RESIDENTS‟ PERCEPTIONS OF AGROFORESTRY LANDSCAPES: IMPLICATIONS FOR AGRITOURISM

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by

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The undersigned, appointed by the Dean of the Graduate School, have examined the thesis entitled

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And hereby certify that, in their opinion, it is worthy of acceptance.

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ABSTRACT

This study assessed residents‟ perceptions of the visual appeal of agroforestry landscapes for recreational purposes in Missouri, Pennsylvania and Texas. Specific objectives of this study were: (1) to identify the features of agroforestry landscapes that are more visually appealing to visit a farm for recreation; (2) to assess the perceived benefits of agroforestry landscapes; (3) to compare residents‟ preferences of agroforestry landscapes features across respondents with different characteristics; and (4) to contrast residents‟ perceived benefits of agroforestry landscapes across different respondents segments. Data were collected in 2011 using an online survey questionnaire from three non-random panels of residents in Missouri, Pennsylvania, and Texas (n = 250 each).

Results showed that “wildlife”, “water resources”, “heritage resources”, and “farm animals” are the most preferred individual landscape features. MANOVA showed significant differences on preferences of landscape features across gender, levels of agritourism experience, and relationships with a farm/forested land. Females, *Recurrent Agritourists*, and those with *Direct* or *Indirect Relationship* to a land showed higher preferences for most landscape features as compared to their counterparts. Overall respondents perceived that both conventional and agroforestry farms are equally important in providing socio-economic benefits to society, while agroforestry farms are slightly more important regarding the provision of eco-physical benefits. MANOVA tests showed significant differences only between male and female respondents on their perceived importance of eco-physical and socio-economic benefits that both types of farms provide. Theoretical and practical implications of study results are discussed.

CHAPTER I:

INTRODUCTION

Agroforestry is an emerging agricultural practice in North America, and it is still considered a new science associated with sustainability issues of land use and agriculture production (Gold & Garrett, 2009). According to Lassoie, Buck and Current (2009), periodic agricultural disasters have stimulated the interest in adopting agroforestry practices for conservation purposes, such as planting trees as windbreaks. These practices bridge the gap between production agriculture and natural resources management, contributing to sustainable agriculture and sustainable forestry (Gold & Garrett, 2009). Although several benefits have been attributed to agroforestry, yet to be examined is the impact of such practices on the visual appeal of the farmland for recreational purposes (i.e., agritourism). In this chapter, the concepts of agroforestry and agritourism are introduced to provide a background for this study. Chapter I also details the study purpose, research objectives, justification, and definitions.

Agroforestry: Concept and Practices

Agroforestry is an intensive land-use management which combines woody perennials (trees or shrubs) with agricultural crops and/or livestock (Gold & Garrett, 2009). It is important to emphasize that such combination of agricultural components (e.g., trees, livestock) existing in agroforestry systems is created intentionally (Erdmann, 2005). The biological interactions occurring in agroforestry systems optimizes the

abundance of eco-physical, economic, and social benefits for farmers, local communities and overall society (Gold & Garrett, 2009; Lassoie et al., 2009).

The following review of agroforestry practices is intended to provide a background for this study as they contribute to various sorts of agroforestry landscapes. However, it is important to mention that this study will not examine the preferences towards any specific agroforestry practices, but their components of agroforestry (e.g., trees, shrubs, grassland). Five types of agroforestry practices are usually recognized in North America: riparian and upland buffers; windbreaks; alley cropping; forest farming; and silvopasture (Gold & Garrett, 2009). *Riparian* and *upland buffers* are the combination of strips of trees, shrubs, and grasses, placed between agricultural land and water bodies (riparian), or along the contour of agricultural lands (upland) which builds effective bridges between the upland and aquatic ecosystems (Gold & Garrett, 2009; Schultz et al., 2009). *Windbreaks* are trees/shrubs planted as natural barriers in an agricultural or forest operation (Gold & Garrett, 2009; Ucar & Hall, 2001). Three types of windbreak practices are recognized: (1) Shelterbelts, which main purposes are to redirect wind, reduce wind speeds, and reduce erosion (Gold & Garrett; 2009; Tyndall & Colletti, 2007); (2) Timber belts that are implemented mainly to increase the value of forestry components (Gold & Garrett, 2009); and (3) Hedgerows, used to enclose or separate fields (Burel, 1996). *Alley cropping* is the incorporation of high-value tree species, in single or multiple rows, in the alleyways between agricultural or horticultural crops (Gold & Garrett, 2009). *Forest farming* is designed to provide appropriate microclimate conditions to cultivate high-value specialty crops under the protection of a forest overstory (Gold & Garrett, 2009). *Silvopasture* integrates trees with forage

(pasture) and livestock; it can also be achieved by adding or improving a forage component to an existing forest system (Gold & Garrett, 2009; Sharrow, Brauer, & Clason, 2009). As compared to alley cropping and forest farming which combine trees and crops, silvopasture is a more complex form as it deliberately integrates three agricultural components: trees, forage (pasture), and livestock (Sharrow et al., 2009). It is worth mentioning that *Special Applications* is a sixth type of agroforestry practice which involves the management of trees/shrubs for solving special concerns (e.g., disposal of animal wastes, filtering irrigation tail water) while producing a short- or long- rotation woody crop (Schoeneberger, 2009).

Agroforestry and Agritourism

Evidence suggests synergies between agroforestry practices and the recreational enjoyment of the farmland (Barbieri & Valdivia, 2010a; 2010b). The multiple environmental benefits of agroforestry, especially in terms of landscape beautification, increases the farmland capacity to provide recreation services for farm household members and others (Barbieri & Valdivia, 2010a), including agritourism. Agritourism is the recreational use of agricultural private lands, such as farms and privately-own forests (Che, Veeck, & Veeck, 2005; Wicks & Merrett, 2003; Sotomayor, 2011). This growing segment of the tourism industry has emerged as a form of economic diversification, landscape preservation, and conservation of natural resources (Che et al., 2005; Che, 2007; Wicks & Merrett, 2003). In fact, the appeal of rural living for relaxation and recreational purposes, the increased demand for amenity countryside uses, as well as

desire to fill the generational gap between rural and urban families, are enlarging the potential market for agritourism (Che et al., 2005; Che, 2007; Wicks & Merrett, 2003).

Agritourism is considered a type of agricultural enterprise diversification as it is mainly being developed to respond to new market opportunities and adjust farms to existing challenging agricultural contexts (Barbieri, Mahoney, & Butler, 2008; Nickerson, Black, & McCool, 2001). By providing a diversity of recreation and educational experiences to the public, farmers can directly increase their revenues (e.g., activity or entrance fees), as well as indirectly, by increasing their sales for their other farm products and services, thus serving as a potential cushion against agriculture income fluctuations (Barbieri & Mahoney, 2009; Barbieri & Mshenga, 2008; Brown & Reeder, 2007; Che et al., 2005; Fleischer & Tchetchik, 2005; Marks, Polucha, Jaszczak, & Marks, 2009; Nickerson et al., 2001; Telfer & Wall, 1996; Tew & Barbieri, 2011; Wicks & Merrett, 2003). Moreover, mainly because of those economic benefits, agritourism has gained a strong appeal to government agencies, which provide several types of incentives to existing businesses and to those farms willing to diversify into agritourism (Che, 2007; Wicks & Merrett, 2003).

Although economic benefits (e.g., increased revenues, expanded market share) play an important role driving agritourism development, evidence suggests that those are not the only benefits that farmers seek (Barbieri & Mahoney, 2009; Che, 2007; Nickerson et al., 2001; Ollenburg & Buckley, 2007). Farm families may decide to develop agritourism, irrespective of income considerations (Cánoves, Villarino, Priestley, & Blanco, 2004; Hall & Rusher, 2004; Hogh, 2001; Nickerson et al., 2001). For example, one study conducted in Australia showed that social motivations are marginally more

important overall economic ones such as the pursuit of rural/farm lifestyle (Ollenburg & Buckley, 2007). Other possible motivations might evolve from farmers‟ interests or hobbies (Nickerson et al., 2001; Young & Welsch, 1993). A study conducted in Missouri concluded that agritourism serves to accomplish economic and market related goals, as well as those more related to family and personal pursuits (Tew & Barbieri, 2012).

Besides the benefits associated with the providers (farmers and their farms), agritourism can also bring a range of societal benefits, including those derived from the recreation participation of those seeking rural experiences (Brown & Reeder, 2007; Nickerson et al., 2001) as well as environmental benefits such as the maintenance of cherished and picturesque rural landscapes, the preservation of cultural agriculture heritage, and the conservation of natural resources and amenities (Brown & Reeder, 2007; Che et al., 2005). Additional societal benefits include the education of the public about food production, support of distinctive regional agricultural products, stimulation of the local economy, improvement of the living conditions in rural areas, and employment generation to local people (Busby & Rendle, 2000; Brown & Reeder, 2007; Che et al., 2005; Marks et al., 2009; Nickerson et al., 2001; Oppermann, 1995). Given the breadth of benefits of this form or recreation, agritourism is especially used as a policy instrument in Europe and North America to rejuvenate regional economics and preserve local heritage and landscape (Busby & Rendle, 2000; Morris, 2006; Ollenburg & Buckley, 2007; Paquette & Domon, 2003).

Study Purpose and Research Objectives

The purpose of this study is to assess residents‟ perceptions of the visual appeal of agroforestry landscapes for recreational purposes in Missouri, Pennsylvania and Texas. Two dimensions of the agroforestry landscapes are examined: 1) the *structure* in terms of the visual appearance of the landscape features (e.g., trees, livestock); and 2) the *function* in terms of perceived benefits.

Specifically, this study addresses the following objectives:

1. To identify the features of agroforestry landscapes that are more visually appealing to visit a farm for recreational purposes;
2. To assess the perceived benefits of agroforestry landscapes;
3. To compare residents‟ preferences of agroforestry landscapes features (e.g., trees) across respondents with different states of residence, gender, levels of exposure to agritourism (i.e., whether they have visited a farm for recreational purposes in the past), and relationships with a farm or forested land (i.e., whether they live or have lived on a farm or forest).
4. To contrast residents‟ perceived benefits of agroforestry landscapes across respondents with different states of residence, gender, levels of agritourism experience (i.e., whether they have visited a farm for recreational purposes), and relationships with a farm or forested land (i.e., whether they live or have lived on a farm or forest).

Study Justification

Previous studies have assessed the several economic and eco-physical values of agroforestry concluding that its adoption would benefit overall society as it provides a more sustainable land use management (Benayas, Bullock, & Newton, 2008; Gold & Garrett, 2009; Lassoie et al., 2009). Agritourism has also been suggested to benefit rural societies, especially helping farmers to remain in business, maintain their farmlands, and satisfy their entrepreneurial goals (Barbieri & Mahoney, 2009). Although agroforestry has been associated to the recreational function of the farm (Barbieri & Valdivia, 2010a, 2010b), there is a dearth of knowledge on residents‟ preference of the visual appeal of agroforestry landscapes for agritourism purposes. This lack of information is consistent with an overall limited understanding of the role of natural resources on human behaviors as compared to the influence of humans on the natural resource (e.g., how to limit visitors to protect a natural resource) as Henderson and Bialeschki (2005) suggest.

A better understanding of residents‟ preference of the visual appeal of agroforestry landscapes for agritourism purposes is needed given the increasing popularity of agritourism as a means to alleviate farmers‟ economic distress and the need to increase agroforestry adoption due to its low environmental impacts. Besides filling a gap in the literature of both, agroforestry and agritourism disciplines, this study also carries useful practical implications for farmers. Firstly, results can facilitate the recognition of agroforestry as a competitive advantage to develop agritourism, thus encouraging farmers to adopt agroforestry, which in turn brings manifold benefits to society (e.g., carbon sequestration, biodiversity conservation). Study results may also help farmers to increase the on-farm direct sale of their products by better promoting their

agroforestry farms as a recreational destination. Finally, study results provide farmers involved in agritourism with information on how to enhance the visual appeal of their farmlands based on consumers‟ preferences.

Definitions

Agricultural Multifunctionality: In the broader sense, agricultural multifunctionality recognizes that agriculture is not limited to the role of producing food and fiber, but it has the capacity to produce many other functions, such as the conservation of landscapes and biodiversity, contribution to the socio-economic viability of rural areas, provision of recreational opportunities (Renting et al., 2009).

Agritourism: Although there is not an agreed definition of agritourism, it is mostly understood as visiting a working farm or any other agricultural setting for the purpose of enjoyment, education, or active involvement in the operation‟s activities (Barbieri & Mshenga, 2008; Barbieri & Mahoney, 2009; Che, 2007; Desmond, 2010; Lobo, 2011).

Agroforestry: An intensive and integrated land-use management in which trees or shrubs and agricultural crops or livestock are intentionally combined (Gold & Garrett, 2009; Erdmann, 2005).

Agroforestry Landscape: Based on the definition of agricultural landscape provided by Vanslembrouck & Van Huylenbroeck (2005), this study defines agroforestry landscape as the visible outcomes derived from the complex interactions between agroforestry

practices and the environment, which includes its structure (i.e., features) and its functions (i.e., benefits).

CHAPTER II:

LITERATURE REVIEW

Agroforestry systems have been examined from several approaches (e.g., ecological, agricultural). Within the social sciences, agricultural multifunctionality is one approach usually used to explore the complexity of benefits derived from agroforestry (Benayas et al. 2008; Gold & Garrett, 2009; Lassoie et al., 2009; Pandey, 2007; Schoeneberger, 2009; Tyndall & Colletti, 2007). Agricultural landscapes are usually examined in relation to their structure (i.e., features) and their functions (i.e., benefits). Thus, this chapter reviews the agricultural multifunctionality and agricultural landscapes as theoretical frameworks supporting this thesis research.

Agricultural Multifunctionality

The concept of agricultural multifunctionality, addressed in the Agenda 21 documents of the Rio Earth Summit in 1992 (UNCED, 1992), is a useful conceptual framework to examine the mixture of functions that lands provide to society when optimally allocated (Jongeneel, Polman, & Slangen, 2008). Agricultural multifunctionality recognizes that agriculture is not limited to the role of producing food and fiber, but may also serve many other functions, such as renewable natural resources management, conservation of landscapes and biodiversity, and contribution to the socio-economic viability of rural areas (Renting et al., 2009). In this sense, agricultural multifunctionality focuses on the production of both agricultural commodities and a range of ecological services (Jordan & Warner, 2010), while balancing issues related to

the allocation of private (e.g., food and fiber) and public goods (e.g., recreational opportunities) of agricultural landscapes (Mander, Wiggering, & Helming, 2007).

Wilson (2007) developed the normative conceptualization of multifunctionality, suggesting that [agricultural] productivist and non-productivist action as well as thought is bounded by a complex transition within a continuum from weak to strong multifunctionality pathways. Thus, farms can be placed along the productivist/non-productivist multifunctionality continuum, a placement that is transitional as they have the capacity to advance towards stronger multifunctionality. This transition towards strong multifunctionality is especially important for small farmers as economic challenges are making them reduce their farming activity and „deepen" on entrepreneurial diversification activities (Wilson, 2008). Transitioning to strong multifunctionality also has significant implications for various stakeholders who see „farming" and „agriculture" as systems going beyond food and fiber production to welcome other entrepreneurial ventures, such as agritourism, hoping to revitalize rural communities (Wilson, 2008).

