Distributional Impacts of Agritourism in the Arkansas Delta Byways region

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Background

The travel and tourism industry is a significant driver of the U.S. economy, creating a $582 billion impact on the nation. Comprising nearly 5 percent of the gross domestic product (GDP), travel and tourism yielded a $14 billion trade surplus for the United States (Southern Governors Association, Tourism Task Force (SGATTF), 2002). In the southern US, where a number of states lag on major indices of economic growth and development, the industry is critical to the region's economy, where it ranks among the top three industries in most states. Travel and tourism produces a $194 billion economic impact in the region - employing over 3 million people (SGATTF, 2002). The benefits of tourism include both tangible (new jobs, state and local tax revenue, etc.) and less tangible (social structure, quality-of-life of residents in tourist destinations, etc.) community effects.

Many parts of North America including large parts of the Southern US have experienced a long period of rural decline (Long and Lane, 2000). While there have been efforts to revitalize the economies, residents are hesitant to change dramatically the physical character and ethos of their landscapes like setting up a prison, nuclear power station or a gambling casino. Agri-tourism is viewed positively but it also has profound social and environmental impacts (Hall et al, 2002). Agri-tourism is a hybrid concept that merges elements of two complex industries—agriculture and travel/tourism—to open up new, profitable markets for farm products and services and provide travel experience for a large regional market. Some examples of agri-tourism include agriculture festivals, antique stores, bed and breakfasts, farmers' markets, mazes (corn, hay), petting zoos, roadside markets, scenic byways tours, wineries, camping, ecosystem preserves, hiking, hunting, living history farms, tractor pulls/hay rides, U-pick it farms (Ramsey and Schaumleffel, 2003). While focusing on agri-tourism, it is also critical to identify the

comparative advantage that each county offers as implementing a uniform policy for cluster of counties might not yield the intended benefits. Further, along with the benefits, there are costs associated as well. For example, majority of visitors to rural areas are urbanites who visit for 2-3 days. The benefits accrue to them (satisfaction derived from leisure and relaxation) and the rural residents (economic benefits) but the costs are borne mostly by the rural community (social and environmental). Lastly, agri-tourism serves the environment well because visitors forgo traditional tourism activities causing damage to the environment and instead opt for eco-friendly leisure activities. While some studies have examined the effects of agritourism in Kentucky, Tennessee, Colorado, California, and New York, enough academic attention has not been focused on the state of Arkansas and examine the economic impacts that an effective agritourism policy can trigger. This study seeks to fill the void by using an agriculture dominated 15-county Arkansas Delta Byways (ADB) region, shown in Figure 1 which includes 8 extreme poverty counties (USDA, 2007) as a case study.

Jensen *et al*. (2005) examined the assistance needs and characteristics of agritourism businesses in Tennessee. 125 responses came from a sample of 381 enterprises thought to be agritourism related. Among the responding agritourism operations, the most common types of attractions included on-farm retail markets, on-farm restaurants/eating establishments, on-farm tours, pick-your-own farms, farm festivals and fairs, pumpkin patches, cut-your-own Christmas trees, and on-farm petting zoos. The median expenditure per visitor as estimated by the agri-tourism business owners was about $15.00. The majority of the spending was on purchasing the venue's product and admission or user fees. The most common types of advertisement used at the operations were word of mouth, business signs, websites, and newspaper advertising.

Jolly and Reynolds (2005) looked at consumer demand for agricultural and

on-farm nature tourism Sacramento and Yolo Counties in California. The purpose of the survey was to assess the level of participation in agricultural and nature tourism, identify consumer preferences for agri-tourism experiences, assess on-farm spending, and uncover consumer values and habits regarding food and the agricultural system. Of 294 respondents, 27 percent were 44 years of age or younger and 48 percent of respondents were female. Sixty-five percent of the respondents indicated that they were “very interested” or “interested” in nature tourism, while 57.3 percent indicated interest in agri-tourism. Sixty-one percent of respondents indicated that they had spent an average of between $5 and $40 on the farm during their visits with 16 percent having spent more than $40. About 67 percent of the respondents who had purchased products at farm-related tourism sites indicated a willingness to pay a price equal to or more than what they would pay for the same or similar products in conventional outlets. Agritourism operators can realize revenue through entrance fees and this study found 68 percent of the respondents indicated that they were willing to pay between $1 and $15 while 5 percent were willing to pay more than $15.

