age, tenure nature (Getz and Carlsen, 2000), extent of economic dependence on farming, household income (McGehee and Kim, 2004) and farm size (McGehee and Kim, 2004; Nickerson et al., 2001). Nearness to potential markets is another farm characteristic triggering diversification. Ilbery (1991) concluded that 82% of the diversified farmers interviewed in his study indicated that proximity to a major urban market was the second most important factor influencing their decision to develop an alternative enterprise. Farmers located close to urban fringes diversify to help to compensate and allow them to pay for property tax increases resulting from nearby residential developments (Nickerson et al., 2001). A number of studies, however, failed to show statistical associations between the types of goals pursued and farm/firm attributes, including the age of the firm, total business income (Lynn and Reinsch, 1990), type of industry, entrepreneur's gender (Kuratko et al., 1997) and the number of years in agriculture (Nickerson et al., 2001).

Research is inconclusive regarding the relative importance of goals driving farm diversification. While some studies show that goals linked to external environmental factors (e.g., economic and market changes) are more important than those that are related to internal factors (Bowler et al., 1996; Ilbery, 1991; Nickerson et al., 2001), others conclude that lifestyle and family-related reasons are predominant goals behind farm diversification (Getz and Carlsen, 2000).

### 3. Data and methods

#### 3.1. Objective, research questions and hypothesis

The main purpose of this study is to assess the relative importance of several different types of goals that farmers pursue when diversifying. Since internal firm (farm) characteristics appear to influence decision-making, one purpose is to determine which farm and farmer attributes are associated with different diversification goals. Four research questions were addressed to achieve this purpose: (1) which goals, if any, drive and influence farm diversification? (2) What is the relative importance of various diversification goals? (3) Can diversification goals be reduced to fewer dimensions? (4) Which, if any, farm and farmer characteristics are associated with different diversification goals?

As previously stated, entrepreneurship is driven by a complex set of goals, so it was hypothesized that several different types of goals influence the diversification decision-making process. Hence, the association between diversification and 20 different goals was tested. Types of goals included were economic/financial (e.g., revenues maximization), intrinsic (e.g., pursuit of quality of life) and market-related. An effort was also made to determine additional goals that may be important. The literature describes that individuals have different sets of goals and that goals are hierarchically organized differently across individuals. It was therefore hypothesized that farmers and ranchers attach different levels of importance to different types of diversification goals. Aiming to develop a classification scheme, it was additionally hypothesized that diversification goals could be factor-analyzed based on the importance farmers assign to these goals.

Internal characteristics of the farm (i.e., firm and entrepreneur attributes) appear to be associated with decision-making goals. Accordingly, it was hypothesized that closeness to the market, farm size, and tenure are associated with whether farms diversify. Previous studies have used various ways to measure farm size (Sumner and Wolf, 2002). For this study the number of full-time, year-round employees is used based on the assumption that larger farms (i.e., in terms of scale of diversification) have more human capital dedicated to diversified enterprises. As for entrepreneur characteristics it was hypothesized that farmer's age, farm household income and the family's attachment to the farm are associated with different reasons for embarking on diversification. Attachment was measured in terms of the number of generations the farm or ranch had been in the family.

#### 3.2. Sampling and surveying Texas diversified farmers

A web-based survey was used to collect data from farms and ranches with diversified enterprises in Texas. Since the population of these firms is not known or available in any directory, the sample frame had to be developed. A systematic search on the Internet using keywords resulted in the identification of 497 farms and ranches with diversified operations in Texas. Then, the Texas Center for Rural Entrepreneurship provided the contact information for another 141 diversified firms. The identification process resulted in a frame that comprised 638 farms and ranches; e-mail addresses were available for 568 and 70 mailing addresses were obtained for

the others. This initial list served as a purposive or judgmental sampling, defined as a sample that researchers use because it best serves the purposes of the study (Monette et al., 1994). Although this sample frame prevents this study from being representative of Texan diversified farms, it was appropriate to identify farms with different types of diversified enterprises far beyond a specific agricultural sector. For example, it includes farmers growing crops, fruits, nurseries and greenhouses, Christmas trees, livestock, as well as those involved in value-added processes, agritourism, on-farm retail, consumer-supported agriculture, and direct delivery among others. The sampling method combined with the on-line tool utilized in this study is convenient because it allows gathering information in large geographic areas such as Texas in a short time frame and facilitates snowball referrals (Barbieri et al., 2008). In a similar situation, Getz and Carlsen (2000) used a non-random sample to study family rural businesses involved in tourism and hospitality in Western Australia because they lacked an adequate database to serve as a sampling frame. Barbieri and Mshenga (2008) also used a non-random sample with snowball technique to examine agritourism in the US.

