

Economic Variables that Influence Plantation Sustainability in South Carolinas' Coastal Zone

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Plantations have been around since the European settlement of South Carolina. Plantations have long been an invaluable resource to not only the coastal zone but to America. Plantations are considered the first establishments in the Colonies. Today many of these colonial period plantations are still in existence. Few are worked as before; some are now bed and breakfasts, gardens that are open to the public, and hunting lodges; and some have been maintained as private residences for generations. South Carolina's low country also has the only tea plantation in the contiguous United States. One valuable role that these plantations still play is in keeping large tracts of land in single ownership and not in commercial development (South Carolina Coastal Council, 1990). Today's plantation owners face new, but perilous challenges in maintaining their plantations.

Although agriculture is still important in the Low Country, particularly in the counties of the inner coastal plain, tourism is the region's most important industry (Edgar, 1998). The coastal zone depends on tourism for its economic survival. By 1996, with the exception of private nature preserves and state parks, the entire coast was being intensely developed (Edgar, 1998). Tourism and industrialization have reshaped the Low Country, by attracting new and permanent residents. By 1990 more than 50 percent of Beaufort County's population was nonnative and 40 percent of Berkeley, Dorchester and Horry were nonnative. With this dramatic increase in population comes the need for increased residential and commercial facilities. Many of these plantations are prime lands for these residential and commercial sites. The coastal zone of South Carolina is faced with balancing developmental needs and protection of the areas' natural, historical and cultural resources.

This study will not address the public benefits associated with keeping large tracts of land undeveloped. The main focus of this study is to identify the key factors that have a significant impact on plantation land conversion in South Carolina. There are many factors that are influential in determining land conversion: land characteristics, external forces, and seller's and buyer's characteristics.

Land characteristic data is specific to a particular parcel of land, such as parcel size, location and land uses (Dunford et al., 1985). Some characteristics of sellers that were evaluated were income, use or intended use of parcel, willingness to sell their parcel, and whether they belonged to conservation organizations. Land and seller characteristics were collected from plantation owners and man-

agers in the study area via a mail survey. The study area was designated to be the Coastal Zone of South Carolina. South Carolina's 31,113 square miles are geographically divided into five regions: the coastal zone, coastal plain, sandhills, piedmont, and blue ridge (Edgar, 1998). Probably the best-known region of the state is the coastal zone. By law, the coastal zone consists of eight counties: Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetwon, Horry, and Jasper (South Carolina Coastal Council, 1990).

Survey

The mail survey technique was determined to be the most efficient means of obtaining the needed information. Plantation names and addresses were obtained from two membership lists: the Plantation Society and the Historic Rice Fields Association, both consisting of South Carolina coastal zone plantation owners and managers. Other sources included the attendees list of a Plantation Managers meeting and a Plantation Owners meeting. Two needs assessments meetings provided the basis for determining survey questions. The main objective of this preliminary survey was to have plantation owners and managers identify which variables they thought were most significant in maintaining plantation sustainability. This preliminary questionnaire/ needs assessment provided the framework for developing the survey format and questions.

The questionnaire consisted of four main components. Background information contained questions such as whether the recipient was an owner or a manager or both, the date the plantation was established, and size. Land use was the second component. In this section respondents were asked to give information relating to land use percentages from the time period 1988-1998. This time period was relatively lengthy, so that changes in land use patterns could be determined. The land use section also asked the respondents to identify gross annual income from the plantation and from which land uses the income was generated. The question of real estate taxes was an open-ended question, to cover the large range of responses. Historical information included questions of ownership transfer and current use of land that had been previously sold. A catch all last section, "Miscellaneous," covered questions of willingness to sell, involvement with conservation organizations, and participation in conservation easements. The survey ended with an open-ended question that asked respondents to define a plantation in their own words. Surveys were mailed to 185 South Carolina coastal zone plantation owners and managers. A total of 70 surveys were returned. Using methods described in Dillman (1978) for calculating response rate, a survey response rate of 42.1 percent was obtained in this survey.