Agricultural multifunctionality is used as a theoretical framework for this study as both agroforestry and agritourism maximize the use of the farmland, thus increasing agricultural multifunctionality (Benayas et al., 2008; Barbieri & Valdivia, 2010b; Gold & Garrett, 2009; Lovell et al., 2010; Pandey, 2007). Agricultural multifunctionality facilitates the provision of recreation amenities and environmental quality (Renting et al., 2009) by providing a landscape that is valued for its aesthetics and recreational opportunities (Vanslembrouck & Van Huylenbroeck, 2005). Furthermore, Barbieri and Valdivia (2010a) found that recreational opportunities are supported by agroforestry practices as they found positive associations between the perceived economic and non-

economic benefits of agroforestry and the recreational use of the farmland among landowners in Missouri (Barbieri & Valdivia, 2010a).

Agricultural Landscapes

Agricultural landscapes are the visible outcomes (e.g., amenity, cultural, and other societal values), derived from the interaction between agriculture, natural resources, and the environment (OECD, 2001). Specifically, agricultural landscapes are composed of three dimensions: structure, function, and value as depicted in figure 1 (OECD, 2001).

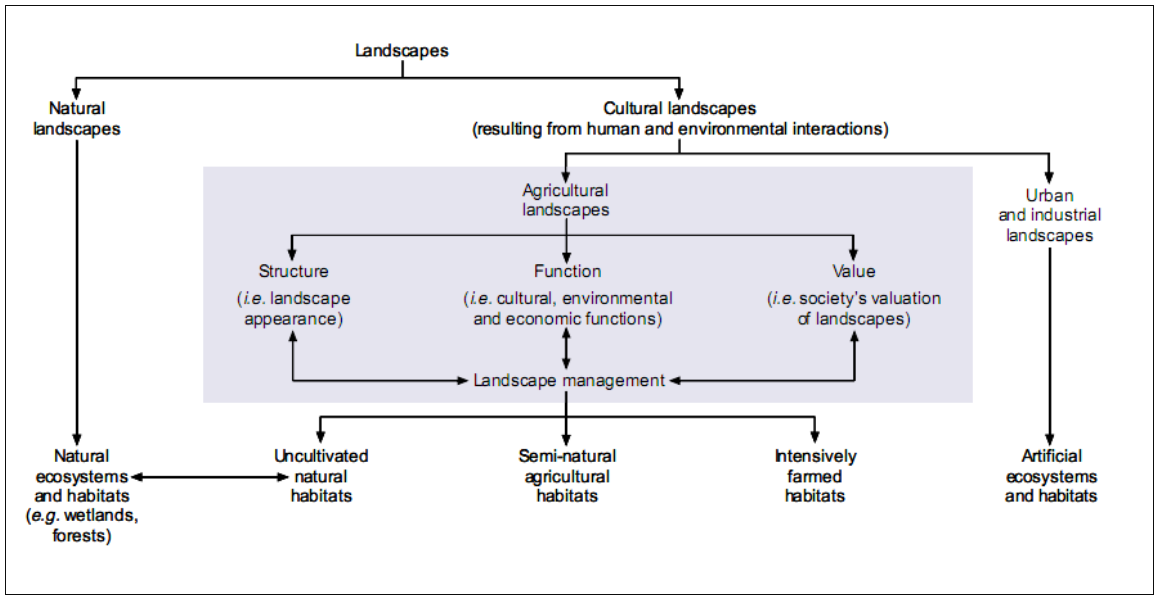

Figure 1. Defining Natural and Cultural Landscapes (OECD, 2001)

Structure is the visual appearance of the landscapes which is composed by environmental/natural features (e.g., natural habitats), types of agricultural land use (e.g., crops, livestock), and cultural –man made- features (e.g., barns, hedges; OECD, 2001). *Function* refers to the several cultural, environmental and economic functions that the

agricultural landscapes provide, such as production of food and fiber, recreation, and environmental services (OECD, 2001). *Value* refers to the economic assessment of the landscapes, including their maintenance costs (for farmers) as well as society‟s valuation (OECD, 2001).

As the study aim is to examine the perceptions of agroforestry landscapes from residents‟ perspectives, this study only focuses on the landscape structure and function, but not on the value dimension which is mainly in terms of providers‟ (farmers‟) perspectives. According to Buck, Lassoie and Fernandes (1999), trees incorporated through agroforestry practices are important elements of the agricultural system itself in both farmlands and forests. In view of the relationship between agroforestry and recreation, this thesis will examine the landscape structure of agroforestry as a facilitator of agritourism, and agroforestry functions measured in terms of perceived benefits.

The Landscape Structure: The Role of Agroforestry Landscapes in the Recreational Offer

The landscape structure is the features of the landscape, and composed by three elements: physiognomy, composition, and ecological connectivity (Taylor, Fahrig, Henein, & Merriam, 1993). Both landscape physiognomy and composition measure the distribution of resource patches in a landscape while landscape connectivity refers to the degree to which the landscape facilitates or impedes movement among resource patches (Dunning, Danielson, & Pulliam, 1992; Taylor et al., 1993). The visual appearance of agricultural activities plays a key role in the decision-making process for visiting rural areas (Vanslembrouck & Van Huylenbroeck, 2005). According to Tyndall and Colletti

(2007), rural tourists are more likely to accept well-landscaped farm operations, especially those in which certain agricultural elements (e.g., trees, hedgerows, forest) exist within the farming context (e.g., animals in the fields, crop variability).

The combination of natural and environmental features existing within the complex structure of agricultural landscapes (see Figure 1) can be schematized in three types of features: natural features, agricultural features, and cultural features (OECD, 2001). The *Natural Features* of the agricultural landscape structure are composed and shaped by their biodiversity (e.g., flora, fauna), habitats (e.g., wetlands, forests), and biophysical elements, including its geology, terrain, soils, climate and hydrology (OECD, 2001; Vanslembrouck & Van Huylenbroeck, 2005). Including natural features in the assessment of landscapes is important as it has been suggested that the visual quality of the rural scene largely depends on the degree of wilderness of the landscape, the percentage of plant and vegetation cover, closely followed by availability of water resources and color contrast (Arriaza, Cañas-Ortega, Cañas-Madueño, & Ruiz-Aviles, 2004). Specifically regarding agroforestry practices, Grala et al. (2010) indicated that windbreaks play an important role in diversifying the visual appearance of agricultural landscapes by improving the aesthetics and enhancing the recreational opportunities of the farmland. In a similar way, Tyndall and Colletti (2007) suggested that besides being visually pleasing, the use of shelterbelts can become a possible solution to minimize odor problems, thus making the farmland more appealing for visitors.

The *Agricultural features* are defined by the type(s) of agricultural land use included in a farmland. Throughout the years, the countryside lands have been shaped by different types of occupation and uses (including no-use) of the lands, such as forestry,

agriculture, and urbanization (Vanslembrouck & Van Huylenbroeck, 2005). From those, the practice of farming has played the major role in shaping the visual appearance of the agricultural landscape (OECD, 2001), either by growing commodity or specialty crops, trees and shrubs, or raising livestock (Vanslembrouck & Van Huylenbroeck, 2005).

The *Cultural Features* of agricultural landscapes result from the interaction between human activity (including farmland uses) and the environment (Vanslembrouck & Van Huylenbroeck, 2005). Well-preserved man-made features, such as farm buildings and structures, have been suggested to be the most important element associated with the visual quality of rural landscapes, thus the need to evaluate them in landscape assessments and to include them as a rural development tools when planning the modernization of rural areas (Arriaza et al., 2004). Several examples of cultural features in agricultural landscapes are found in the literature, including farm-related buildings and structures such as barns and storage sheds, and farm mechanization features such as tractors and windmills (Vanslembrouck & Van Huylenbroeck, 2005). On-farm value-added processes, including the production of food and beverages (e.g., wines, jellies, cheese), crafts (e.g., soaps, yarns, ornaments), as well as the special packaging (e.g., gift baskets) of agriculture products may also contribute to the cultural features of the agricultural landscape (Barbieri & Mahoney, 2009; Barbieri et al., 2008).

Although from an academic perspective, the three features (natural, agricultural, cultural) of the agricultural landscape structure can be identified, such separation is not so readily feasible on-the-ground. Given the complexity and diversity of the agricultural landscape, there are synergies among those features. For example, agricultural features not only shape the visual appearance of the landscape, but also influence the ecological

diversity and conservation of the farmland (e.g., species distribution and movement); different levels of biodiversity depend on the intensity of agricultural land uses (Fu & Chen, 1996; Hendrickx et al., 2007). Specifically in Europe, where agricultural landscapes cover the vast majority of non-urbanized areas, the persistence of structurally diverse agricultural landscapes has been associated with biodiversity conservation (Hendrickx et al., 2007).

Although some studies have suggested that agroforestry practices can enhance the visual appeal of a farm for recreational purposes (Barbieri & Valdivia, 2010b; Grala et al., 2010; Lovell et al., 2010; Tyndall & Colletti, 2007), to the extent of our knowledge, no studies have comprehensively assessed residents‟ preferences of natural, agricultural and cultural features of agroforestry landscapes for engaging in agritourism activities.

The Landscape Functions: A Review of the Benefits of Agroforestry

Agricultural landscapes produce a variety of functions (Vanslembrouck & Van Huylenbroeck, 2005), which can be understood as the benefits. Specifically, agroforestry landscapes produce a diversity of benefits, ranging from those related to the farm agricultural ecosystem to those reaching the broader society and their economies (Lassoie et al., 2009). Thus, agroforestry is frequently recognized as a sustainable management practice (Gold & Garrett, 2009) that facilitates farmland transition to strong multifunctionality (Barbieri & Valdivia, 2010b). It is important to recognize that agroforestry benefits do not operate in isolation, but they occur under a series of inter-relations and interactions (Gold & Garrett, 2009; Lassoie et al., 2009). For example, the physical benefits of windbreaks (i.e., reduced wind speed) play an intermediate role for

economic benefits because the protection of crops can potentially increase agriculture revenues and also social benefits such as carbon sequestration (Gold & Garrett, 2009; Benayas et al., 2008; Lovell et al., 2010).

Agroforestry produces eco-physical (i.e., physical, biological, ecological), economic, and social benefits (Benayas et al. 2008; Gold & Garrett, 2009; Lassoie et al., 2009). From the perspective of wild land recreation management, these benefits also fall in the range of benefits-based management (BBM) framework of leisure and amenity goods and services. The BBM framework seeks to understand not only individual beneficial experiences, but also those benefits that accrue to the society, the economy and the environment from the provision of public recreation opportunities (Anderson, Nickerson, Stein, & Lee, 2000).

One of the main agroforestry benefits, and the ones most studied, relates to its *Eco-Physical* (i.e., ecological and environmental) benefits. Agroforestry can be an effective and important tool to maintain ecosystem diversification and enhance biodiversity (e.g., increased wildlife), thus contributing to the sustainable use of the farmland (Gold & Garrett, 2009). For example, forest farming as compared to traditional grasslands and croplands, improves forest health by increasing biological diversity and more active management of forest resources (Benayas et al., 2008; Chamberlain et al., 2009; Gold & Garrett, 2009). Forest farming also maintains soil quality by retaining nutrients, increases agricultural productivity by reducing erosion, and improves water quality (Benayas et al., 2008; Gold & Garrett, 2009; Lassoie et al., 2009; Pandey, 2007). The incorporation of trees into farms also mitigates greenhouse gas emissions, as it

augments carbon sequestration on agricultural lands (Pandey, 2007; Schoeneberger, 2009).

Soil fertility enhancement, water conservation, and complex landscape structures produced by agroforestry also contribute to integrated biological pest management (Benayas et al., 2008; Gold & Garrett, 2009; Lassoie et al., 2009; Pandey, 2007). Specifically, windbreaks have been suggested as a pesticide alternative technology to mitigate the effects of pesticide drifts (Ucar & Hall, 2001). In turn, the reduced need of chemicals (e.g., fertilizers, pesticides) in agroforestry landscapes leads to a more eco-friendly society (Lassoie et al., 2009). Shelterbelts located near and within livestock facilities, are recognized as a potential long-term and low-cost approach to biophysically deal with livestock odor (Tyndall & Colletti, 2007).

Agroforestry is also suggested to produce economic benefits, through the reduction of production costs and the increase of farm profitability (Benayas et al. 2008; Gold & Garrett, 2009; Lassoie et al., 2009; Raedeke et al., 2003). Regarding the reduction of costs, the intensive management of trees can decrease the need for chemicals (e.g., natural control of agricultural pests), water, energy, labor, among other production inputs (Benayas et al., 2008; Lassoie et al., 2009; Raedeke et al., 2003). Plantings trees and shrubs on agricultural lands can also provide shelter for animals and crops, and even forage for livestock (Benayas et al., 2008; Raedeke et al., 2003). Being an intensive land management practice, agroforestry lands can have a lower total costs per unit of woodlands as compared to extensive reforestation programs (Benayas et al. 2008).

Agroforestry can also increase the net value of production through the diversification of crops and other farm outputs including fuelwood (Cable, 1999;

Chamberlain et al., 2009; Gold & Garrett, 2009; Lassoie et al., 2009). For example, silvopasture not only creates cash flow from the livestock management in the short-term, but it also accumulates farm value from the timber management in the long-run (Gold & Garrett, 2009; Sharrow et al., 2009). Agroforestry also contributes to the total farm production by increasing the production area above and below ground space especially for high-value products, thus enhancing farm economic efficiency and income diversification (Gold & Garrett, 2009; Schultz et al., 2009).

Finally, agroforestry is suggested to produce an array of societal benefits, including the yield of goods (e.g., fiber, fuelwood) to society, life quality improvement in farming regions, increased local employment opportunities, provision of educational resources, upgrade of landscape aesthetics and biodiversity (e.g., increase wildlife), and the functional connectivity of rural landscapes (Benayas et al., 2008; Burel, 1996; Che et al., 2005; Cable, 1999; Gold & Garrett, 2009; Lovell et al., 2010; Schultz et al., 2009). Agroforestry has also been suggested as an option to control urban sprawl (Francis, Bentrup, Schoeneberger, & DeKalb, 2003).

Especially important for the development of this study, the practice of agroforestry can enhance the provision of recreational opportunities. Barbieri and Valdivia (2010a) found that the recreational use of the land by landowners and their visitors is positively associated with their perceived knowledge and willingness to adopt agroforestry practices. Furthermore, this study also concluded that the higher the perception that landowners have of the economic and non-economic benefits of agroforestry, the more they use their lands for recreational purposes. Similarly, the BBM framework suggests that settings have an important role in the personal benefits that

recreationists perceive; based on the setting visited, individuals perceive attaining different benefits from their participation in one recreation activity participation (Anderson et al., 2000). Overall, treed habitats contribute to the visual quality of the landscape facilitating nature appreciation and relaxation to the public, and support various types of recreational activities, including hiking, hunting, skiing, and bird watching (Lovell et al., 2010; Schultz et al., 2009).