The survey included eight different sections that collected information about: the characteristics of the farm and the operator; the products, services and enterprises used to generate farm revenues; amount of farm revenues; an owner/operator assessment of the profitability of the diversified operations; and management, financial and marketing practices being employed by the farm or ranch. One entire section focused on the initial goals for diversifying farm operations, inquiring about the existing goals and their importance in the diversification decision-making process.

The survey, conducted in the Spring 2005, was strongly endorsed by the Texas Commissioner of Agriculture at that time. An invitation to take part in the survey was sent to 585 diversified farms and ranches in Texas by e-mail, regular mail, or both. It described the purpose of the survey and included a web address to access the survey on-line. Of the initial sampling frame, 470 e-mails and 487 mail addresses were valid and/or deliverable. The survey did not offer any economic incentive to participants. Five e-mail reminders and one mail reminder were sent to non-respondents. Although the literature reports that on-line surveys are usually conducted in less than a month (Ilieva et al., 2002), this survey remained open for 64 days in consideration of the fact that spring is usually a busy season for farmers. Also, many were not accustomed to web-based surveys and the survey required some research on their part.

A total of 231 complete surveys were returned. Fifteen surveys were excluded from the analysis because the respondent was not a working farm or ranch (i.e., was not engaged in any agricultural production), their farm or ranch was not located in Texas, or it proved not to fit the definition of being diversified. The analysis included 216 diversified farms and ranches, 167 from the original list of invitees and 49 from the snowball sampling technique. Almost 40% (38.9%) of the farms and ranches originally invited completed the survey. Similar response rates have been obtained in other agricultural diversification studies among farmers in the US (e.g., Barbieri et al., 2008; McGehee and Kim, 2004; Nickerson et al., 2001) and Europe (e.g., McNally, 2001; Carter, 2001). Additional respondents obtained from snowball sampling technique ( $n=49$ ; 17.3%) increased the external validity of this study.

### 3.3. Methods to examine the characteristics and goals of Texas diversified farmers

Descriptive analyses were performed that examined the characteristics of the diversified farms and their operators, the types and extent of their production enterprises and the initial motivations goals. Twenty goals representing a wide spectrum of

economic, intrinsic and market-related goals that the literature recognizes as stimulating diversification were included in this study. Two open-ended categories were included to identify possible goals not already identified in the literature. Participants were asked about the importance of 20 possible goals using a five-point Likert scale ranging from "not important" (1) to "extremely important" (5).<sup>1</sup>

A principal factor analysis with varimax rotation was performed on the rankings that farmers assigned to the 20 different diversification related goals. The purpose was to identify underlying structure/factors, if any existed. A listwise method was used to handle missing values. Eigenvalues over 1 and loadings over .50 were the threshold used in the factor analysis. Cronbach's reliability analysis was performed to test internal consistency of the variables comprising the six factors that were identified.

A multiple linear regression was then performed to determine the degree of association between farm and entrepreneur characteristics (independent variables) and the six diversification goal dimensions produced by the factor analysis. Each goal dimension comprises a set of diversification goals and describes the scores obtained from internal patterns of correlations. Independent variables used to test whether they influence farmers' diversification goals refer to farm and farmer characteristics. Tests performed revealed no collinearity among the independent variables used.

Farm characteristics included accessibility/nearness to markets, farm size, and proportion of the number of acres farmed that are owned (i.e., extent of tenure). Accessibility to the markets was measured as the distance of the farm to an urbanized area.<sup>2</sup> The number of persons employed full-time, year-round in 2004 was used as a proxy for farm size. The proportion of land that is farmed and owned was categorized as follows: (a) all (100%) of the land farmed is owned; (b) most (60–99%) of the land farmed is owned; (c) the proportion of land farmed that is owned and rented is similar (59–41%); (d) little (40–1%) of the land farmed was owned; and (e) none (0%) of the land farmed is owned.