Plantation Profile

Of the 70 returned surveys, 31 (44.3 percent) of respondents indicated they were the owner of the plantation, while 23 (32.9 percent) indicated they were the plantation manager, and 16 (22.9 percent) classified themselves as the owner and manager of the plantation. Of the respondents, 50 (75.8 percent) listed South Carolina as the plantation owner's primary residence, and 16 (24.2 percent) indicated the owner's primary residence was outside of South Carolina. Respondents were asked to provide the year when the plantation was first established. Of the 66 surveys responding to this question, plantations were established as early as 1600 and as recently as 1974. On average though, plantations in South Carolina's coastal zone were established in 1802 (standard deviation ± 97.7 years). When the year of plantation establishment is categorized into decades, data indicate 12 (17.1 percent) of plantations were established in the 1600's. The largest number, 26 (37.1 percent), was established in the 1700's and 16 (22.9 percent) of the plantations were established in either the 1800's or 1900's.

Respondents were asked to provide information related to what year the plantation entered their possession. On average, plantations became part of the respondent's family in 1942 (standard deviation ± 66.0 years, N=68). However, plantations had been in some respondent's families as far back as 1680 and most recently in 1995.

The average size of the 70 plantations surveyed was 4,325 acres (standard deviation $\pm 7,840.5$ acres), collectively encompassing 302,736 acres. Of the eight coastal zone counties surveyed, 18 (25.7 percent) of the 70 respondents were located in Colleton County, 17 (24.3 percent) in Berkeley, 12 (17.1 percent) in Beaufort, 8 (11.4 percent) in Charleston, 7 (10.0 percent) in Georgetown, 4 (5.7 percent) in Dorchester, and 3 (4.3 percent) in Jasper. No surveys were returned from Horry County plantations.

Land Use

Respondents were asked to indicate what percentage of their plantation was devoted to various land uses in 1988 and 1999. Results from 66 surveys indicate that, on average, 38.1 percent of the 1988 plantations' land use was in timber production. Approximately 20.7 percent was used for wildlife management purposes, 14.3 percent was tied up in wetlands, 10.2 percent of the land was used for crop and livestock production, 8.2 percent was devoted to plantation-based enterprises, 4 percent was categorized under other uses, and 3.2 percent of the land was characterized as buildings and other structures. In 1998, timber was still highest with 36 percent (N=68) of the land in timber management, 24.6 percent was used for wildlife management, and 15.1 percent was tied up in wetlands. Plantation-based enterprises accounted for 10.7 percent of land use, crop and livestock production 7 percent, and buildings and structures only 3 percent of the land uses. Other land uses accounted for 2.5 percent of the plantations' land use on average.

Differences between each percentage land use in 1988 and 1998 were calculated and compared statistically. Appropriate statistical tests were conducted on the average difference to determine changes in land use during the survey period (Reynolds, 1999). Results indicated significant differences of 1998 land use compared to 1988 land uses for crop and livestock production, wildlife management activities, and land characterized as wetland. Lands devoted to crop and livestock production significantly decreased between 1998 and 1988 with an average reduction in land use of 3.63 percent. However, in 1998, plantations saw increased land use devoted to wildlife management and characterized as wetlands compared to 1988 land uses. On average, 4.5 percent more of the plantations lands were devoted to wildlife management compared to 1988 activities. Although a significant increase, plantations exhibited a modest increase in lands characterized as wetlands in 1998 compared to 1988. This increase could be explained by increased knowledge and awareness of wetland issues. Comparisons of timber production, plantation-based enterprises, buildings and structures, and other use did not show significant changes between 1988 and 1998.

The survey asked respondents to indicate what percentage of the lands adjacent to their plantation were devoted to various land uses. Of the 66 survey respondents, the average amount of adjacent land devoted to timber production was 49 percent; 14 percent was in the category classified as “other”; 13.1 percent was in residential development; 12.2 percent was adjacent to a major water body; 5.2 percent was adjacent to land that was in crop and livestock production; and 1.7 percent was adjacent to land that was a commercial development.