Studies have also concluded that specific agroforestry practices do influence recreational opportunities on rural areas. According to Schultz et al. (2009), riparian and upland buffers can provide manifold recreational activities such as fishing and hunting, canoeing and boating, hiking, camping and picnicking, and even support trekking, cycling and motor biking when maintained trails are available. On these lines, Kenwick, Shammin, and Sullivan (2009) found that vegetation buffers in riparian zones are highly preferred by people in the U.S. Midwest. Windbreaks and shelterbelts enhances the scenic beauty and habitats, providing both the consumptive (e.g., hunting) and non-consumptive (e.g., hiking, bird watching) enjoyment of wildlife (Cable, 1999; Kulshreshtha & Kort, 2009). Similarly, the conservation of habitats and wildlife derived from alley cropping enhances recreational hunting opportunities for landowners (Garrett, McGraw, & Walter, 2009).

Although there is evidence that agroforestry provides a wide range of bio-physical, economic, and social benefits to landowners and society overall, there is a dearth of studies regarding the awareness of such benefits among the public. In addition, it is yet to unveil whether those perceptions differ among different segments of residents. Exploring perceptions among different segments of consumers is important to understand

tourists‟ behavior and to develop marketing strategies in the tourism destination (Lepp & Gibson, 2003). Examining residents across different areas is also important as they may have different perceptions due to dissimilar tourism development levels in their residence. For example, a study conducted in Hawaii, North Wales, and Istanbul found that residents have more awareness of both positive and negative environmental impacts in areas with a more mature tourism industry (Liu, Sheldon, & Var, 1987). Previous studies have found that landowners have stronger concerns regarding the impacts of tourism development on the conservation of their forest lands (Dolisca, McDaniel, & Teeter, 2007), suggesting that relationships with agricultural settings should be taking into account when examining perceptions related to tourism.

CHAPTER III:

RESEARCH METHODS

This non-experimental exploratory study is designed to collect quantitative data on the features of agroforestry landscapes and the perceived benefits of agroforestry among three panels of residents from Missouri, Pennsylvania and Texas using a web-based instrument. This chapter presents the research methods and procedures used in this study, including participants‟ selection, survey instrument and procedures, and statistical analysis.

Participants' Selection: The Residents' Panel

Considering the exploratory nature of this study, and to ensure a minimum sample size for statistical analysis within a limited budget, this study surveyed three non-random panels of residents from Missouri (n = 250), Pennsylvania (n = 250), and Texas (n = 250). These panels included participants from different genders, ages and income levels; the panels were purchased from Sampling Survey International (SSI), a marketing agency specialized in world-wide research systems. Decision on the nature (i.e., non-random) and size of the sample (n = 250 per state) was made based on economic (i.e., price) and statistical considerations.

To select the three states included in the study, all 50 states in the U.S. were examined to identify states that would fit, in order, the following criteria: 1) represent different levels of agritourism development; 2) be located in different regions to control for landscape variations; and 3) share similar agricultural (e.g., land use, farm size

distribution) and demographic (e.g., education level; age distribution) characteristics. Such process resulted in the selection of Missouri, Pennsylvania, and Texas, which fulfill those three criteria as explained below.

Firstly, and most importantly given the agritourism purpose of this study, Missouri, Pennsylvania, and Texas represent three different levels of agritourism development. Two main criteria were used to evaluate their level of agritourism development: average percent of income derived from agritourism related activities that farms in such state receive; and percent of farms in the state reporting agritourism-related income. Overall, Missouri has the lowest agritourism development level among the three states; only 2.9% of the state farm sales come from agritourism related operations and the 588 farms offering agritourism activities represent less than one percent of the total number of farms in the state (Table 1). In contrast, Texas enjoys the highest level of agritourism development among them; the 2.2% of Texas farms (n = 5,322) offering agritourism activities reported on average that 16.5% of their income is associated with those operations. Pennsylvania represents a moderate agritourism with 552 farms (0.9%) engaged in agritourism, reporting on average 7.6% of agritourism sales.

Table 1. Summary of agritourism development in Missouri, Pennsylvania and Texas [a]

Indicators of Agritourism Development	**Missouri**	**Pennsylvania**	**Texas**
Percent of Income from Agritourism	2.9%	7.6%	16.5%
Number of Farms with Agritourism Income	588	552	5,322
Percent of Farms with Agritourism Income	0.6%	0.9%	2.2%
Agritourism Development Level (Qualitative Assessment)	Low	Moderate	High

[a] Developed based on Agritourism statistics provided by the 2007 Census of Agriculture (USDA, 2007)

Table 2. Summary of geographic, agricultural and ecological differences in Missouri, Pennsylvania and Texas

Descriptors	Missouri	Pennsylvania	Texas
Geographic Descriptors[a]			
U.S. Geographic Region	Midwest	Northeast	South
Agricultural Descriptors			
Agricultural Region [b]	Corn Belt	Northeast	Southern Plains
Number of Farms [c]	107,825	63,163	247,437
Average farm size [c]	269 acres	124 acres	527 acres
Ecological Descriptors[d]			
Ecological Region	VII	III	VI
Number of Ecoregions (Level III)	7 regions	11 regions	12 regions

[a] U.S. Census Bureau (2007)
[b] USDA (2011)
[c] USDA (2007)
[d] USEPA (2011)

Secondly, Missouri, Pennsylvania, and Texas are located in different geographic, agricultural, and ecological regions (Table 2). Missouri, geographically located in the Midwest, belongs to the Corn Belt, a region characterized by a rich soil and good climate favoring the production of feed grains, soybeans, wheat, corn, beef, cattle, hogs, and dairy products (USDA, 2011). Pennsylvania belongs to the Northeastern agricultural region, one of the Nation‟s principal milk producing areas, which has suitable climate and soil for raising grains and forage for cattle and for providing pasture for grazing (USDA, 2011). Texas stands in the Southern Plains region, mainly producing cotton (USDA, 2011). The different geography and size of those states shape the number and size of their farms. Pennsylvania (the smallest among those states) has 63,163 farms averaging 124 acres, while Texas (the largest) includes 247,437 farms with an average farm size of 527 acres. These three states are also very diverse on their ecological composition in terms of number of eco-regions (i.e., landscapes), which is very important

for the purpose of this study because may suggest that their residents are not attached to a specific landscapes representation or image.

Thirdly, those states share similar agricultural characteristics in terms of farm size distribution (Table 3). About 40% of their farms are defined as small farms (less than $200,000 annual sales), while less than 15% are classified as large farms (more than $1,000,000 annual sales). Additionally, Missouri, Pennsylvania and Texas are somewhat comparable on the agricultural use of their total state acreage. At least 20% of their total land is dedicated to agricultural use, especially for growing crops, suggesting that agricultural landscapes are commonly observed. The percent of land dedicated to grassland is also very similar in Missouri (8.4%) and Texas, while Missouri (5.7%) and Pennsylvania (5.3%) have very similar forest (woodlands not dedicated to pasture) coverage (USDA, 2007).

Table 3. Summary of agricultural similarities in Missouri, Pennsylvania and Texas

Agricultural Descriptors	**Missouri**	**Pennsylvania**	**Texas**
Farm Size Distribution [a]			
Small (Less than US$ 200,000)	38.1%	29.1%	40.8%
Medium (US$ 200,000 – 999,999)	52.0%	56.1%	44.6%
Large (At least US$ 1M)	13.9%	14.8%	14.6%
Percent of Agricultural Use [b]			
Cropland	29.1%	13.4%	11.2%
Grassland	8.4%	1.9%	7.7%
Woodland for wood sale	5.7%	5.3%	1.1%

[a] USDA (2007)

[b] Percent of land from total state acres (in size) dedicated to different agricultural uses (USDA, 2007; U.S. Census Bureau, 2007).

Finally, the three study states have similar demographic composition in terms of age distribution, race, education level and income (Table 4). The majority of those three

states‟ residents are 45 years old or younger and they are predominantly white (Table 4). About a quarter of residents of Missouri (24.0%), Pennsylvania (25.7%) and Texas (25.2%) have at least a bachelor‟s degree; they are also comparable in terms of per-capita income (MO= US$ 23,026; PA = US$ 24,591; TX= US$ 22,216) and median household income (MO= US$ 41,974; PA = US$ 44,537; TX = US$ 42,139).

Table 4. Summary of demographic characteristics in Missouri, Pennsylvania and Texas [a]

Demographic Characteristics	Missouri	Pennsylvania	Texas
Age Distribution			
Under 25 years	34.0%	32.2%	38.3%
25 – 44 years	27.5%	26.2%	29.5%
45 – 64 years	25.2%	26.4%	22.4%
65 years or older	13.3%	15.2%	9.9%
Race			
White	85.4%	86.0%	83.2%
Non-white	14.6%	14%	16.8%
Ethnicity			
Hispanic/Latino Origin	2.7%	4.1%	35.1%
Education Level			
Percent of bachelor‟s degree or higher	24%	25.7%	25.2%
Income (in US $)			
Median household income	41,974	44,537	42,139
Per capita income	23,026	24,591	22,216

[a] U.S. Census Bureau (2007)

Survey Instrument and Variables Measurement

A web-based questionnaire addressing the study objectives was developed based on the literature reviewed (Barbieri & Valdivia, 2010a; 2010b; Gold & Garrett, 2009; Lovell et al., 2010; OECD, 2001). The questionnaire collected information on past visitation to farms for recreational purposes, preferences of recreational activities in a

farm, perceptions of the visual appearance of agroforestry landscapes and their features, perceptions of agroforestry benefits, and socio-demographic characteristics of respondents. Specifically, the instrument was organized in five topic sections. The first topic section related to farm visits for recreation purposes and included questions aimed to gather information on respondents‟ past recreational experiences (e.g., whether they have visited a farm for recreational purposes, visitation frequency) and willingness to visit a farm in the next 12 months. The second topic section inquired about respondents‟ preferences of different types of recreational activities engaged during their visitation using a five-point Likert scale (1 = Dislike Very Much; 5 = Like Very Much); types of recreational activities included in the instrument were selected to represent a variety of activities found in the literature (Aguilar & Barbieri, in review; Barbieri & Mahoney, 2009; Phillip et al., 2010; Tew & Barbieri 2012; Cordell, 2004).

The third topic section focused on the preferences for 15 natural, agricultural and cultural features that are commonly present on agricultural and agroforestry landscapes (OECD, 2001), thus visitors might encounter when visiting farms for recreation (e.g., wildlife; farm-related buildings). Five-point Likert scales anchored in “Like Very Much” and “Dislike Very Much” were used to rate respondents‟ preferences of the agricultural landscape features. Table 5 summarizes the landscape features most commonly found in the literature organized by dimensions (natural, agricultural, cultural) and the items included in the survey instrument to operationalize such features.

Table 5. Natural, agricultural and cultural features of the landscape found in the literature and their operationalization items

Literature	Questionnaire Items
Natural Features	
1. Biodiversity	1. Wildlife (deer, birds, quail, etc.)
2. Natural resources	2. Native plants, flowers or grasses
3. Natural habitats	3. Water resources (lake, creek, etc.)
	4. Wetlands (swamps or marshes, etc.)
	5. Forests
Agricultural Features	
1. Commodity crops	1. Intensive one-crop farm (corn farm, wheat farm, etc.)
2. Specialty crops	2. Variety of specialty crops (vineyards, mushrooms, herbs, etc.)
3. Livestock	
4. Trees and shrubs	3. Grassland and pastures (grasses, hay, etc.)
	4. Farm animals (cattle, horses, goat, chicken, alpaca, etc.)
	5. Planted trees or shrubs (pecan or apple trees, berries, etc.)
Cultural Features	
1. Buildings and structures	1. Farm-related buildings (barns, storage sheds, silo, etc.)
2. Mechanization	2. Farm equipments (tractors, windmill, etc.)
3. Value-added processes	3. Petting zoos, corrals or stalls
	4. Historic features (log cabins, antique tractors, artifacts, etc.)
	5. Trails (walking, biking, etc.)

To better capture the preferences of agricultural landscapes, respondents were presented with a series of images portraying six different types of agricultural and agroforestry landscapes, and asked to rate them using five-point Likert scales anchored in "Like Very Much" and "Dislike Very Much". Each series had a unique landscape theme constructed with three different pictures; selection of different pictures was intended to provide a clear representation of each type of landscape. Using three different pictures in each series helped to control for biases associated to picture quality; as to control for within-series biases, pictures within each series had the same size (width and height).

Table 6. Identification number, label and visual representation of the six series of agricultural and agroforestry landscapes included in the survey instrument

ID	Label	Visual Representation
Series 1	Intensive Monoculture	
Series 2	Diversified Specialty Crops	
Series 3	Grassland	
Series 4	Farm Animals	
Series 5	Trees and Shrubs	
Series 6	Agroforestry	

Series 1 was labeled “Intensive Monoculture” and their pictures portrayed three different landscapes with one type of crop. Series 2, named “Diversified Specialty Crops”, included pictures portraying landscapes with a diversity of specialty crops. Series 3 was labeled “Grassland” and included three pictures with different types of pastured

landscapes. Series 4 was labeled “Farm Animals” as their pictures displayed landscapes featuring three types of animals commonly raised in American farms (horses, cattle and goats). Series 5, labeled “Trees and Shrubs”, portrayed pictures of trees or shrubs in a farm landscape. Series 6 was labeled “Agroforestry” and their pictures portrayed three different agroforestry landscapes combining crops with shrubs, crops with trees, and livestock with trees. Table 6 displays the six series of agricultural and agroforestry landscapes included in the survey instrument, detailing the image identification number, (ID), label, and their visual representation.

The fourth survey topic inquired about the perceived benefits of agroforestry as compared to those produced by conventional farms (i.e., not engaged in agroforestry) using a scale ranging from negative 2 (-2 = “Conventional Farms are Much More Important”) to positive 2 (2 = “Agroforestry Farms are Much More Important”), with zero (0) as the neutral point. The 14 benefits included in the instrument were selected to represent the eco-physical (e.g., protect natural ecosystems and wildlife, reduce the overall use of chemical use) and socio-economic (e.g., provide recreational activities and opportunities, create jobs in rural areas) benefits most commonly cited in the literature (e.g., Gold & Garrett, 2009; Lassoie et al., 2009; Pandey, 2007). Table 7 includes the eco-physical and socio-economic benefits of agroforestry most commonly cited in the literature and the benefits included in the survey instrument to operationalize such benefits. The last section collected socio-demographic information of respondents (e.g., age, gender, employment status, relationship to a forested or farm land, residence distance from a 50,000 population area). Appendix A includes the survey form.