The entrepreneurial characteristics that were analyzed in terms of their relationship to various diversification goals include the age of the owner/operator, gross household income and number of generations on the farm (independent variables). Farmer/operator age was categorized as follows: less than 25 years; 25–34 years; 35–44 years; 45–54 years; 55–64 years; 65–69 years; 70–74 years; and 75+ years. Farm household income was aggregated into these categories: less than \$25,000; \$25,000–\$34,999; \$35,000–\$49,999; \$50,000–\$74,999; \$75,000–\$99,999; \$100,000–\$149,999; \$150,000–\$199,999; and \$200,000+. Four categories were used to assess the number of generations the farm/ranch was in the family: 1 generation; 2 generations; 3 generations; and 4 or more generations.

## 4. Research results

### 4.1. Profiling study respondents

The majority (64.5%) of farm owners/operators that responded to the survey is middle-aged, ranging from 45 to 64 years old (Table 1). Over a quarter (29.9%) of the diversified farms and ranches that responded to the survey had female principal operators. A relative high percentage (28.6%) of the wives of the male principal operators exclusively worked on the farm diversified operations, confirming previous findings regarding an active role of women in

<sup>1</sup> The complete scale had the following points: (1) not important; (2) somewhat important; (3) moderately important; (4) fairly important; and (5) extremely important.

<sup>2</sup> An urbanized area is a densely settled area that has a census population of at least 50,000 (U.S. Census Bureau, 2001).

**Table 1**

Socio-economic characteristics and level of farm attachment of Texas diversified farmers and ranchers that responded to the survey

Attributes ( <i>n</i> = 216)	Percent of respondents
<i>Farmer's age</i>	
Less than 35 years	3.5
35–44 years	15.0
45–54 years	26.0
55–64 years	38.5
65 years or more	17.0
<i>Operator's gender</i>	
Male	70.1
Female	29.9
<i>Farmer's level of education</i>	
At least some school	11.3
At least some college	55.8
At least some graduate school	32.9
<i>Annual farm household income</i>	
Less than \$25,000	7.5
\$25,000–\$34,999	10.3
\$35,000–\$49,999	14.1
\$50,000–\$99,999	34.0
\$100,000–\$199,999	22.2
\$200,000 or more	11.9
<i>Number of generations on the farm</i>	
One generation	61.5
Two generations	9.5
Three generations	10.0
Four or more generations	19.0
<i>Total number of family members working on the farm</i>	
None	18.8
One family worker	16.1
Two family workers	34.3
Three to five family workers	24.0
Six or more family workers	6.8
<i>Operator's principal occupation</i>	
Farming/ranching	61.2
Non farming/ranching	38.8
<i>Off-farm work days yearly</i>	
None <sup>a</sup>	56.5
1–49 days	3.0
50–99 days	4.0
100–199	12.5
200 days or more	24.0

<sup>a</sup> According to U.S. Census of Agriculture 2002, 56.1% of Texas farmers worked at least 1 day off the farm. Of those, 10.3% worked 1–49 days off-farm; 5.8% between 50 and 99 days; 12.7% between 100 and 199 days and 71.2% worked at least 200 days off-farm.

agricultural diversification (Bock, 2004; McNally, 2001). The respondents are also relatively highly educated. The majority of the respondents (88.7%) have some college education and a third (32.9%) has at least some graduate studies. Over one-third (34.1%) of diversified farm households have annual gross incomes over \$100,000.<sup>3</sup> A similar proportion (31.9%) earned less than \$50,000.