Income

Of the 64 respondents providing annual gross income information for the plantation, 43 (67.2 percent) identified that their plantation had an annual income of \$0 - \$100,000. Eight (12.5 percent) of the plantations grossed between \$100,000 and \$250,000, 7 (10.9 percent) made \$1 million or more, 4 (6.3 percent) grossed between \$250,000 and \$500,000, and 2 (3.1 percent) had an income between \$500,000 and \$1 million. Fifty-three of the respondents provided information regarding income generated from various land uses. On average, 41 percent of the plantation’s annual income was generated from timber production. Hunting activities and other land uses not defined by the survey question averaged 20 percent and 10 percent, respectively, of the plantation’s gross income. Other land uses indicated by respondents included such things as movie production, rental houses, aquaculture, mining, and stable yards. Ecotourism, livestock production, bed and breakfast, and crop production each accounted for less than 8 percent of the plantation’s annual income. When asked to provide tax information, respondents indicated that they paid approximately \$7,370.53 (standard deviation = \$12,361.79, N=49) in real estate taxes during the most recent tax year. Taxes paid ranged from \$0 to \$79,322. When broken down to a per acre basis, approximately \$15.44 (standard deviation = \$50.81) were paid in taxes per acre. Taxes on a per acre basis ranged between \$0 and \$336.36.

Plantation Transfer

Of the 70 surveys responding, 27 (38.6 percent) of the plantations surveyed indicated that the plantation had transferred ownership between 1988 and 1998, totaling 70,285.8 acres transferred. On average, ownership was transferred in 1993 (N = 21, standard deviation \pm 3.2 years). Of the plantations that transferred ownership, 15 (65.2 percent) of them were not retained within the family, but sold to an outside party. Respondents were asked to indicate if they anticipated a change in plantation ownership. Nine (13.4 percent) of the 67 surveys responding answered “yes” to this question, and of those, 7 (63.6 percent) said the change would occur in the next 1-5 years while only 4 (36.4 percent) suggested a change would occur in the next 6-10 years.

The average size of South Carolina’s coastal zone plantation when first established was 5,505 acres (N=51, standard deviation \pm 9,834.2 acres). A comparison of plantation size when first established to current plantation size was conducted. Results indicated there was no significant difference between historical and current size (Reynolds, 1999).

Respondents were asked to indicate if the plantation size had increased and/or decreased since 1988. Of the 67 surveys responding, 9 (13.4 percent) responded an increase in size had occurred. On average, this increase in plantation size occurred in 1995, with an average increase of 1,510 acres (N=8, standard deviation \pm 2,652.8 acres). Of the 64 surveys responding to the decrease in plantation size, 9 (14.1 percent) responded a decrease in size had occurred. On average, this decrease in plantation size occurred in 1991, with an average decrease of 1,433 acres (N=9, standard deviation \pm 2,065.7 acres). Of the 17 respondents providing information related to the new land uses of transferred parcels, data indicated 36.8 percent of this land was in timber production, 21.1 percent was in residential development and commercial development each, and 10.5 percent was in crop and livestock production and “other” land uses each. Some respondents indicated that transferred land was in multiple land uses. From the information obtained, it is not possible to determine whether transferred land had the same land uses as it did prior to being transferred. Respondents were asked to indicate if any buildings and/or structures on the plantation were listed on the National Historic Register. Of the 68 responses, 15 (22.1 percent) of plantations indicated the presence of buildings or structures that were registered. Of the 16 buildings or structures listed, 11 (68.8 percent) were the main house, while 6.3 percent reported a ricemill, slave cabins, carriage house, building, or structure each.

Conservation Easement and Associations

Forty-seven (69.1 percent) of the 68 plantations did not have any type of conservation easement on their property. Of the 21 (30.9 percent) that did, the average size of easement was 2, 966 acres (standard deviation \pm 4,185.6 acres, range 3-12,525 acres). However, 44 (65.7 percent) of 67 re-

spondents answered that they were members of a conservation organization. These conservation groups included The Nature Conservancy, Ducks Unlimited, South Carolina Waterfowl Association, and several other local land trust organizations. Fourteen (22.6 percent) of the 62 surveys responding said they would consider selling their plantations. Fifty percent of the 12 surveys providing reasons identified financial gain as their reason for their willingness to sell. Other reasons identified included development, generational change over, and management.