Table 7. Eco-physical and socio-economic benefits of agroforestry found in the literature and their operationalization items

Benefits in the Literature	Questionnaire Items
Eco-physical Benefits	
1. Maintenance of ecosystem diversification with biodiversity enhancement **2.** Contribution to integrated biological pest management and reduce chemical use **3.** Enhancement of natural resources **4.** Mitigation of greenhouse gas emissions	1. To protect natural habitats (e.g., wetlands, prairies) 2. To conserve wildlife (e.g., deer, quail) 3. To reduce the overall use of chemicals (e.g., fertilizers, pesticides) 4. To protect natural resources (e.g., soil; water resources) 5. To reduce farm waste and odors 6. To alleviate climate change
Socio-economic Benefits	
1. Increase of the yield of goods and services to society 2. Improvement of life quality in farming regions 3. Increase of local employment opportunities 4. Provision of educational resources 5. Upgrade of landscape aesthetics and biodiversity 6. Improvement of land-use sustainability, costs reduction, and increase revenues 7. Enhancement of the provision of recreational opportunities	1. To provide a diversity of agricultural products (e.g., foods, wood) 2. To enhance the quality of life of rural residents 3. To create jobs in rural areas 4. To educate the public about nature and agriculture 5. To provide scenic beauty to the countryside 6. To maximize the use of agricultural lands 7. To provide recreational opportunities 8. To preserve American rural heritage and traditions (e.g., historic barns)

Survey Procedures

The survey was developed using Qualtrics, a web-based survey development software. The survey was launched on August 17th, 2011. SSI emailed the survey link to their residents‟ panels from Missouri, Pennsylvania and Texas. When clicking on the survey link, participants first accessed a land page that described the study purpose and confidentiality and privacy protocol. The first survey screen included a filter question,

where respondents were required to answer whether they reside in Missouri, Pennsylvania or Texas; those residing in a different state were exited from the survey. Data collection was concluded in two days.

Statistical Analysis

This study used Statistical Package for the Social Sciences (SPSS) version 19 to conduct descriptive and inferential statistics. Firstly, a series of descriptive analysis (i.e., frequencies, means and standard deviation) were conducted to identify the features of agroforestry landscapes that are more appealing to the public for agritourism purposes. Following, dimension-mean scores were calculated for each dimension of agroforestry landscapes (Natural Features, Agricultural Features, Cultural Features) by averaging the five items included in each dimension. Similar statistical analyses (i.e., descriptives) were conducted to assess the respondent‟s perceptions of the two types of functions (Eco-physical, Socio-economic Benefits) that agroforestry provides to society. Cronbach‟s alphas were computed to test the internal reliability within each dimension (Eco-physical, Socio-economic Benefits) of agroforestry functions.

A series of Multivariate Analysis of Variance (MANOVA) were conducted to compare features preferences and perceived benefits of agroforestry landscapes, among respondents with different characteristics. Each MANOVA was conducted with the items comprising each feature/benefit dimension as dependent variables. Independent variables were: residents‟ state of residence, gender, agritourism experience (i.e., frequency they visit a farm for recreational purposes), and relationship to a forested or farm land (i.e., who lives or has lived on a farm or a forest). Significant MANOVA results were followed

with post-hoc univariate analysis (Analysis of Variance – ANOVA or independent *t*-tests). Significance levels for all statistical tests were measured at the .05 alpha levels ($p < .05$). To account for multiple comparisons and controlling for family-wise errors, critical values were adjusted using Bonferroni by dividing the 0.05 critical value by the number of items to be examined. Specifically, critical value for comparing natural, agricultural and cultural landscape features was 0.01 (0.05/5); critical value for comparing eco-physical benefits was 0.008 (0.05/6) and 0.006 (0.05/9) for socio-economic benefits. Figure 2 illustrates the statistical analyses that were conducted on this thesis for each study objective.

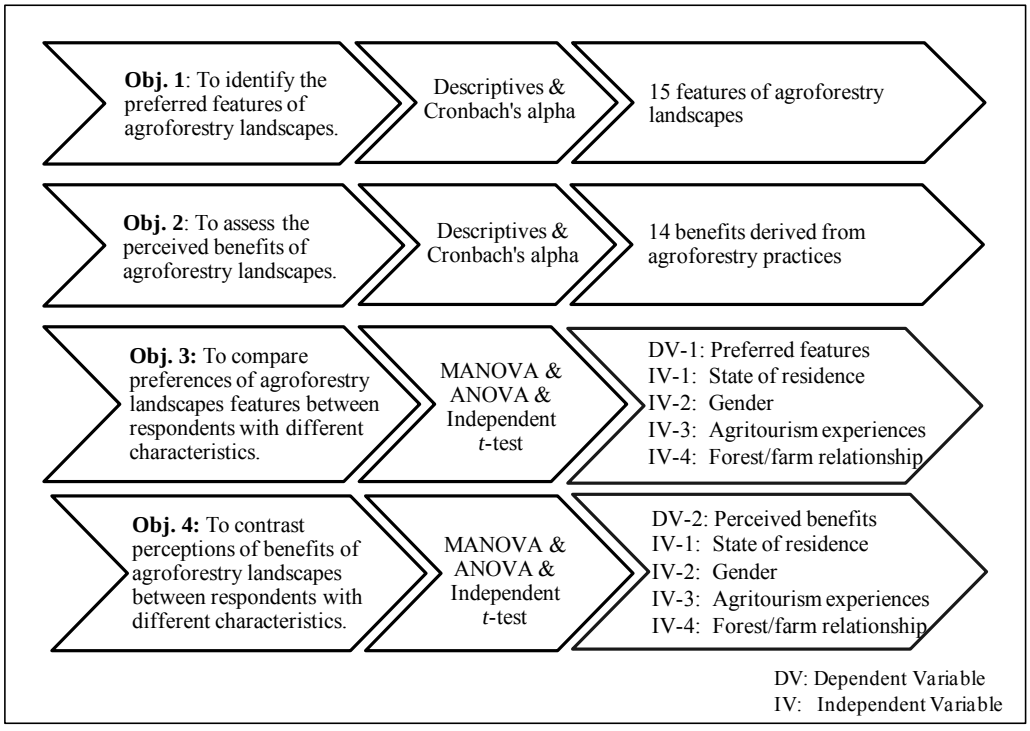

Figure 2. Study objectives and statistical analysis

CHAPTER IV:

RESULTS

Chapter V reports results of statistical analyses. These results include descriptive statistics of respondents‟ socio-demographic information, preferred landscape features and perceived benefits of agroforestry. This section also reports the results from MANOVA and post-hoc univariate analysis (ANOVA; *t*-test) contrasting preferences of features and perceived benefits of agroforestry landscapes among respondents with different characteristics.

Socio-Demographic Profile of Respondents

The majority of respondents were female (70.9%; Table 8). On average, respondents were in their mid-forties (M = 46.9 years; SD = 16.9); 21.5% respondents were less than 30 years old, 29.4% were between 30 and 49 years old, and a quarter were in their fifties (23.1%), or over 60 years old (25.8%). Over one-third of respondents (35.9%) had a high-school degree or less education, 29.6% had some college studies, and 34.4% had at least a two-year college degree. At the time of the study, 26.3% of respondents were full-time employees, 23.8% were retired, 20.3% were homemakers, and a relative large proportion (17.0%) was unemployed. Overall respondents reported low household income[1]; 48.0% earned less than $35,000 annually before taxes; 36.0% between $35,000 and $74,999; only 16.0% beyond $75,000.

[1] Low household income is defined as earning less than $33,525 for a four-member family unit (USDE: OPE, 2011).

Table 8. Socio-demographic profile of responding residents

	n	%
Gender (*n* = 741)		
Male	216	29.1
Female	525	70.9
Age (*n* = 739)		
18 – 29 years old	158	21.5
30 – 39 years old	111	15.0
40 – 49 years old	107	14.4
50 – 59 years old	171	23.1
60 – 69 years old	123	16.6
70 years or older	69	9.2
Mean (in years)		(46.9)
Standard Deviation		(16.9)
Education Level (*n* = 743) [a]		
High school graduate or less	267	35.9
Some college	220	29.6
College degree [b]	200	26.9
Post-graduate studies	56	7.5
Occupation (*n* = 749)		
Full-time employee	197	26.3 [c]
Retired	178	23.8
Homemaker	152	20.3
Unemployed	127	17.0
Part-time employee	89	11.9
Student	54	7.2
Independent/business owner	30	4.0
Full/part-time farmer	3	0.4
Annual Household Income before Taxes (*n* = 736) [d]		
Less than $25,000	205	27.9
$25,000 - $34,999	148	20.1
$35,000 - $49,999	128	17.4
$50,000 - $74,999	137	18.6
$75,000 or more	118	16.0

[a] Measured on a six-point scale ranging from 1 (Less than high school degree) to 6 (Post-graduate studies).
[b] College degree includes two-year and four-year college degree.
[c] Percentages sum to more than 100% as respondents were able to select multiple categories.
[d] Measured in an eight-point scale anchored in 1 (Less than $25,000) and 8 ($200,000 or more).

The vast majority of respondents (85.7%) lived with at least another person in their household, mostly with their spouse, partner or significant other (60.7%; Table 9). Over one third (37.9%) of responding residents lived in an urban area with at least 50,000

residents, 34.5% lived less than 30 miles away, and the remaining quarter (27.6%) lived at least 30 miles away. Results show that respondents or their close family and friends have strong connections to farm or forested landscapes; a relative large proportion live or have lived at any point of their lives on a farm or forest (28.2%), about one third (31.7%) reported that their parent(s) live or have lived on a farm or forest, 22.0% reported having close friends living on a farm or forest.

Table 9. Household and residential attributes of respondents

	n		**%**
Household Composition (*n* = 743)			
Live alone	148		19.9
Live with at least one person	595		80.1
Live with spouse, partner or significant other		451	60.7 [a]
Live with child(ren) 6 years old or younger		125	16.8
Live with child(ren) 7 to 12 years old		87	11.7
Live with child(ren) 13 to 17 years old		79	10.6
Live with other relatives or friends		144	19.4
Residence Proximity to an Urban Area (*n* = 746)[b]			
Live in a 50,000 pop. city	283		37.9
Less than 10 miles	105		14.1
10 - 29 miles	152		20.4
30 - 59 miles	110		14.7
60 miles or more	96		12.9
Mean			(3.0)
Standard Deviation			(1.9)
Household Relationship with a Farm or Forest (*n* = 747)			
Other relatives live on a farm or forest	328		43.9 [a]
My parent(s) live on a farm or forest	237		31.7
I live on a farm or forest	211		28.2
Close friends live on a farm or forest	164		22.0
My spouse or significant other live on a farm or forest	107		14.3
My child(ren) live on a farm or forest	33		4.4
None of the above	214		28.6

[a] Percentages sum to more than 100% as respondents were able to select multiple categories.
[b] Measured on a five-point scale ranging from 1 (I live in a 50,000 pop. city) to 6 (60 miles or more). An urban area was defined as having at least 50,000 people.

Agritourism Behavior of Respondents

About two-thirds of respondents (64.5%) reported that they have visited a farm for recreation at least once in their lives (Table 10). From those, 43.6% participate in agritourism on rarely or very rarely occasion; a relative large proportion (41.9%) do so on occasional bases and 14.5% often or very often (M = 2.6; SD = 1.0). The majority of respondents (56.3%) engaged in agritourism at least once in the last five years. Although a large proportion of respondents (43.7%) has not participated in agritourism in the last five years, 16.3% did so three to five times and nearly a quarter (21.5%) at least six times (M = 5.4; SD = 16.0). Over a third (35.9%) of respondents stated to be likely or very likely to participate in agritourism in the next 12 months suggesting a positive augury for this form of recreation (M = 2.8; SD = 1.4*)*.

Among those respondents who have ever visited a farm for recreation (n = 484; 64.5%), about one half (46.1%) recalled that their first farm visit was at least 10 years ago; a smaller proportion (29.0%) engaged in agritourism for the first time less than five years ago (Table 11). Nearly one third of respondents recalled visiting farms for recreation often (23.2%) or always (7.1%) during their childhood and 29.0% did so on occasional bases. A third (31.1%) never or very rarely engaged in agritourism during their childhood.

Table 10. Current agritourism participation and willingness to engage in agritourism in the future

	n	%
Agritourism Participation (*n* = 750)		
Have visited a farm for recreation	484	64.5
Have never visited a farm for recreation	266	35.5
Frequency Agritourism Participation (*n* = 482) [a, b]		
Very rarely	82	17.0
Rarely	128	26.6
Occasionally	202	41.9
Often	52	10.8
Very often	18	3.7
Mean		(2.6)
Standard Deviation		(1.0)
Number of Times of Farm Visit for Recreation in the Last 5 Years (*n* = 744)		
None (0 times)	325	43.7
1-2 times	136	18.2
3-5	122	16.3
6-10 times	81	10.9
11-20 times	48	6.4
21 times or more	32	4.2
Mean (in number of times)		(5.4)
Standard Deviation		(16.0)
Likelihood of Agritourism Participation in the Next 12 Months (*n* = 747) [c]		
Very unlikely	197	26.4
Unlikely	130	17.4
Undecided	152	20.3
Likely	162	21.7
Very likely	106	14.2
Mean		(2.8)
Standard Deviation		(1.4)

[a] Only includes those that have visited at least once a farm for recreation purposes (*n* = 484; 64.5%).
[b] Measured on a five-point scale ranging from 1 (Very rarely) to 5 (Very often).
[c] Measured on a five-point scale ranging from 1 (Very unlikely) to 5 (Very likely).

Table 11. Indicators of past agritourism participation among respondents [a]

	n	%
First Farm Visit for Recreation		
In the last 12 months	41	8.5
1 or 2 years ago	43	8.9
3-5 years ago	56	11.6
6-9 years ago	42	8.7
At least 10 years ago	223	46.1
Do not recall	79	16.3
Frequency of Farm Visit for Recreation during Childhood		
Never	44	9.1
Rarely	106	22.0
Occasionally	140	29.0
Often	112	23.2
Always	34	7.1
Do not recall	46	9.5

[a] Only includes those that have visited at least once a farm for recreation purposes (n = 484; 64.5%).

Respondents would like to engage in a variety of recreational activities while visiting a farm for agritourism (Table 12). The vast majority (89.8%) would like or very much like enjoying a meal when visiting a farm (M = 4.36; SD = 0.74). In order, other preferred activities they would like or very much like to do were: to attend a festival or event (79.7%; M = 4.09; SD = 0.89); to engage in farm-based recreational activities such as hay rides, pumpkins patch, and corn maze (77.2%; M = 4.04; SD = 0.97); to observe agricultural processes such as visiting a winery (76.1%; M = 4.03; SD = 0.95); and to stay overnight such in a bed and breakfast (75.8%; M = 4.03; SD = 0.94). On the other hand, engaging in physically active activities such as hiking, biking, and cross-country skiing (16.2%; M = 3.57; SD = 1.10), or participating in educational activities such as educational tours, seminars, and workshops (14.3%; M = 3.48; SD = 1.00) were the least preferred activities respondents would like to do while engaging in agrioturism.

Table 12. Preferences of activities that respondents would like doing while visiting a farm for recreation

Recreational and Leisure Activities	*n*	Dislike Very Much	Dislike	Neither Dislike nor Like	Like	Like Very Much	*M* [a]	*SD*
Enjoy a meal	745	0.7%	0.9%	8.6%	41.1%	48.7%	4.36	0.74
Attend a festival or event	744	1.5%	3.9%	14.9%	43.8%	35.9%	4.09	0.89
Farm-based recreational activities	741	2.7%	4.0%	16.1%	40.6%	36.6%	4.04	0.97
Observation of agricultural processes	744	2.6%	3.4%	18.0%	41.0%	35.1%	4.03	0.95
Stay overnight	747	1.9%	4.4%	17.9%	40.2%	35.6%	4.03	0.94
Farm hands-on activities or experiences	745	4.4%	6.8%	18.3%	38.8%	31.7%	3.86	1.08
Nature observation activities	748	3.3%	4.8%	20.5%	45.2%	26.2%	3.86	0.97
Non-farm recreational activities	746	5.6%	7.5%	26.1%	34.0%	26.7%	3.69	1.11
Wildlife extractive activities	747	6.4%	9.5%	22.1%	33.6%	28.4%	3.68	1.17
Physically active activities	747	6.2%	10.0%	24.4%	39.5%	19.9%	3.57	1.10
Educational activities	743	4.2%	10.1%	34.1%	37.1%	14.5%	3.48	1.00

[a] Measured on a five-point scale ranging from 1 (Dislike Very Much) to 5 (Like Very Much).