Diversified farmers' families that responded to the survey have a strong attachment to farming and agricultural traditions. Almost two-thirds (65%) of the responding farms have at least two family members working on the farm (mean = 2.3) and their owners/operators are more likely to be full-time farmers. The findings also indicate that 61.2% of the operators have farming as their main occupation and 56.6% reported working exclusively on the farm. This is a considerably greater involvement than Texas farms and ranches on average (53.6 and 43.9%, respectively). About a quarter

of respondents (24%) worked 200 or more days off the farm, which is significantly less than the 40% reported in the 2002 Census of Agriculture. Results show a high percentage of new entrants to agriculture. The majority of respondents (61.5%) reported being first generation of farmers. Interestingly, about half of them (49.2%) were retired from a previous job or profession. First generation farmers also reported having farmed on average only 12 years. These results suggest that agriculture may be attracting people seeking the rural lifestyle or to further a personal interest or hobby as has been reported in Europe (Turner et al., 2003). These findings deserve closer investigation in the US.

The responding owners/operators were engaged in a variety of diversified enterprises (Table 2). Almost three quarters (71.3%) were involved in three or more categories of diversification, with an average of 3.5. The simultaneous development of different enterprises confirms previous studies reported in North America (Barbieri et al., 2008) and in Europe (Turner et al., 2003; Ploeg et al., 2000). Over a third (34.4%) of farmers and ranchers are engaged in some type of value-added processing including production of food and beverages, arts and crafts and cosmetics and health products. Over two-thirds (68.9%) of diversified farmers and ranchers generate revenues through non-traditional crops, livestock and practices. As expected, the majority (88.2%) of the diversified farmers and ranchers are engaged in new marketing, either advertising, communications or distribution. About two-thirds (64.6%) of participants reported having diversified through agritourism, recreation and/or hospitality services. Almost half (42.9%) of the diversified farmers and ranchers have preserved, restored or adaptively re-used historic buildings, equipment, artifacts and other heritage on their farm. A smaller but still large proportion (13.2%) is generating revenues through various types of leases as well as positive and negative easements. Almost a third (31.1%) offer at least one consulting or education service. Contracting and services such as boarding horses, renting pack animals and customized processing generate revenues for about 6% of the diversified farms and ranches.

#### 4.2. Diversification goals and their dimensions

The results reveal a broad range of economic, intrinsic and market-related goals related to decisions to diversify (Table 3). The greatest percentage (83.7%) of farmers diversified to generate additional farm income. This goal also received the highest average importance rating (mean = 3.8, on a five-point scale with 1 being not important and 5 very important). The majority of respondents also diversified to continue farming (53.4%, mean = 2.94) and as a way of enhancing their and their family's quality of life

**Table 2**

Categories of on-farm diversification and diversification index

Diversification categories and index ( <i>n</i> = 212)	Respondents (%)
<i>Diversification categories</i>	
Value-added to existing products	34.4
Non-traditional crops, livestock and practices	68.9
New marketing and distribution	88.2
Recreation, tourism and hospitality	64.6
Historic preservation and adaptive re-use	42.9
Leases, easements and timeshares	13.2
Contracts and services	6.1
Education, expertise and consulting	31.1
<i>Diversification index (1–8)<sup>a</sup></i>	
Range	1–8
Mean index score	3.5
Median index score	3.0

<sup>a</sup> This index represents the sum/composite of the eight types of diversification categories.

<sup>3</sup> The annual farm household income included income coming from the farm, wages, salaries, social security and retirement benefits.

**Table 3**

Percentage of respondents who considered different goals to be important reasons for diversifying their farms and their average level of importance

Diversification goals (n = 208)	Percent of respondents	Importance mean <sup>a</sup>
Generate additional income	83.7	3.80
Continue farming/ranching	53.4	2.94
Enhance personal/family quality of life	52.4	2.93
To generate additional revenues from existing resources	50.5	2.60
Respond to a market need/opportunity	49.5	2.50
Keep the farm/ranch in the family	47.1	2.78
Increase/diversify the market	44.2	2.46
Capitalize on an interest/hobby	38.0	2.14
Interact with customers	38.0	2.26
Educate customers	33.7	2.12
Offset fluctuations in farm/ranch revenues	33.2	2.06
Generate revenues during off/non-growing seasons	32.7	2.11
Provide current customers with new products/services	32.7	2.02
Provide a new challenge	32.7	2.05
Enhance ability to meet financial/loan obligations	29.8	2.09
Make farm less dependent on outside factors	26.9	1.90
Reduce overall farm/ranch debt	26.4	1.96
Reduce impacts of catastrophic events	25.5	1.81
Provide employment opportunities for family members	22.1	1.68
Qualify for state/federal assistance program	12.5	1.38

<sup>a</sup> Anchors: (1) not important; (2) somewhat important; (3) moderately important; (4) fairly important; and (5) very important.