Respondents did not suggest an increased willingness to sell based on their involvement in conservation easements. Plantation owners and/or managers that were involved in conservation organizations were less willing to sell (15 percent) than those not involved in conservation organizations (37 percent). Except for plantations generating an annual income between \$500,000 - \$1,000,000, a majority (>66 percent) of the plantations were not willing to sell their plantation. Plantations with a gross income between \$500,000 and \$1,000,000 were more willing to sell their plantation (100 percent, N= 3) than plantations in other income brackets. A plantation's willingness to sell was also compared to the number of years the plantation had been in the family. The number of years the plantation had been in the family was broken into six categories: 0-10 years, 11-25 years, 26-50 years, 51-100 years, 101-200 years, and >201 years. There was no correlation between the number of years in the family and willingness to sell as a majority (>69 percent) of all plantations were not willing to sell for each category, regardless of how long the plantation had been in the family.

Statistical Analysis

A statistical analysis of South Carolina's coastal zone plantations' turnover characteristics was conducted. Statistical analyses were accomplished using appropriate regression models (Reynolds, 1999). Only observations from the eight coastal zone counties were included in the analyses. A predictive model was developed to estimate the probability that a land transfer will occur, and the factors that influence that probability. A detailed description of the empirical models, including dependent and independent variables can be found in Reynolds (1999). Three alternative specifications were applied. One specification omitted observations where land transfer occurred outside the family. The second specification used a similar set of explanatory variables but changed observations where a transfer within the family took place to mean no land transfer. The third specification omitted observations where land transfer outside the family occurred.

Modeling Results

A predictive model was selected to explain the relationship between plantation transfer and select variables that may characterize the probability that a plantation may or may not transfer ownership for three alternative speculations. Attempts were made to predict whether a plantation would transfer ownership based on the model.

Three models were produced to predict the probability that a plantation will transfer ownership based on three data subsets. Obtaining information related to the percentage of income from various land uses, plantation income category, proximity to places with substantial population, percentage of adjacent land use in commercial development or crop and livestock production, relative plantation size, number of acres in a conservation easement, and involvement in conservation organizations were needed to predict the probability of land transfer. The first model developed used data collected with omission of plantations that transferred within the family. Percentage income from timber production, percentage of adjacent land uses in crop and livestock production, and involvement in conservation organization were all significant factors in predicting changes in land tenure. The probability of transferring decreased with an increase in the percentage of income from timber production and ecotourism as expected. Plantations less than 1,000 acres and those not involved in conservation organizations had higher probabilities of land transfer than larger plantations and those involved in conservation organizations. A second model was developed to predict the probability of land transfer outside the family which used all available data but assumed plantations that transferred within the family did not transfer ownership. For this model, percentage of income from timber production, percentage of income from hunting activities, percentage of adjacent land in commercial development, involvement in a conservation organization, and plantation income category were significant factors in determining land tenure changes. The probability of transferring decreased with an increase in the percentage of income from timber production as expected. Plantations less than 1,000 acres and those not involved in conservation organizations had higher probabilities of land transfer than larger plantations and those involved in conservation organizations. The third model developed predicted the probability of plantation transfer within the family. Plantation income category, involvement in conservation organization, and percentage of adjacent land in crop and livestock production were identified as significant variables. The overall model was not a dependable predictor of land transfers within the family. Variables not measured in this survey may affect land transfer within the family more than economic or other plantation characteristics. Owner age and health could be significant factors to evaluate land transfers within the family.

As expected, larger plantations are less likely to transfer ownership for all models. This could be a result of the need for larger financial resources to purchase large tracts of land. However, it should be noted that large tracts of land are not necessarily out of danger of development. Xu (1994) provided some reasoning for this in that larger tracts have a lower per acre cost. This would influence potential land buyers to take advantage of the lower costs per acre and purchase larger tracts for development. This coupled with the demand of large tracts for residential and commercial development, places larger plantations at risk of transfer.

Summary

This study gives an overview of South Carolina's coastal zone plantations between 1988 and 1998. Characteristics of these plantations such as income, land use patterns, and ownership transfer patterns were defined. Coastal zone plantations have made their mark on the identity and overall character of South Carolina's low country. Today, they face subdivision into smaller plots for residential and commercial development. Urban land area in the United States as a whole has been steadily decreasing over the last two decades (Healy, 1985). Healy (1985) reported that the South is exhibiting fast population growth and is a region where rural population is higher than the national average. This results in the consumption of land by urban population expansion. The movement toward urban population expansion puts these prime lands at risk of development, both for residential and commercial activities. Over the years, plantations in South Carolina have kept large tracts of land under single ownership and away from development. These lands are facing pressures to sell, as urban growth means a greater demand for residential, commercial, recreational, and industrial areas (Shonkwiler and Reynolds, 1986).