Preferences of Agricultural Landscapes

Cronbach"s tests showed high internal reliability among the features included to examine respondents" preferences of the three dimensions of agroforestry landscapes: natural (α = 0.828), agricultural (α = 0.843) and cultural (α = 0.783) features (Table 13). Organized by dimensions, respondents would prefer seeing natural features (M = 3.94; SD = 0.68) when visiting a farm for recreational purposes, followed by agricultural (M = 3.82; SD = 0.71) and cultural (M = 3.86; SD = 0.69) features. The most preferred specific features that respondents would like or like very much seeing are wildlife such as deer (83.5%; M = 4.21; SD = 0.85) and water resources such as a lake or creek (83.9%; M = 4.18; SD = 0.83), both from the natural dimension; those were closely followed by

historic features such as log cabins or antique tractors from the cultural dimension (80.1%; *M* = 4.14; *SD* = 0.87), and farm animals such as cattle or horses (78.5%; *M* = 4.10; *SD* = 0.88) from the agricultural dimension. On the contrast, the least preferred landscape features were wetlands such as swamps or marshes (*M* = 3.28; *SD* = 1.05) and intensive one-crop landscapes (*M* = 3.41; *SD* = 0.92) from the natural and agricultural dimensions.

Table 13. Respondents‟ preferences of landscape features

Landscape Features	***n***	**Dislike Very Much**	**Dislike**	**Neither Dislike nor Like**	**Like**	**Like Very Much**	***M*[a]**	***SD***
Natural Features (*α* = 0.828)							**3.94**	**0.68**
Wildlife	738	1.1%	2.8%	12.6%	40.8%	42.7%	4.21	0.85
Water resources	749	1.3%	2.1%	12.7%	45.0%	38.9%	4.18	0.83
Native plants, flowers or grasses	743	0.9%	2.8%	20.2%	45.8%	30.3%	4.02	0.84
Forests	742	1.2%	3.4%	20.1%	42.9%	32.5%	4.02	0.88
Wetlands	745	5.0%	16.9%	35.6%	29.9%	12.6%	3.28	1.05
Agricultural Features (*α* = 0.843)							**3.82**	**0.71**
Farm animals	742	1.5%	2.7%	17.3%	41.6%	36.9%	4.10	0.88
Planted trees or shrubs	745	1.5%	3.9%	18.9%	44.7%	31.0%	4.00	0.89
Variety of specialty crops	745	1.7%	2.8%	22.3%	46.4%	26.7%	3.94	0.87
Grassland and pastures	747	2.7%	6.6%	32.3%	39.5%	19.0%	3.66	0.95
Intensive one-crop farm	741	2.8%	9.4%	43.2%	32.8%	11.7%	3.41	0.92
Cultural Features (*α* = 0.783)							**3.86**	**0.69**
Historic features	748	1.2%	2.8%	15.9%	40.9%	39.2%	4.14	0.87
Trails	744	1.9%	3.9%	16.3%	44.2%	33.7%	4.04	0.91
Petting zoos, corrals or stalls	746	1.5%	5.5%	19.4%	40.5%	33.1%	3.98	0.94
Farm-related buildings	742	2.8%	8.5%	30.5%	39.8%	18.5%	3.63	0.97
Farm equipments	745	3.0%	8.6%	36.6%	35.7%	16.1%	3.53	0.96

[a] Measured on a five-point scale ranging from 1 (Dislike Very Much) to 5 (Like Very Much).

When presented the series of landscapes images, most respondents stated that they would like or very much like visiting a farm raising animals (88.4%; *M* = 4.33; *SD* = 0.77; Series 4), growing a variety of specialty crops such as vineyards or mushrooms (86.2%; *M* = 4.24; *SD* = 0.77; Series 2), and practicing agroforestry either combining crops with shrubs, crops with trees, or livestock with trees (85.2%; *M* = 4.22; *SD* = 0.79; Series 6) as shown in Table 14. Although still over the neutral point, respondents least preferred visiting cultivated grasslands (*M* = 3.73; *SD* = 0.92; Series 6) or farms with only one type of crop (*M* = 3.62; *SD* = 0.90; Series 1).

Table 14. Preferences for farm landscapes images

Types of Landscapes (Series ID and Label) [a]	***n***	**Dislike Very Much**	**Dislike**	**Neither Dislike nor Like**	**Like**	**Like Very Much**	***M*** [b]	***SD***
(4) Farm Animals	744	0.5%	2.0%	9.0%	40.6%	47.8%	4.33	0.77
(2) Diversified specialty crops	747	0.7%	1.6%	11.5%	45.1%	41.1%	4.24	0.77
(6) Agroforestry	750	0.4%	2.9%	11.5%	44.5%	40.7%	4.22	0.79
(5) Trees and shrubs	747	0.7%	1.6%	16.9%	45.6%	35.2%	4.13	0.79
(6) Grassland	746	1.7%	5.8%	31.8%	39.3%	21.4%	3.73	0.92
(1) Intensive monoculture	750	2.1%	7.3%	32.3%	43.1%	15.2%	3.62	0.90

[a] Refer to Table 6, Chapter 3 for a detailed description of all six series.
[b] Measured on a five-point scale ranging from 1 (Dislike Very Much) to 5 (Like Very Much).

Perceived Benefits of Agricultural Landscapes

Cronbach‟s tests showed high internal reliability in the eco-physical ($\alpha = 0.829$) and socio-economic ($\alpha = 0.840$) benefit dimensions examined in this study (Table 15). Overall, respondents perceived that both, conventional and agroforestry of farms, are

equally important in providing eco-physical benefits (M = 0.31; SD = 0.68) and socio-economic benefits (M = 0.11; SD = 0.62) to society, although they perceived that agroforestry farms are slightly more important than conventional farms regarding the provision of eco-physical benefits.

Table 15. Perceived benefits of agricultural lands

Perceived Benefits	*n*	Conventional farms are much more important	Conventional farms are somewhat more important	Both are equally important	Agroforestry farms are somewhat more important	Agroforestry farms are much more important	M^a	*SD*
Eco-physical Benefits (α = 0.829)							**0.31**	**0.68**
Protect natural habitats	746	5.0%	3.1%	59.4%	16.4%	16.2%	0.36	0.96
Conserve wildlife	746	5.2%	6.0%	53.4%	18.6%	16.8%	0.36	1.00
Alleviate climate change	745	3.1%	3.4%	62.3%	16.8%	14.5%	0.36	0.88
Protect natural resources	743	3.6%	3.5%	63.4%	16.2%	13.3%	0.32	0.88
Reduce farm waste and odors	740	4.6%	7.2%	61.5%	15.0%	11.8%	0.22	0.91
Reduce the overall use of chemicals	741	5.9%	5.7%	61.8%	14.4%	12.1%	0.21	0.94
Socio-economic Benefits (α = 0.840)							**0.11**	**0.62**
Provide scenic beauty to the countryside	743	4.2%	4.2%	62.3%	14.0%	15.3%	0.32	0.93
Educate the public about nature and agriculture	745	3.8%	6.2%	64.7%	14.6%	10.7%	0.22	0.86
Provide a diversity of agricultural products	744	6.2%	9.4%	56.7%	17.9%	9.8%	0.16	0.94
Maximize the use of agricultural lands	743	6.6%	9.3%	60.7%	12.1%	11.3%	0.12	0.96
Provide recreational opportunities	747	5.2%	8.2%	67.1%	12.4%	7.1%	0.08	0.83
Enhance the quality of life of rural residents	743	6.7%	8.3%	66.6%	10.8%	7.5%	0.04	0.87
Create jobs in rural areas	743	6.1%	7.0%	72.4%	8.6%	5.9%	0.01	0.80
Preserve American rural heritage and traditions	743	9.7%	10.2%	65.8%	7.5%	6.7%	-0.09	0.91

[a] Measured on a five-point scale ranging from -2 (Conventional farms are much more important) to 2 (Agroforestry farms are much more important).

Respondents perceived that agroforestry farms are slightly more important than conventional ones in producing all eco-physical benefits examined in this study. One third of respondents perceived that farms practicing agroforestry are more important than conventional farms in protecting natural habitats such as wetlands or prairies (32.6%; *M* = 0.36; *SD* = 0.96), conserving wildlife such as deer or quail (35.4%; *M* = 0.36; *SD* = 1.00), and to alleviate climate change (31.3%; *M* = 0.36; *SD* = 0.88). Higher perceptions of agroforestry farms as compared to conventional farms were even less pronounced regarding the overall less use of chemicals such as fertilizers or pesticides (*M* = 0.21; *SD* = 0.94) and the reduction of farm waste and odors (*M* = 0.22; *SD* = 0.91).

Specifically related to the socio-economic benefits, over one quarter of respondents perceived that agroforestry farms are more important than conventional ones to provide scenic beauty to the countryside (29.3%; *M* = 0.32; *SD* = 0.93). Respondents also perceived that farms practicing agroforestry are slightly more important than conventional ones in educating the public about nature and agriculture (*M* = 0.22; *SD* = 0.86) and in producing a diversity of agricultural products such as food or wood (*M* = 0.16; *SD* = 0.94). Respondents perceived that both types of farms are equally important in maximizing the use of agricultural lands (*M* = 0.12; *SD* = 0.96), providing recreational opportunities (*M* = 0.08; *SD* = 0.83), enhancing the quality of life of rural residents (*M* = 0.04; *SD* = 0.87) and creating jobs in rural areas (*M* = 0.01; *SD* = 0.80). Although still within a neutral point, conventional farms were perceived slightly more important than those practicing agroforestry in preserving American rural heritage and traditions such as preserving historic barns (*M* = -0.09; *SD* = 0.91).

Composition of Study Segments

Study respondents were segmented based on their state of residence, gender, agritourism experience (i.e., frequency they visit a farm for recreational purposes), and relationship of a forested or farm land (i.e., who lives or has lived on a farm or a forest) using frequency distributions. As for the state of residence, respondents were grouped into three mutually exclusive segments: Missouri residents (n = 250; 33.3%); Pennsylvania residents (n = 250; 33.3%); Texas residents (n = 250; 33.3%). Regarding the gender-based segmentation, results show that the sample was composed by a larger proportion of female (n = 525; 70.9%) than male (n = 216; 29.1%) respondents. As for the agritourism experience, respondents were segmented into three groups: the *Non-Agritourists* (n = 266; 35.6%) defined as those who have never visited a farm for recreation purposes; the *Sporadic Agritourists* (n = 210; 28.1%) defined as those who visit a farm for recreational purposes very rarely or rarely; and the *Recurrent Agritourists* (n = 272; 36.4%) defined as those who reported to visit a farm for recreational purposes very often, often or on occasional bases. The level of respondents‟ relationship with a forested or farm land was used to segment respondents into three groups: *No Relationship* (n = 214; 28.6%) indicated those who do not have any family member or close friend living (have lived) on a farm or forest; *Indirect Relationship* (n = 270; 36.1%) comprised respondents whose family members (parents, offspring, other relatives) or close friends live or have lived on a farm or forest, but themselves or significant others have not; *Direct Relationship* (n = 263; 35.2%) comprised those respondents who themselves or significant others live or have lived on a farm or forest. Table 16 summarizes the labels

and description of the respondents segments that will be used as independent variables in statistical analysis.

Table 16. Composition, description and labels of study segments

Segment Labels	Segment Description	*n*	%
State of Residence			
MO (Missouri)	Missouri residents	250	33.3
PA (Pennsylvania)	Pennsylvania residents	250	33.3
TX (Texas)	Texas residents	250	33.3
Gender			
Male	Male respondents	216	29.1
Female	Female respondents	525	70.9
Agritourism Experience			
Non-Agritourists	Have never participated in agritourism	266	35.6
Sporadic Agritourists	Rarely or very rarely agritourism participation	210	28.1
Recurrent Agritourists	Participate in agritourism at least occasionally	272	36.4
Relationship to a Farm or Forested Land			
No Relationship	Do not have any family member or close friend living or having lived on a farm or forest	214	28.6
Indirect Relationship	A relative or close friend live or have lived on a farm or forest, but not themselves or their spouse	270	36.1
Direct Relationship	Themselves or their significant other live or have lived on a farm or forest	263	35.2

Comparing Landscape Preferences among Respondents Segments

Segment 1: State of Residence

MANOVA showed that there were no significant differences on the preferences of the landscape features among Missouri, Pennsylvania and Texas residents in any of the three types of landscape dimensions examined: natural (Wilks‟ Lambda = 0.989; F = 0.826; p = 0.603), agricultural (Wilks‟ Lambda = 0.988; F = 0.845; p = 0.585), and

cultural (Wilks‟ Lambda = 0.989; $F = 0.797$; $p = 0.631$) landscapes. Given the non-significant results, follow-up ANOVAs were not conducted.

Segment 2: Gender

Statistical tests showed that gender is associated with residents‟ preferences of landscapes features. Male and female residents significantly differed on their preferences regarding natural (Hotelling‟s Trace = 0.113; $F = 16.061$; $p < .001$), agricultural (Hotelling‟s Trace = 0.057; $F = 8.095$; $p < .001$), and cultural (Hotelling‟s Trace = 0.113; $F = 16.125$; $p < .001$) landscapes (Table 17).

Specifically within the Natural Landscape Dimension, *t*-test showed that females ($M = 4.13$) had higher preference than males ($M = 3.71$) for native plants, flowers or grasses ($F = 44.460$; $p < .001$). No significant differences were found on the remaining natural features of the landscape. Regarding the Agricultural Landscape Dimension, *t*-test revealed that females also have stronger preference than males to see: farm animals ($M_{female} = 4.17$; $M_{male} = 3.90$; $F = 17.348$; $p < .001$); planted trees or shrubs ($M_{female} = 4.11$; $M_{male} = 3.73$; $F = 27.795$; $p < .001$); and variety of specialty crops ($M_{female} = 4.01$; $M_{male} = 3.73$; $F = 15.000$; $p < .001$). No significant differences were found between genders on their preferences for seeing grassland and pastures or intensive one-crop farms. As for the Cultural Landscape dimension, *t*-tests showed that females have stronger preferences for seeing trails ($M_{female} = 4.10$; $M_{male} = 3.90$; $F = 7.052$; $p = 0.008$) and petting zoos, corrals or stalls ($M_{female} = 4.14$; $M_{male} = 3.59$; $F = 52.273$; $p < .001$) than males. In contrast, males had significantly higher preference for farm equipment ($M_{male} = 3.68$; $M_{female} = 3.47$; $F = 7.140$; $p = 0.008$) than females. Males and females have similar

preferences for seeing historic features and farm-related buildings such as barns when visiting a farm for recreation.