(52.4%, mean = 2.93). Enhanced economic utilization of the farm resources, including keeping farm labor employed, was a reason given by 50.5% of the owners and operators to diversify the enterprise. On average this goal received a 2.6 importance rating. Although some other reasons for diversifying were reported in addition to the 20 goals, they were not significant to a majority of the respondents. The relevance of economic goals behind diversification, either related to income enhancement or maximization of the farm resources, has been consistently found in European and US studies (Turner et al., 2006; McGehee and Kim, 2004; Nickerson et al., 2001).

The results confirm that farmers are motivated by different combinations of goals and that they assign different degrees of importance to the same goals. This goal structure complexity was consistently found in European and American studies (McGehee and Kim, 2004; Turner et al., 2003; Alsos et al., 2003; Bowler et al., 1996). Since each farmer has their own set of goals with different levels of importance, a principal component factor analysis was used to identify the underlying patterns of relationships among the goals. The varimax-rotated factor analysis resulted in six factors (eigenvalues over 1 and factor loadings over .5) accounting for 60.9% of the variance. Reliability analysis (Cronbach's alpha) produced coefficients higher than .50 (minimum value expected) indicating internal consistency among the variables comprising each of the six factors. The overall reliability measure was .85. "To educate customers" did not load on any factor (<.5) and the loadings on four different factors ranged between .45 and .26 reflecting the heterogeneity of this goal. This goal was therefore dropped from further analysis. Each of the six factors was assigned a label based on the nature of the goals that loaded on each factor. The factors are as follows: Reduce Uncertainty and Risk (F1), Grow and Service Markets (F2), Enhance Financial Condition (F3), Individual Aspirations and Pursuits (F4), Revenues Enhancement (F5), and Family Connections (F6). Table 4 displays the six labeled factors obtained, the goals that loaded on each factor and their corresponding loadings, and the Cronbach's alpha reliability coefficients, eigenvalues, and percentage of variance explained by each factor.

The four goals which loaded on the Reduce Uncertainty and Risk factor (F1) relate to minimizing the uncertainty and risk associated with farming including fluctuations of the agriculture revenues

**Table 4**

Rotated factor matrix of the goals for farm diversification

Factors and goals (n = 195)	Factor loadings	Explained variance (%)	Eigenvalue
Reduce Uncertainty and Risk (F1, $\alpha = .74$ ) <sup>a</sup>		14.34	5.38
Offset fluctuations in farm/ranch revenues	.765		
Reduce impacts of catastrophic events	.754		
Make farm less dependent on outside factors	.626		
Continue farming/ranching	.568		
Grow and Service Markets (F2, $\alpha = .71$ )		11.32	1.86
Provide current customers with new products/services	.732		
Generate revenues during off/non-growing seasons	.597		
Respond to a market need/opportunity	.576		
Increase/diversify the market	.572		
Enhanced Financial Condition (F3, $\alpha = .66$ )		10.09	1.58
Enhance ability to meet financial/loan obligations	.811		
Reduce overall farm/ranch debt	.740		
Qualify for state/federal assistance program	.540		
Personal Aspirations and Pursuits (F4, $\alpha = .60$ )		9.83	1.32
Capitalize on an interest/hobby	.740		
Provide a new challenge	.691		
Enhance quality of life	.538		
Interact with customers	.501		
Revenue enhancement (F5, $\alpha = .56$ )		7.88	1.09
Generate additional income	.813		
Generate additional revenues from existing resources	.625		
Family connection (F6, $\alpha = .53$ )		7.50	1.03
Keep the farm/ranch in the family	.714		
Provide employment opportunities for family members	.630		
Total variance explained		60.96	

<sup>a</sup> Cronbach's alpha reliability coefficients for domains. Overall reliability ( $\alpha = .85$ ).

caused by variations in commodity prices and catastrophic events (e.g., droughts, floods) that frequently threaten farmers and ranchers, creating independence from outside factors (e.g., being a price setter instead of a price taker), and allowing the farm to stay in business. This factor explained 14.3% of variance in the data and had an eigenvalue of 5.4. The alpha reliability coefficient for this factor was the highest obtained ( $\alpha = .74$ ). The second factor, *Grow and Service Markets*, explained 11.3% of variance in the data, with an eigenvalue of 1.9 and an alpha reliability coefficient of .71. The four goals loading on this factor (F2) are associated in various ways to retaining and expanding markets. They include: providing current customers with new products/services; generating revenues during off/non-growing seasons; responding to market needs/opportunities and diversifying markets.