Seventy of the 185 surveys mailed to plantation owners and/or managers within the coastal zone of South Carolina responded to the survey. The relatively high return rate supports the concern individuals have related to the future of these plantations. Information gathered from this study characterizes coastal zone plantations as relatively large parcels of land generating less than \$100,000 in annual gross income. The predominant land use for most plantations was timber production, which also accounted for the majority of the income generated. Today's plantation has drifted away from the historically important agriculture production. Even within the ten-year period evaluated, the percentage of lands devoted to crop and livestock production on these lands decreased by over 3 percent. It appears the future of plantations will depend on income generated from timber and other sources such as hunting, ecotourism, or other revenue producers such as movie production and rental houses.

One of the surprising realizations from this survey was that plantations were not significantly involved with conservation easements. Plantations that were involved in conservation easements generally only had 50 percent of the average plantation size in an easement. Although many were involved in conservation organizations, it appears that relatively few owners see benefits of having their lands in conservation easements. Lands placed in conservation easements protect them from extensive disturbance and could qualify the donor for tax deductions, tax credits, lower inheritance taxes, and potentially lower property tax assessments.

Between 1988 and 1998, 27 (39 percent) of the 70 plantations surveyed transferred ownership. Of the 302,736 acres included in the plantations surveyed, 70,285.8 acres (23 percent) were transferred

to different ownership. In some instances, only partial acres of the plantation were transferred. However, 67 percent transferred the entire plantation. This included 39 percent generational transfers, or transfers within the family. A majority of the lands were transferred to individuals outside the family. Most of the lands (42 percent) transferred were used for commercial or residential development. From this information, it appears transferred plantations are being developed. A transfer rate of nearly 40 percent over a ten-year period is significant and should cause concern regarding the future of South Carolina's coastal zone plantations. The rate at which these lands are being transferred does not suggest that these plantations will continue to be a part of the culture and identity of South Carolina's low country.

Purchasing of parcels, with otherwise similar characteristics, require greater financial resources for larger parcels than smaller ones (Xu, 1994). This is a result of a higher price for the entire parcel. When viewed on a per acre basis, typically prices for larger parcels will be lower than smaller lands. Tomerlin (1996) reported that there is a converting of larger parcels because of the preference for neighborhoods classified as "communities," particularly at the urban-rural interface. The conversion of larger tracts is accommodated by the lower per acre costs for these lands. Efforts have been directed toward slowing the loss of farmland by many states and counties through instituting "preservation" strategies such as the purchase of development rights, agricultural zoning, and preferential assessment for farmland (Peterson, 1982; Coughlin et al., Undated).

Shonkwiler and Reynolds (1986) report that parcels having development potential will likely crumble to the pressures of conversion to urbanization, regardless of agricultural use incentives. This study noted that more than 40 percent of the land transferred had new land uses of commercial or residential development. With this in mind, it seems that the cultural, historical, and natural resources associated with plantations are in jeopardy of being lost. Over the last ten years, transfer of plantation ownership was nearly 42 percent of all plantations surveyed. Within the coastal zone, there is a wide movement to large residential communities. As our population and residential and commercial expansion increases, so will the pressures to sell large tracts of land once a part of the prime lands of South Carolina's coastal zone.

How do we protect these lands? Conservation Easement. An easement is a simple way of protecting lands from any unwanted development or disturbance to the natural resource. However, an easement can be written to facilitate rights such things as timber production, private residence, or farming. The benefits of conservation easements are not solely the satisfaction of keeping our lands clean and protected for nature and man to enjoy, but they provide financial advantages to the owner to include potential reductions in income tax, estate taxes, gift taxes, and property taxes. With a conservation easement in place, an owner can ensure that the property will never undergo unwanted development, and, the owner may receive tax benefits. Additional policies should be sought to reduce the financial pressures of putting large historical, cultural lands into development. These should focus on reduced

financial burden for those wanting to keep these lands for the benefit of the natural resources, in a more natural state. Plantation owners should explore the benefits of conservation easements and consult with appropriate agencies and groups to customize and easement for the benefit of the land and the owner themselves.

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