Table 17. A comparison of landscape preferences between male and female respondents

Types of Landscapes and Features	*n*	Preference Mean [a]		Statistical Values	
		Male	Female	*F*	*p-value* [b]
Natural Landscapes [c]					
Wildlife	729	4.19	4.22	0.338	0.561
Water resources	740	4.12	4.20	1.860	0.173
Native plants, flowers or grasses	734	3.71	4.13	44.460	< .001
Forests	733	3.99	4.03	0.557	0.456
Wetlands	736	3.43	3.22	4.714	0.030
Agricultural Landscapes [d]					
Farm animals	733	3.90	4.17	17.348	< .001
Planted trees or shrubs	736	3.73	4.11	27.795	< .001
Variety of specialty crops	736	3.73	4.01	15.000	< .001
Grassland and pastures	738	3.59	3.68	1.931	0.165
Intensive one-crop farm	732	3.31	3.45	3.522	0.061
Cultural Landscapes [e]					
Historic features	739	4.07	4.16	1.939	0.164
Trails	735	3.90	4.10	7.052	0.008
Petting zoos, corrals or stalls	737	3.59	4.14	52.273	< .001
Farm-related buildings	733	3.64	3.61	0.021	0.884
Farm equipment	736	3.68	3.47	7.140	0.008

[a.] Measured on a five-point scale ranging from 1 (Dislike Very Much) to 5 (Like Very Much).
[b.] Critical value: $p < 0.01$, after applying Bonferroni correction ($p < 0.05 / 5$).
[c.] MANOVA statistics: Hotelling‟s Trace = .113; $F = 16.061$; $p < .001$.
[d.] MANOVA statistics: Hotelling‟s Trace = .057; $F = 8.095$; $p < .001$.
[e.] MANOVA statistics: Hotelling‟s Trace = .113; $F = 16.125$; $p < .001$.

Segment 3: Agritourism Experience

MANOVA results showed that the level of agritourism experience is associated with the preferences on landscapes features. *Non-Agritourists, Sporadic Agritourists* and *Recurrent Agritourists* significantly differ on their preferences regarding natural (Wilks‟ Lambda = 0.914; $F = 6.552$; $p < .001$), agricultural (Wilks‟ Lambda = 0.879; $F = 9.516$; p

< .001), and cultural (Wilks‟ Lambda = 0.877; $F = 9.804$; $p < .001$) landscapes (Table 18).

Table 18. A comparison of landscape preferences among respondents with different levels of agritourism experiences

Types of Landscapes and Features	*n*	Preference Mean [1]			Statistical Values	
		Non Agritourists	Sporadic Agritourists	Recurrent Agritourists	*F*	*p-value*[2]
Natural Landscapes[3]						
Wildlife	736	3.97 [a]	4.18 [b]	4.48 [c]	24.513	<.001
Water resources	747	3.96 [a]	4.14 [b]	4.42 [c]	22.190	<.001
Native plants, flowers or grasses	741	3.84 [a]	4.00 [a]	4.20 [b]	13.309	<.001
Forests	740	3.85 [a]	4.00 [a]	4.20 [b]	10.166	<.001
Wetlands	743	3.08 [a]	3.22 [a]	3.54 [b]	14.693	<.001
Agricultural Landscapes [4]						
Farm animals	740	3.80 [a]	4.07 [b]	4.40 [c]	31.340	<.001
Planted trees or shrubs	743	3.72 [a]	3.95 [b]	4.30 [c]	30.156	<.001
Variety of specialty crops	743	3.68 [a]	3.88 [b]	4.23 [c]	29.948	<.001
Grassland and pastures	745	3.39 [a]	3.59 [b]	3.97 [c]	27.159	<.001
Intensive one-crop farm	739	3.24 [a]	3.30 [a]	3.66 [b]	15.676	<.001
Cultural Landscapes [5]						
Historic features	746	3.96 [a]	4.05 [a]	4.38 [b]	16.501	<.001
Trails	742	3.80 [a]	4.00 [b]	4.30 [c]	20.729	<.001
Petting zoos, corrals or stalls	744	3.67 [a]	4.00 [b]	4.27 [c]	27.354	<.001
Farm-related buildings	740	3.40 [a]	3.50 [a]	3.93 [b]	24.056	<.001
Farm equipment	743	3.30 [a]	3.41 [a]	3.85 [b]	25.138	<.001

[1] Measured on a five-point scale ranging from 1 (Dislike Very Much) to 5 (Like Very Much).
[2] Critical value: $p < 0.01$, after applying Bonferroni correction ($p < 0.05 / 5$).
[3] MANOVA statistics: Wilks' Lambda= .914; $F = 6.552$; $p < .001$.
[4] MANOVA statistics: Wilks' Lambda= .879; $F = 9.516$; $p < .001$.
[5] MANOVA statistics: Wilks' Lambda= .877; $F = 9.804$; $p < .001$.
[a,b,c] Any two values with different superscripts were significantly different in post-hoc Tukey pair wise comparisons.

Specifically within the Natural Landscape Dimension, ANOVA showed that the five natural features were significant different across segments: wildlife ($F = 24.513$; $p < .001$); water resources ($F = 22.190$; $p < .001$); native plants, flowers or grasses ($F = 13.309$; $p < .001$); forests ($F = 10.166$; $p < .001$); and wetlands ($F = 14.693$; $p < .001$).

Post-hoc Tukey‟s tests showed pair-wise significant differences across the three types of agritourists on their preferences for seeing wildlife ($M_{recurrent}$ = 4.48; M_{non} = 3.97; $M_{sporadic}$= 4.18) and water resources ($M_{recurrent}$ = 4.42; M_{non} = 3.96; $M_{sporadic}$ = 4.14) in the landscape, reporting the *Recurrent Agritourists* the strongest preference and the *Non-Agritourists* the least preference. The *Recurrent Agritourists* also reported higher preferences for seeing native plants, flowers or grasses ($M_{recurrent}$ = 4.20; $M_{sporadic}$ = 4.00; M_{non} = 3.84), forests ($M_{recurrent}$ = 4.20; $M_{sporadic}$ = 4.00; M_{non} = 3.85), and wetlands ($M_{recurrent}$ = 3.54; $M_{sporadic}$ = 3.22; M_{non} = 3.08) than their counterparts, with no significant differences between the *Sporadic* and the *Non-Agritourists.*

As for the Agricultural Landscape Dimension, ANOVA revealed significant differences across respondents with different levels of agritourism experience regarding their preferences for five features: farm animals (F = 31.340; p < .001); planted trees or shrubs (F = 30.156; p < .001); variety of specialty crops (F = 29.948; p < .001); grassland and pastures (F = 27.159; p < .001); and intensive one-crop farm (F = 15.676; p < .001). Post-hoc Tukey‟s tests showed that all three groups differ on their preferences for seeing: farm animals ($M_{recurrent}$ = 4.40; M_{non} = 3.80; $M_{sporadic}$ = 4.07), planted trees or shrubs ($M_{recurrent}$ = 4.30; M_{non} = 3.72; $M_{sporadic}$ = 3.95), variety of specialty crops ($M_{recurrent}$ = 4.23; M_{non} = 3.68; $M_{sporadic}$ = 3.88), and grassland and pastures ($M_{recurrent}$ = 3.97; M_{non} = 3.39; $M_{sporadic}$ = 3.59), reporting the *Recurrent Agritourists* the strongest preference and the *Non-Agritourists* the lowest preference for those features. *Recurrent Agritourists* somewhat liked ($M_{recurrent}$ = 3.66) seeing intensive one-crop farms, a significantly stronger preference than *Non-Agritourists* (M_{non} = 3.24) and *Sporadic Agritourists* ($M_{sporadic}$ = 3.30).

Regarding the Cultural Landscape Dimension, ANOVA showed that the three study segments differed on their preferences for the five cultural features examined: historic features ($F = 16.501$; $p < .001$); trails ($F = 20.729$; $p < .001$); petting zoos, corrals or stalls ($F = 27.354$; $p < .001$); farm-related buildings ($F = 24.056$; $p < .001$); and farm equipment ($F = 25.138$; $p < .001$). Pairwise comparisons showed that *Recurrent Agritourists* had higher preference than *Sporadic Agritourists* and *Non-Agritourists* for seeing historic features ($M_{recurrent} = 4.38$; $M_{sporadic} = 4.05$; $M_{non} = 3.96$), farm-related buildings ($M_{recurrent} = 3.93$; $M_{non} = 3.40$; $M_{sporadic} = 3.50$), and farm equipment ($M_{recurrent} = 3.85$; $M_{non} = 3.30$; $M_{sporadic} = 3.41$), with no significant differences between the latter two segments. With significant differences across the three types of agritourists, Tukey's tests showed the *Recurrent Agritourists* have the strongest preference and the *Non-Agritourists* the lowest preference for seeing trails ($M_{recurrent} = 4.30$; $M_{non} = 3.80$; $M_{sporadic} = 4.00$) and petting zoos, corrals or stalls ($M_{recurrent} = 4.27$; $M_{non} = 3.67$; $M_{sporadic} = 4.00$) in the landscape of agritourism farms.

Segment 4: Relationship to a Farm or Forested Land

MANOVA results showed that respondents' relationship to a farm or forested land is associated to their preferences on landscapes features. Respondents with *No Relationship, Indirect Relationship,* and *Direct Relationship* to a farm or forested land significantly differed on their preferences regarding natural (Wilks' Lambda = 0.938; $F = 4.624$; $p < .001$), agricultural (Wilks' Lambda = 0.949; $F = 3.767$; $p < .001$), and cultural (Wilks' Lambda = 0.952; $F = 3.580$; $p < .001$) landscapes (Table 19).

Table 19. A comparison of landscape preferences among respondents with different relationships to a farm or forested land

Types of Landscapes and Features	*n*	Preference Mean[1]			Statistical Values	
		No Relationship	Indirect Relationship	Direct Relationship	*F*	*p-value*[2]
Natural Landscapes[3]						
Wildlife	735	3.91 [a]	4.28 [b]	4.38 [b]	19.902	< .001
Water resources	746	3.96 [a]	4.21 [b]	4.35 [b]	13.523	< .001
Native plants, flowers or grasses	740	3.80 [a]	4.07 [b]	4.12 [b]	9.546	< .001
Forests	739	3.84 [a]	4.03 [a]	4.18 [b]	8.424	< .001
Wetlands	742	3.12 [a]	3.31	3.40 [b]	4.273	0.014
Agricultural Landscapes [4]						
Farm animals	739	3.82 [a]	4.17 [b]	4.28 [b]	17.220	< .001
Planted trees or shrubs	742	3.85 [a]	4.05 [b]	4.08 [b]	4.348	0.013
Variety of specialty crops	743	3.82	3.98	4.00	2.833	0.059
Grassland and pastures	744	3.49 [a]	3.66	3.80 [b]	6.097	0.002
Intensive one-crop farm	738	3.27 [a]	3.45	3.48 [b]	3.640	0.027
Cultural Landscapes [5]						
Historic features	745	4.00 [a]	4.15	4.26 [b]	5.060	0.007
Trails	741	3.89 [a]	4.09	4.16 [b]	5.719	0.003
Petting zoos, corrals or stalls	743	3.80 [a]	4.06 [b]	4.07 [b]	5.977	0.003
Farm-related buildings	739	3.43 [a]	3.61 [a]	3.80 [b]	8.994	< .001
Farm equipment	742	3.30 [a]	3.50 [b]	3.76 [c]	13.814	< .001

[1] Measured on a five-point scale ranging from 1 (Dislike Very Much) to 5 (Like Very Much).
[2] Critical value: $p < 0.01$, after applying Bonferroni correction ($p < 0.05 / 5$).
[3] MANOVA statistics: Wilks' Lambda= .938; $F = 4.624$; $p < .001$.
[4] MANOVA statistics: Wilks' Lambda= .949; $F = 3.767$; $p < .001$.
[5] MANOVA statistics: Wilks' Lambda= .952; $F = 3.580$; $p < .001$.
[a,b,c] Any two values with different superscripts were significantly different in post-hoc Tukey pair wise comparisons.

Specifically within the Natural Landscape Dimension, ANOVA revealed significant differences of respondents‟ preference across segments for the following four features: wildlife ($F = 19.902$; $p < .001$); water resources ($F = 13.523$; $p < .001$); native plants, flowers or grasses ($F = 9.546$; $p < .001$); and forests ($F = 8.424$; $p < .001$). Post-hoc Tukey‟s tests showed that respondents who either had *Indirect* or *Direct Relationship* to a farm/forested land, with no differences between them, had higher preference than those

with *No Relationship* for seeing wildlife ($M_{indirect}$ = 4.28; M_{direct} = 4.38; M_{no} = 3.91), water resources ($M_{indirect}$ = 4.21; M_{direct} = 4.35; M_{no} = 3.96), and native plants, flowers or grasses ($M_{indirect}$ = 4.07; M_{direct} = 4.12; M_{no} = 3.80). *Direct Relationship* respondents showed higher preference than their counterparts for the presence of forests in the landscape (M_{direct} = 4.18; $M_{indirect}$ = 4.03; M_{no} = 3.84) with no significant differences between those with *No Relationship* or *Indirect Relationship*.

In regard to the Agricultural Landscape Dimension, ANOVA showed that respondents have different preferences only for seeing farm animals (F = 17.220; p < .001) and grasslands/pastures (F = 6.097; p = 0.002) in the landscape. Pairwise comparisons revealed that those respondents with an *Indirect Relationship* or *Direct Relationship* to a farm/forested land have stronger preference for seeing farm animals ($M_{indirect}$ = 4.17; M_{direct} = 4.28) than those with *No Relationship* (M = 3.82), with no differences between the first two groups. Regarding the grassland and pastures feature, significant difference was only found between the *No Relationship* (M = 3.49) and the *Direct Relationship* (M = 3.80) groups.

As for the Cultural Landscape Dimension, ANOVA showed that respondents with different levels of relationship to a farm/forested land had different preferences for seeing the five cultural features examined: historic features (F = 5.060; p = 0.007); trails (F = 5.719; p = 0.003); petting zoos, corrals or stalls (F = 5.977; p = 0.003); farm-related buildings (F = 8.994; p < .001); and farm equipment (F = 13.814; p < .001). Post-hoc Tukey‟s tests revealed that respondents with a *Direct Relationship* to a farm/forested land had stronger preferences than those with *No Relationship* for seeing historic features (M_{no} = 4.00; M_{direct} = 4.26) and trails (M_{no} = 3.89; M_{direct} = 4.16) in the landscape. Those with

some sort of relationship with a farm/forested land, with no difference whether the relationship is direct or indirect (M_{direct} = 4.07; $M_{indirect}$ = 4.06), had stronger preferences for the existence of petting zoos, corrals or stalls in the landscape, as compared to those with *No Relationship* (M = 3.80). The *Direct Relationship* group (M = 3.80) have stronger preferences for seeing farm-related buildings than their counterparts (M_{no} = 3.43; $M_{indirect}$ = 3.61), with no significant differences between the last two groups. Significant pairwise comparisons showed that the closer the relationship with the land, the stronger preferences for seeing farm equipment in the landscape (M_{direct} = 3.76; $M_{indirect}$ = 3.50; M_{no} = 3. 30).