The *Enhanced Financial Condition* factor (F3) is associated mostly with goals relating to the financial wellbeing and performance of farm and ranch businesses. This factor explained 10.1% of variance, had an eigenvalue of 1.6 and an alpha reliability coefficient of .66. The goals loading on this factor are enhancing the ability to meet financial obligations, the reduction of the farm debt, and the ability to qualify for an assistance program. The four goals that most define the *Individual Aspirations and Pursuits* factor (F4) are personal in nature including the goal to capitalize on an interest/hobby; diversification as a new challenge; enhancement of quality of life; and to interact on a personal level with customers. This fourth factor explained 9.8% of variance and had an eigenvalue of 1.3 (Cronbach's  $\alpha = .6$ ). This fourth factor is consistent with findings in England where 17% of the diversified farmers reported that their enterprises grew from an original informal hobby (Turner et al., 2003).

Two goals loaded on the *Revenues Enhancement* factor (F5) which explained 7.8% of variance with an eigenvalue of 1.1 (Cronbach's  $\alpha = .6$ ). These goals are the generation of additional income derived, for example, from the additional value-added to the agriculture product, and the maximum utilization of the farm resources including land, capital and labor. Economic goals that loaded in this factor are similar to different income and economic opportunity related factors found in Europe (Turner et al., 2003; Ilbery, 1991), Australia (Getz and Carlsen, 2000) and North America (McGehee and Kim, 2004; Nickerson et al., 2001) suggesting that the importance of economic drivers in agricultural diversification extends far beyond geographic boundaries. Diversifying to keep the farm in the family and to generate employment for family members loaded on the *Family Connections* factor (F6). This factor has an eigenvalue of 1.03 and explains 7.5% of the variance with a reliability coefficient of .53 which is just above the minimum which is considered acceptable for this study. A similar family-related motivator was also reported in England (Turner et al., 2003).

#### 4.3. Attributes associated with farm diversification goal dimensions

Multiple linear regressions performed on the six diversification goal dimensions produced five statistically significant models suggesting that entrepreneurial and farm characteristics are associated with the goals that motivate farmers and ranchers to diversify (Table 5). Interestingly, there were no statistically significant associations between the *Revenues Enhancement* factor (F5) and entrepreneurial or farm characteristics.

The first statistically significant model shows the number of generations that the family has been owned/operated the farm ( $\beta = .325$ ,  $p < .001$ ) and farm household income ( $\beta = -.175$ ,  $p = .019$ ) are statistically related to the goals that load on the *Agriculture Uncertainty and Risk* factor – F1 ( $R^2 = .147$ ,  $p < .001$ ), though this is not surprising. Families who have been engaged in agriculture for more than one generation have accumulated experience with the cyclical ups-and-downs of farming and are therefore more likely to be motivated to find ways of reducing uncertainty. Being attached to the farm for multiple generations may also increase their aspirations to continue the farming legacy and keep the farm in the family. Household income is negatively associated with this factor. Farmers with higher incomes, whether produced by the farm or other sources, place less importance on reducing the risks and uncertainties commonly associated with farming and are less likely to diversify for these reasons. This is expected because farmers with higher incomes have a larger capacity for absorbing financial losses, reducing the need to diversify for this reason.

The second statistically significant model ( $R^2 = .130$ ,  $p = .001$ ) reveals that the number of generations on the farm ( $\beta = -.191$ ,  $p = .016$ ) and the number of full-time, year-round employees ( $\beta = .248$ ,  $p = .002$ ) are associated to the goals related to the *Grow and Service Markets* factor (F2). The more generations a farm has been in the family, the less importance is assigned to goals associated in some way with retaining and expanding markets. This may in part be explained by the fact that long established family farms may be more likely to have well-established customer bases and marketing networks. They may not be as concerned in growing or diversifying their markets as newly established farm businesses. Larger farms, in terms of number of employees, are much more concerned with growing their markets in large part because this is necessary to finance their operations, cover their overhead costs and to offer continuing employment to their staff. Also, greater human capital of these farms enables them to be more responsive to market opportunities. Surprisingly, the distance that farms are located from urbanized areas was not related to the importance of the goals that loaded on this factor. It was expected that closeness to a major market place would provide the firm with a larger customer base seeking farm products directly from the consumer or searching for rural landscapes.

The farm household income ( $\beta = -.254$ ,  $p = .001$ ) and the distance from an urbanized area ( $\beta = -.183$ ,  $p = .024$ ) were significantly associated to the *Enhanced Financial Condition* factor – F3 ( $R^2 = .091$ ,  $p = .019$ ). As it would be expected, the higher the household income the less important the goals related to the financial wellbeing and performance of farm and ranch businesses. This third significant model confirms the relationship between the firm's profit maximization and the household's utility maximization behavior (Benjamin, 1994) explaining the relation between the family farm members and the physical farm resources.

The fourth statistically significant model ( $R^2 = .085$ ,  $p = .029$ ) shows that the number of full-time, year-round employees is negatively associated with the *Individual Aspirations and Pursuits* factor – F4 ( $\beta = -.264$ ,  $p = .001$ ). Although a significant relationship was expected, it was anticipated in the opposite direction. A larger number of employees were expected to provide more free time to operators that could be invested in goals that are personal in nature, such as capitalizing on a hobby or increasing the interaction with customers. The time these operators need to allocate to human resource management may explain the opposing direction of the results. Also, a greater number of employees imply a larger operation that may require more owner involvement reducing their spare time for individual pursuits.

As it would be expected, the model related to the *Revenues Enhancement* factor (F5) was not significant, meaning that there is a universal importance of revenue and income generation as

**Table 5**

Multiple linear regressions of farm and entrepreneur characteristics on the diversification goals factors

Independent variables	DV – diversification goals' factors <sup>a</sup> (standardized $\beta$ and significance)					
	F1	F2	F3	F4	F5	F6
Operator's age	-.104	-.090	-.011	.002	-.138	.148*
Number of generations in the farm	.325***	-.191*	.027	-.037	-.002	.408***
Household gross income	-.175*	-.109	-.254**	-.081	-.061	.001
Distance from urbanized area	.078	-.063	-.183*	-.052	.084	-.006
Total full-time year-round employees	.122	.248**	.079	-.264**	-.020	.081
Extent of tenure	-.003	-.111	.027	-.036	-.100	-.007
p Value	.000	.001	.019	.029	.421	.000
R	.423	.361	.302	.292	.193	.419
R <sup>2</sup>	.179	.130	.091	.085	.037	.176
Adjusted R <sup>2</sup>	.147	.097	.056	.050	.000	.139

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

<sup>a</sup> F1 – Reduce Uncertainty and Risk; F2 – Grow and Service Markets; F3 – Enhanced Financial Condition; F4 – Personal Aspirations and Pursuits; F5 – Revenue Enhancement; F6 – Family Connection.

a reason for diversifying farms and ranches. Among the farm and entrepreneurial characteristics included in the model, none were related to more or less enterprise diversification to generate additional revenues or to maximize the utilization of the farm resources including land, capital and labor.

The final significant model ( $R^2 = .176$ ,  $p < .000$ ) shows that the operator's age ( $\beta = .148$ ,  $p = .048$ ) and the number of generations in the farm ( $\beta = .408$ ,  $p < .001$ ) are positively associated with the *Family Connections* factor – F6. Both attributes indicate that longer-term ties and larger investments in a farm would lead to farmers wanting to strengthen through diversification, such as keeping the next generation involved in the business.