Comparing Benefits Perceptions of Conventional and Agroforestry Farms among Respondents Segments

Segment 1: State of Residence

MANOVA did not show any significant differences across respondents living in Missouri, Pennsylvania and Texas on their perceived importance that conventional and agroforestry farms provide to society. In all cases, respondents perceive that both types of agricultural settings are equally important in providing eco-physical (Wilks‟ Lambda = 0.982; F = 1.094; p = 0.360) and socio-economic (Wilks‟ Lambda = 0.967; F = 1.523; p = 0.083) benefits to society. Given the non-significant MANOVA results, follow-up ANOVAs were not conducted. When contrasting the means of each benefit dimensions, no significant results were found across respondents residing in different states regarding overall eco-physical (F = 2.281; p = 0.103) and socio-economic (F = 0.426; p = 0.653) benefits.

Segment 2: Gender

MANOVA showed significant differences between male and female respondents on their perceived importance of both eco-physical (Hotelling‟s Trace = 0.048; F = 5.706; p <.001) and socio-economic (Hotelling‟s Trace = 0.035; F = 3.050; p = 0.002) benefits that conventional and agroforestry farms provide to society (Table 20).

Specifically within the Eco-physical benefit dimension, after controlling for other variables, *t*-tests revealed that females (M = 0.40) as compared to males (M = 0.11) perceive that agroforestry farms are more important than conventional farms in protecting natural resources (F = 17.491; p <.001). When considering the overall dimension mean, results showed that male (M = 0.23) and female (M = 0.33) have similar perceptions on the role that agroforestry and conventional farms have in providing eco-physical benefits (F = 2.613; p = 0.071).

When examined the socio-economic benefit dimension, *t*-tests showed that females perceived that agroforestry farms are more important than conventional farms in maximizing the use of agricultural lands (M_{female} = 0.20; M_{male} = -0.07; F = 9.967; p = 0.002) and creating jobs in rural areas (M_{female} = 0.08; M_{male} = -0.15; F = 9.706; p = 0.002). No significant differences were found between genders on the perceived role that agroforestry and conventional farms have in providing overall socio-economic benefits to society (M_{male} = 0.23; M_{female} = 0.33; F = 2.029; p = 0.017).

Table 20. A comparison of the perceived benefits of agroforestry and conventional farms between male and female respondents (MANOVA / t-test)

Perceived Benefits	*n*	Importance Mean[1]		Statistical Values	
		Male	**Female**	***F***	***p-value***
Eco-physical Benefits [2]					
Protect natural habitats	737	0.32	0.37	0.654	0.419
Conserve wildlife	737	0.44	0.32	2.353	0.125
Alleviate climate change	736	0.29	0.39	2.009	0.157
Protect natural resources	735	0.11	0.40	17.491	< 0.001
Reduce farm waste and odors	731	0.12	0.26	3.689	0.055
Reduce the overall use of chemicals	732	0.11	0.24	2.930	0.087
Dimension Mean	**738**	**0.23**	**0.33**	**2.613**	**0.071**
Socio-economic Benefits [3]					
Provide scenic beauty to the countryside	734	0.28	0.33	0.065	0.799
Educate the public about nature and agriculture	736	0.22	0.24	0.164	0.685
Provide a diversity of agricultural products	735	0.13	0.17	0.034	0.854
Maximize the use of agricultural lands	734	-0.07	0.20	9.967	0.002
Provide recreational opportunities	738	0.10	0.08	0.334	0.563
Enhance the quality of life of rural residents	734	-0.11	0.10	6.324	0.012
Create jobs in rural areas	734	-0.15	0.08	9.706	0.002
Preserve American rural heritage and traditions	734	-0.17	-0.04	2.204	0.138
Dimension Mean	**738**	**0.03**	**0.15**	**2.029**	**0.017**

[1] Measured on a five-point scale ranging from -2 (Conventional farms are much more important) to 2 (Agroforestry farms are much more important).

[2] MANOVA statistics: Hotelling"s Trace = .048; $F = 5.706$; $p < .001$; Critical value for ANOVA: $p < 0.0083$, after applying Bonferroni correction ($p < 0.05 / 6$).

[3] MANOVA statistics: Hotelling"s Trace = .035; $F = 3.050$; $p = .002$; Critical value for ANOVA: $p < 0.0056$, after applying Bonferroni correction ($p < 0.05 / 9$).

Segment 3: Agritourism Experience

MANOVA showed that there are no significant differences across *Non-Agritourists, Sporadic Agritourists* and *Recurrent Agritourists* on the perceived importance that agroforestry and conventional farms have in providing eco-physical (Wilks‟ Lambda = 0.976; $F = 1.453$; $p = 0.136$) or socio-economic (Wilks‟ Lambda = 0.981; $F = 0.844$; $p = 0.635$) benefits to society. Considering non-significant results, the follow-up ANOVAs were not conducted. When contrasting the overall mean of each benefit dimension, no significant results were either found across the three types of agritourists regarding overall eco-physical ($F = 3.148$; $p = 0.044$) and socio-economic ($F = 0.189$; $p = 0.828$) benefits.

Segment 4: Relationship to a Farm or Forested Land

MANOVA showed that there were no significant differences on the perceived importance of the eco-physical (Wilks‟ Lambda = 0.984; $F = 0.941$; $p = 0.505$) and socio-economic benefits (Wilks‟ Lambda = 0.968; $F = 1.446$; $p = 0.112$) that conventional and agroforestry farms provide to society among respondents with different relationships of a farm or forested land (i.e., *No Relationship*, *Indirect Relationship*, and *Direct Relationship*); thus no follow-up ANOVAs were conducted. ANOVA did not yield significant results when contrasting the overall means of the eco-physical ($F = 0.816$; $p = 0.442$) and socio-economic ($F = 0.785$; $p = 0.456$) benefit dimensions.

CHAPTER V:

CONCLUSION

This chapter discusses key study findings and implications especially related to agritourism organized in three topic areas: overall findings, landscape preferences, and perceived benefits of farms practicing agroforestry. Study limitations, and recommendations for future research are also presented.

Overall Findings: Discussion and Implications

This study showed a strong agritourism participation among respondents as 64.5% reported that they had visited a farm for recreation at least once in their lives. Importantly, over one-third (35.9%) of respondents would likely or very likely participate in agritourism in the next 12 months, supporting the growing phenomenon of agritourism as a form of recreation in the U.S. (Schilling et al., 2006) and suggesting a positive augury for this form of recreation. The increased residents‟ interest in agritourism is especially important for rural America, taking into account that farmers considered this type of entrepreneurial diversification as important for the continued operation of their farms (Tew & Barbieri, 2012; Barbieri, 2010).

Contrary to previous findings (Sotomayor, 2011), enjoying a meal in the farm was ranked as the most preferred recreational activity; these results may be associated with consumers‟ increased interest in locally produced and specialty foods, either because of their healthy attributes or their low-input production such as natural or certified organic (Privitera, 2009; 2010). The preponderance of enjoying a meal within the farm gates may

also be associated with growing recognition of the benefits of organic agriculture and the recent development of the organic-agritourism niche (Frost, Wales, & Wacher, 2010). In this sense, study findings suggest that enjoying a meal as a component of the agritourism experience should be more readily advertised, especially in relation with the natural and health benefits associated with low-input (e.g., organic, natural growth) aiming to capture the emerging segment of visitors who are seeking a healthy life style while enjoying the rural experience.

Other popular agritourism activities that emerged from this study include attending a festival or event, engaging in farm-based recreational activities (e.g., hay rides) and observing agricultural processes (e.g., visiting a winery), confirming previous findings in Missouri (Sotomayor, 2011). Developing an inventory of the preferred activities in which residents would like to engage is critical as they can serve to guide those farmers willing to enter into the agritourism sector or willing to expand their operations. Taking into consideration that responding consumers prefer to partake in those activities (e.g., festivals, hayrides) that have been reported as the most frequently offered by agritourism farms (Tew & Barbieri, 2012; McGehee & Kim, 2004; Brown & Reeder, 2007), it is critical that future studies recognize the knowledge and expertise that agritourism farmers have accumulated throughout the years.

Landscape Preferences: Discussion and Implications

Respondents indicated that they would prefer appreciating natural features followed by cultural and agricultural features when engaging in agritourism. Overall, the top three individual preferred features correspond to the natural dimension of landscapes,

namely wildlife, water resources (e.g., lake or creek) and native flora (e.g., plants, flowers or grasses). These results confirm that the degree of wilderness, percentage of vegetation cover, and availability of water resources play a critical role on the visual quality of rural scenes as previously reported (Arriaza et al., 2004). Historic resources (e.g., log cabins, antique tractors) from the cultural dimension was the fourth preferred landscape feature, result that is consistent with previous studies that found log cabins as the most preferred type of accommodation in farm settings mainly because it offers a unique experience (Hong, Kim, & Kim, 2003). Based on the pull-push factors theory in which pull factors are conceptualized as the features, events, attractions, or attributes of the destination itself which attract a person to move to another area (Kim, Lee, & Klenosky, 2003), this study builds on the existing knowledge, concluding that heritage resources are critical pull attractions in agritourism. The following preferred landscape features belonged to the agricultural dimension, namely farm animals such as cattle and horses (top fifth) and planted trees or shrubs (top sixth). These latter results are important in this study as both features (animals, planted tress/shrubs) form part of the definition of agroforestry (Gold & Garrett, 2009).

The recognition of the aforementioned top preferred landscape features has practical implications for agritourism farmers, as they can serve to enhance their farm aesthetic appeal. For example, attracting wildlife with feeders and propagating native plants, flowers or grasses on the farm premises can increase the visual appeal for agritourists without comprising agricultural practices. Similarly, facilitating the appreciation of water resources available on the farmland, such as by developing trails and viewpoints, can increase the beauty of the agritourism farm. Furthermore,

recognizing visitors‟ landscape preferences and integrating them as part of the aesthetic offering can increase consumers‟ interest and satisfaction (Huffman & Kahn, 1998). In this sense, restoring and promoting log cabins and other heritage resources are critical to enhance the pull factor of farms as tourism destinations. However, taking into consideration the major cost that historic restoration may represent, it is suggested that this recommendation is taken with caution. It is important that farmers assess the economic feasibility (costs versus revenues) of embarking into historic restoration to enhance the pull tourism capacity of their farm.

When examining preferences among visitors and tourists, it is important to recognize that different socio-demographic characteristics, agritourism experiences, and relationship to a farm or forested land may influence their preferences and choice (Lyons, 1983; Middleton, Fyall, Morgan, & Ranchhod, 2009; Sönmez & Graefe, 1998). Along these lines, results confirmed that females have stronger preferences than males for greener scenes in natural environments (Lyons, 1983), specifically related to the availability of native florae (plants, flowers, grasses), planted trees or shrubs, and a variety of specialty crops in the landscape of agritourism farms. This study expands on existing knowledge as it was found that female respondents also had stronger preferences than their counterparts for seeing farm animals and cultural features (i.e., trails, petting zoos, corrals or stalls) when visiting a farm for agritourism purposes. On the contrary, males showed stronger preferences for appreciating farm equipment when visiting an agritourism farm than females, results that may be associated with the traditional male dominance in bearing outdoor housework responsibilities, such as yard work (Greenstein, 1996). The identification of gender differences associated with landscape preferences

provides agritourism farmers with critical information to better target customers, thus increase their market share, and in turn further strengthen visitors‟ satisfaction. For example, promotional agritourism materials aiming specifically at female consumers (e.g., “women‟s retreats”) should predominantly include their preferred features (e.g., native florae, specialty crops) while those aiming at male visitors should portray farm equipment such as tractors.

Results also showed that the higher level the agritourism experience, the stronger the preference of landscape features by respondents. Specifically, *Recurrent Agritourists* (who visit a farm for recreation at least on occasional bases) expressed a stronger preference for all natural, agricultural, and cultural landscape features examined in this study as compared to *Non-Agritourists* and *Sporadic Agritourists*. These results are consistent with the effect that past tourism experience has in repeat visits because of an enhanced confidence in the travel destination (Sönmez & Graefe, 1998); thus frequent visits to agritourism farms may deepen and increase appreciation for different features of their landscapes. These results suggest that agritourism farmers should employ customer relationship management (CRM) to keep in touch with their previous visitors, which in turn may enhance customer loyalty, repeat visit, and increase farm brand recognition (Pike, 2005; Winer, 2001). For example, farmers could periodically mail/email newsletters to their visitors depicting a variety of natural, agricultural and cultural landscape features. Given the effect that previous agritourism experience has in repeat visitation, it would also be advisable that loyal customers are encouraged to bring along their family and friends by providing them with group discounts or other types of family perks.

The significantly low interest in appreciating most natural, agricultural, and cultural features examined among *Non-Agritourists* suggest their overall lack of familiarity or exposure to those features. To increase farmer‟s market share, this group of potential agritourists should be approached to arouse their interest with those features that are more appealing to them. Taking into consideration that stronger attraction for natural amenities stimulates agritourism participation (Gascoigne, Sullins, & McFadden, 2008), it is important that *Non-Agritourists* are specifically targeted with messages portraying natural features in the farm landscapes, especially wildlife and water resources as those were found to be their preferred features. Results suggest that target marketing of agritourism should focus on visitors at both ends of exposure (i.e., *Recurrent Agritourists*; *Non-Agritourists*) as those with a reduced agritourism experience (i.e., *Sporadic Agritourists*) did not convey any evidently higher or lower preferences for natural, agricultural, or cultural features in the agritourism landscape, features, as compared to the other two kinds of agritourists.

Finally, results showed that overall those with a *Direct* (who or whose significant other live(d) on a farm/forest) or *Indirect* (have close friends/relatives living on a farm/forest) relationship with a farm/forested land had stronger preferences for most natural, agricultural, and cultural landscape features as compared to those with *No Relationship.* These results are probably due to their familiarity with such features, as Lyon (1983) found that people tend to favor their familiar biome where they reside. In this sense, promotional agritourism material targeting at those with some sort of relationship to farm/forested lands (*Direct Relationship*; *Indirect Relationship)* should

portray an environment in which they feel comfortable by including those landscape features that were more appealing to them (e.g., wildlife, farm animals).

There is also a need to expand agritourism recognition among the group of residents with *No Relationship* to farm/forested lands to enlarge farmers‟ customer base as they represented over one-quarter (*n* = 214; 28.6%) of all current/potential agritourists. In this regard, natural features (especially wildlife and water resources) and heritage resources could be suitable images to portray to this group not only because of their preferences, but because people are becoming more attracted to natural resources (McGranahan, 1999), traditional rural scenes with old structures (Strumse, 1996), and a combination of both (Kent & Elliot, 1995) to enrich their recreation experiences. Additionally, distinctive elements that some agritourism farms may have can be used to attract this group to maximize the pull-effect of destination‟s uniqueness (Santos, Belhassen, & Caton, 2008). For instance, advertising using images portraying landscapes including native flora, lakes or creek, historic structures (e.g., barn) or unique features (e.g., stone walls) may stimulate those potential agritourists with *No Relationship* to farm/forested lands.

Perceived Benefits: Discussion and Implications

Results show that overall respondents perceived that farms engaged (agroforestry farms) and not engaged (conventional farms) in agroforestry are equally important in providing eco-physical and socio-economic benefits to society. These results are not surprising taking into consideration that agroforestry is an emerging agricultural practice in North America (Gold & Garrett, 2009). However, these results stress the importance to

increase public awareness of agroforestry benefits, so to add a competitive advantage of their products when reaching the market.