## 5. Conclusions

This study confirms that diversification is a strategy that Texas farmers are utilizing to adjust their farms to current challenging agricultural contexts. As reported across North America, this study also confirms that Texas farmers are developing eight different types of enterprises, namely: non-traditional crops, livestock and practices, value-added, new marketing and distribution, recreation, tourism and hospitality, historic preservation, leases, easements and timeshares, contracts and services, and expertise, consulting and education (Barbieri et al., 2008). The flexibility of this strategy, in terms of capacity to incorporate and leverage a broad variety of enterprises, suggests that diversification can enable farmers and ranchers to respond to new market opportunities and to adapt their farms to emerging agricultural contexts.

A complex set of goals, ranging from intrinsic to economic in nature, drive decisions to incorporate different enterprises into the farm business. This complexity is consistent with previous findings in both farmer and entrepreneur motivational studies. Certainly, taking into account the economic nature of any business venture, the majority of respondents diversified to generate additional income. However, the majority of respondents also reported the continuance of farming, the enhancement of their (family's) quality of life and the maximization of the economic use of their existing resources as important goals in their diversification decision-making process. These goals were also considered to have greater importance among the respondents.

The heterogeneity of goals and the different levels of importance among the respondents were able to be reduced to fewer dimensions that better explain a range of reasons why farmers and ranchers diversify. A first set of goals are associated with the risks and insecurities inherent to farming, such as offsetting fluctuations in market prices. Another goal deals with retaining and expanding markets, such as providing current customers with new products or responding to new market opportunities. Goals related to the financial wellbeing and performance of the business (e.g., farm debt reduction) and the enhancement of farm revenues (e.g., economic maximization of farm resources) resulted in another two goal dimensions driving diversification. Consistent with previous motivational findings of farmers, goals associated with Individual Aspirations and Pursuits also lay behind entrepreneurial agricultural ventures. Similarly, goals related to strengthening or maintaining the farm household ties to farming were another goal dimension found to be driving diversification.

Agricultural agencies in the US have demonstrated interest in diversification and some states, such as Texas, are encouraging diversification through integrated policies, incentives, and educational programs to tap into the economic potential of farmers and local communities. As a case in point, the Small Farms Policy promotes diversity in food, fiber and wood productions, encourages opportunities to connect farmers with consumers and supports agricultural systems that sustain and strengthen rural communities, cultural diversity, and a traditional way of life. The fact that

farmers diversify to achieve a variety of economic and non-economic goals as shown in this study suggests that diversification should also be promoted to reach goals that are more intrinsic in nature. These results are important to take into account by US agencies since previous studies in Europe have shown the positive effects of public support, in terms of economic aid and knowledge transfer, in encouraging and sustaining agricultural diversification (Turner et al., 2006). This study also shows that diversification is attracting some specific groups, such as people that have not been traditionally related to agriculture. Almost half (49.2%) of the diversified farmers and ranchers that are first generation farmers – new entrants to agriculture – are retired from another profession and the majority (82.0%) do not have any formal training in agriculture. Attracting new entrants to agriculture for non-economic reasons, including retirees seeking the rural experience or willing to capitalize on a hobby, may bring societal benefits such as maintaining rural landscapes, preserving agricultural heritage and natural resources conservation. Identifying these groups is important for agricultural agencies to better allocate their funding resources to stimulate diversification as it has been suggested (Turner et al., 2006).

The evaluation of diversification leads to questions concerning the assessment of this strategy. The multi-motivational dimension of diversification decisions shown in this study suggests that this strategy should not be evaluated solely on its economic contribution, but also for the non-economic values that it provides farmers and local communities. Performance assessments of diversification – success or failure – must incorporate valid measures of the accomplishment of a range of different goals that encourage farmers to diversify.

At last, it is essential to reiterate that this study is not representative of all farms and ranches with diversified operations in Texas, US. The sample frame drawn from a systematic search on the Internet and the contact list provided by Texas Center for Rural Entrepreneurship may be misrepresenting a certain sector (e.g., over-representing farms with larger networking capabilities or more involved in electronic marketing media). However, the sampling method together with the electronic/printed tools utilized in this study was threefold convenient: (1) it facilitated gathering information in a large geographic area such as Texas; (2) it provided motivational information in a short time frame to be incorporated in state programming efforts; and (3) it facilitated snowball referrals which enlarged the number of respondents in a relative short time frame.

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