It is worth mentioning that consumers perceived that agroforestry farms are slightly more important than conventional farms in the provision of three eco-physical benefits: protect natural habitats, conserve wildlife, and alleviate climate change. These results suggest that consumers have an intuitive perception of the beneficial role that agroforestry plays in the conservation of wildlife, biodiversity and natural habitats (Mcneely & Schroth, 2006; Gold & Garrett, 2009), and in the mitigation of climate change by reducing accumulation of greenhouse gases (Pandey, 2007; Schoeneberger, 2009; Verchot et al., 2006). Therefore, agroforestry farms that directly reach their consumers through on-farm direct sales or agritourism activities should make a greater effort in disseminating their superior role in producing distinguishable eco-physical benefits as compared to conventional farms. It is advisable that messages emphasizing their greater eco-physical role are accompanied by images portraying preferred landscape features (e.g., planted trees or shrubs) to develop or reinforce the concept of agroforestry.

Among all segments examined (state of residence; gender; agritourism experience; relationship to a farm/forested land), gender was the only segment showing some significant associations with the perceived role that conventional and agroforestry farms have in society. Females, as compared to their male counterparts, perceived that agroforestry farms are more important than conventional farms in protecting natural resources, which may be associated with strong environmental concerns found among women (Hunter, Hatch, & Johnson, 2004). Stronger perceptions on the socio-economic benefits of agroforestry farms among female respondents, specifically in maximizing the

use of agricultural lands and creating jobs in rural areas, may be associated with gender roles found in diversified farming operations including agritourism (Chiappe & Flora, 1998; McGehee & Kim, 2004) and agroforestry (Kiptot & Franzel, 2011). These results suggest a competitive advantage of agroforestry farms engaged in agritourism when targeting female groups (e.g., ladies getaways) which is a growing tourism market (Berdychevsky, Bell, & Gibson, 2011).

Study Limitations

The most noticeable limitations of this study relates to the sample utilized. Its non-random nature prevents generalizing study results. Similarly, although a significant effort was placed in selecting three states representing different levels of agritourism development and a diversity of landscapes while holding similar agricultural characteristics and residents‟ socio-demographic composition, results should not be extrapolated to other similar regions. It is important to emphasize though, that such limitations in the sample should not diminish the value of this exploratory study as it advances our understanding of the role of agricultural landscapes for agritourism purposes. Finally, it is worth discussing the unforeseen and undesired unbalance gender distribution (70.9% female) in the sample. Although such unbalance is usually perceived as limitation (in spite of controlling for it in the statistical analysis), it provided the opportunity to have a greater insight from female consumers, which is important taking into consideration the primary role that women have in selecting holiday choices (Mottiar & Quinn, 2004).

A second study limitation relates to the questionnaire design. To evaluate consumers‟ preferences of agricultural landscapes, this study focused on those features that are commonly found and/or inherent to agriculture (e.g., wildlife, farm equipment, farm animals, pastures); however, other non-agricultural features (e.g., gas pipes, internet lines) which may also have an impact on the consumer‟s perceptions (Marks et al., 2009) were excluded.

Lastly, it is appropriate to acknowledge that the neutral perceptions that respondents had regarding the perceived benefits of agroforestry (as compared to conventional farms) may also be related to the overall unawareness of agroforestry. Evidence suggests that even farmers practicing agroforestry have difficulties to define and fully understand those agroforestry practices and therefore identify their benefits (Lassoie et al., 2009; Smith, 2011), thus the need to elicit responses using pictures in studies examining the human dimensions of agroforestry (e.g., Barbieri & Valdivia, 2010a). Therefore, another limitation of this study, specifically related to the perceived benefits of agroforestry, may be that residents don‟t necessarily perceive differences between agroforestry and conventional farms.

Recommendations for Future Research

While the results of this study provide insight into both the consumer‟s preferences of agricultural landscape features and their perceptions of benefits provided by agroforestry farms, it also sheds light into future research directions. The most palpable recommendation emerging from study results is the need to replicate this study using a random sample, and optimistically at a larger geographic scale, for

generalizability purposes. As being exploratory, this study sought to include states representing a diversity of landscapes and agricultural regions. For generalizability purposes, future studies may want to consider digging further into similarities and differences within and across regions.

This study showed that different features of the agricultural landscape are associated with agritourists preferences. Taking into consideration the accumulated knowledge and expertise of agritourism farmers, future studies should aim at unveiling farmers‟ perspectives of the landscape preferences of their clientele preferably using qualitative research methods. Similarly, it is advisable that future studies survey actual agritourists, preferably on site, to better capture their preferences and account for romanticized images of the agricultural landscape commonly found in related literature (Buijs, Elands, & Langers, 2009). The on-site survey is also suggested to be conducted to examine residents‟ personal benefits included in the BBM recreational framework. However, taking into consideration that personal benefits are more on-site experience related, future research should consider evaluating them using the motivational approach.

Taking into account the popularity of natural landscape features among respondents, following studies may consider exploring in more detail the types of natural features (e.g., specific wildlife species, native plants) that are most preferred as some of those could be easily incorporated into agritourism farm landscapes. This study also suggests that more effort should be invested in exploring consumers‟ preferences for landscapes providing a mix of natural, agricultural, and cultural features, especially to uncover those landscape combinations that may have a greater pull effect in attracting visitors to the farm.

This study examined the structure (landscape features) and function (perceived benefits) of agroforestry landscapes, but the value dimension was excluded. Study results supporting different landscape preferences among consumers suggest moving research forward to examine the economic value that potential and current agritourists place in those features. Estimating such economic value, using willingness to pay procedures for example, can assist small farmers in preserving their landscapes which is constantly threatened with urban sprawl (Francis et al., 2003).

Finally, additional analysis is needed to explore preferences among different consumers segments and to deepen examination within specific segments. For example, further analysis is needed to explore consumers‟ preferences with different socioeconomic backgrounds as previous research in other topics has provided valuable insights on that regards (Page & Ridgway, 2001). Similarly, further statistical analysis can be conducted between genders across different socio-demographic factors (e.g., annual house income, education) to explore whether landscape preferences of females are associated with their socio-demographic conditions. Taking into consideration that this study found that different types of relationship to the land (i.e., direct, indirect, no relationship) are associated with landscape preferences, future research should consider examining more closely such relationships. This is especially important as the number of landowners seeking for the rural lifestyle is increasing in the U.S. (Hoppe, 2001) and that there are notable differences on the perceptions across different types of tenants, especially between landowners in the practice of farming (farmers) and those seeking for the rural lifestyle (Barbieri & Valdivia, 2010b).

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APPENDIX A

FARM LANDSCAPE PREFERENCES FOR RECREATION IN MISSOURI, PENNSYLVANIA, AND TEXAS

Residence Information

In which of the following states do you live? ***Required question.***

○ Missouri ○ Pennsylvania ○ Texas ○ Other

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Section 1:
Visiting a Farm for Recreation

How likely are you to visit a farm for recreational purposes in the next 12 months?

○ Very Unlikely ○ Unlikely ○ Undecided ○ Likely ○ Very Likely

Have you ever visited a farm for recreational purposes? For example, to pick-up berries or visiting a corn maze. ***Required question.***

○ Yes ○ No

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Section 1:
Visiting a Farm for Recreation

How frequently do you visit a farm for recreational purposes?

○ Very Rarely ○ Rarely ○ Occasionally ○ Often ○ Very often

How many times have you visited a farm for recreational purposes in the last 5 years?

When did you visit a farm for recreational purposes for the first time?

○ In the last 12 months ○ 1 or 2 years ago ○ 3 - 5 years ago

○ 6 - 9 years ago ○ At least 10 years ago ○ Do not recall

How frequently did you visit a farm for recreation when you were 16 years old or younger?

○ Never ○ Rarely ○ Occasionally ○ Often ○ Always ○ Do not recall

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Section 2:
Your Preferred Recreational Activities in a Farm

How much would you like or dislike doing the following activities while visiting a farm for recreation?

	Dislike Very Much	Dislike	Neither Dislike nor Like	Like	Like Very Much
Nature observation activities (Landscape photography, orchard tours, bird watching, etc.)	○	○	○	○	○
Physically active activities (Hiking, biking, cross-country skiing, etc.)	○	○	○	○	○
Farm hands-on activities or experiences (U-pick berries, milking a cow, petting farm animals, etc.)	○	○	○	○	○
Educational activities (Educational tours, seminars, workshops, etc.)	○	○	○	○	○
Wildlife extractive activities (Fishing, hunting, mushroom gathering, etc.)	○	○	○	○	○
Non-farm recreational activities (Swimming, playground, inflatables, bouncers, etc.)	○	○	○	○	○
Farm-based recreational activities (Hay rides, pumpkins patch, corn maze, etc.)	○	○	○	○	○
Observation of agricultural processes (Winery, cider mill, cheese making, chestnut roast, etc.)	○	○	○	○	○
Attend a festival or event (Harvest festival, private party, wedding, etc.)	○	○	○	○	○
Enjoy a meal (Picnic, cookout, specialty dining, etc.)	○	○	○	○	○
Stay overnight (Bed and breakfast, cabin, camping, etc.)	○	○	○	○	○

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Section 3:
Your Preferred Farm Landscapes

For the following elements, how much would you like or dislike seeing each while visiting a farm for recreation?

	Dislike Very Much	Dislike	Neither Dislike nor Like	Like	Like Very Much
Wetlands (swamps or marshes, etc.)	○	○	○	○	○
Wildlife (deer, birds, quail, etc.)	○	○	○	○	○
Water resources (lake, creek, etc.)	○	○	○	○	○
Farm-related buildings (barns, storage sheds, silo, etc.)	○	○	○	○	○
Historic features (log cabins, antique tractors, artifacts, etc.)	○	○	○	○	○
Variety of specialty crops (vineyards, mushrooms, herbs, etc.)	○	○	○	○	○
Native plants, flowers or grasses	○	○	○	○	○
Farm animals (cattle, horses, goat, chicken, alpaca, etc.)	○	○	○	○	○
Planted trees or shrubs (pecan or apple trees, berries, etc.)	○	○	○	○	○
Trails (walking, biking, etc.)	○	◉	○	○	○
Forests	○	○	○	○	○
Petting zoos, corrals or stalls	○	○	○	○	○
Farm equipments (tractors, windmill, etc.)	○	○	○	○	○
Grassland and pastures (grasses, hay, etc.)	○	○	○	○	○
Intensive one-crop farm (corn farm, wheat farm, etc.)	○	○	○	○	○

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Section 3:
Your Preferred Farm Landscapes

These three pictures represent farms specializing in one type of crop.

How much would you like or dislike visiting this type of farm for recreation?



○ Dislike Very Much ○ Dislike ○ Neither Dislike nor Like ○ Like ○ Like Very Much

0% 100%

Section 3:
Your Preferred Farm Landscapes

These three pictures represent farms growing a variety of specialty crops.

How much would you like or dislike visiting this type of farm for recreation?



○ Dislike Very Much ○ Dislike ○ Neither Dislike nor Like ○ Like ○ Like Very Much

0% 100%

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Section 3:
Your Preferred Farm Landscapes

These three pictures represent farms growing grassland or pastures.

How much would you like or dislike visiting this type of farm for recreation?



○ Dislike Very Much ○ Dislike ○ Neither Dislike nor Like ○ Like ○ Like Very Much

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Section 3:
Your Preferred Farm Landscapes

These three pictures represent farms raising livestock or other farm animals.

How much would you like or dislike visiting this type of farm for recreation?



○ Dislike Very Much ○ Dislike ○ Neither Dislike nor Like ○ Like ○ Like Very Much

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Section 3:
Your Preferred Farm Landscapes

These three pictures represent farms growing trees or shrubs.

How much would you like or dislike visiting this type of farm for recreation?



Dislike Very Much Dislike Neither Dislike nor Like Like Like Very Much

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Section 3:
Your Preferred Farm Landscapes

These three pictures represent farms combining crops with trees or animals.

How much would you like or dislike visiting this type of farm for recreation?



Dislike Very Much Dislike Neither Dislike nor Like Like Like Very Much

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Section 4:
The Benefits of Agricultural Lands

This section asks about the benefits of **two types of farms**:
Conventional farms specialize in the production of crops, livestock or both.
Agroforestry farms integrate trees or shrubs into their farming (crops/livestock) production.

What type of farm you believe is more important in providing the following benefits?

	Conventional farms are much more important	Conventional farms are somewhat more important	Both are equally important	Agroforestry farms are somewhat more important	Agroforestry farms are much more important
To protect natural habitats (e.g., wetlands, prairies)	○	○	○	○	○
To provide recreational opportunities	○	○	○	○	○
To provide a diversity of agricultural products (e.g., foods, wood)	○	○	○	○	○
To educate the public about nature and agriculture	○	○	○	○	○
To conserve wildlife (e.g., deer, quail)	○	○	○	○	○
To enhance the quality of life of rural residents	○	○	○	○	○
To alleviate climate change	○	○	○	○	○
To maximize the use of agricultural lands	○	○	○	○	○
To reduce farm waste and odors	○	○	○	○	○
To provide scenic beauty to the countryside	○	○	○	○	○
To reduce the overall use of chemicals (e.g., fertilizers, pesticides)	○	○	○	○	○
To create jobs in rural areas	○	○	○	○	○
To protect natural resources (e.g., soil, water resources)	○	○	○	○	○
To preserve American rural heritage and traditions (e.g., historic barns)	○	○	○	○	○

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Section 5:
Information About You And Your Family

Please write in your age:

Check your gender:

○ Male ○ Female

What is the highest level of formal education you have received?

○ High school graduate

○ Some college

○ Two-year college degree (e.g., associate degree)

○ Four-year college degree (bachelor's degree)

○ Post-graduate studies (Masters or Doctorate)

○ Other (please specify):

What's your current employment status? ***Check all that apply.***

☐ Full-time employee ☐ Part-time employee ☐ Homemaker (care for family and/or house)

☐ Full-time farmer ☐ Part-time farmer ☐ Independent / Business owner

☐ Student ☐ Retired ☐ Unemployed

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Section 5:
Information About You And Your Family

Please indicate which of the following live or have lived on a farm or a forest. ***Check all that apply.***

- ☐ I live or have lived on a farm or forest
- ☐ My parent(s)
- ☐ My spouse or significant other
- ☐ My child(ren)
- ☐ Relatives (e.g., aunt, cousin)
- ☐ Close friends
- ☐ None of the above

With whom do you live at home? ***Check all that apply.***

- ☐ I live alone
- ☐ With spouse, partner or significant other
- ☐ With child(ren) 6 years old or younger
- ☐ With child(ren) 7-12 years old
- ☐ With child(ren) 13-17 years old
- ☐ With other relatives or friends

How far do you live from an area of at least 50,000 people?

- ○ I live in a 50,000 pop. city
- ○ Less than 5 miles
- ○ 5 – 9 miles
- ○ 10 – 29 miles
- ○ 30 – 59 miles
- ○ 60 miles or more

Which of the following best represents your annual household income before taxes?

- ○ 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
- ○ $200,000 or more

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