Objective

The major objective of this study is to examine the future potential of agritourism in the ADB region. To achieve this, the study’s specific objectives are to make projections (5 and 10 years) of the agritourism visitors into the ADB region; estimate total agritourism expenditure; and determines their economic impacts on ADB region; estimate per capita impacts of jobs created, output added, value-added and local and state taxes generated.

Arkansas Delta Byways and Agritourism

ADB refers to a 15-county region (Figure 1) in Eastern Arkansas bound by a rich natural and cultural heritage. The region with a total population of 0.42 million in 2005, i.e. about 15 percent of the state's population, accounts for 13 percent of the total state personal income. Only 4 of the 15 counties have population greater than the state average county population of 37,000. The average per-capita personal income of ADB counties is $21,872, compared to the state average of $26,681 i.e.18 percent below the state average (REIS, 2006). Known for its agriculture, visitors come to state parks, wildlife refuges, museums and galleries, archeology sites, national heritage sites, a national forest, and recreational opportunities ranging from hunting and fishing, to hiking, biking and bird watching. Local festivals, blues music events, farm tours, and foods such as catfish and pork barbecue convey the unique flavor of the delta (ADB, 2008). For example, Arkansas, Chicot, Craighead, Cross, Desha, Mississippi counties hold farmers markets during April through November. There are some U-pick farms that operate in Clay, Cross, Greene, Philips and St Francis counties. The share of visitors to the 15 counties expressed in percentages is illustrated in Figure 2.

For many farmers living in this region, rice growing and waterfowl hunting are a way of life. In autumn, after the harvest is complete, the drainage outlets are closed to hold water on the land during the winter months. The region often receives enough rainfall to completely flood the fields, but during dry years, irrigation water from wells is pumped on farms and provides much-needed habitat for waterfowl and other migratory birds. The flooded fields attract a wide variety of waterfowl, including mallards, pintails, green-winged teal, wigeon, shovelers, gadwalls, redheads, and a lot of snows and specklebellies. Waterfowl flock to rice fields because they contain highly nutritious foods. Ducks dabble in the shallow water for waste grain, weed seeds,

and aquatic invertebrates. Geese also eat rice grain, as well as the roots of rice stalks and young green shoots sprouting in the fields. Not surprisingly, flooded rice fields are often excellent places to hunt waterfowl, and many rice farmers receive significant extra income by leasing fields to hunters. Visiting duck hunters also provide an economic boost to rural communities in rice growing regions, when they buy food, lodging, and other goods and services. Stuttgart, in Arkansas county is promoted as "The Rice and Duck Capital of the World," where waterfowl hunting-related tourism is a multi-million dollar business (Ducks.org, 2008).

Conceptual Framework

A combination of time series forecasting and input-output analysis is used in the study. The Box-Jenkins (1976) methodology is used to estimate the Autoregressive Integrated Moving Average (ARIMA) model for the univariate time series data (Gujarati, 1995).

ARIMA

If a time series is stationary, it can be modeled in a variety of ways. Let Y_t represents the number of tourists at time t. If Y_t is modeled as

(1) $$(Y_t - \delta) = \alpha_1(Y_{t-1} - \delta) + u_t$$

where δ is the mean of Y and where u_t is an uncorrelated random error term with zero mean and constant variance σ^2, then Y_t follows a first-order autoregressive, or AR(1), stochastic process. In other words, this model says that the forecast value of Y at time *t* is simply some proportion (α_1) of its value at time *(t-1)* plus a random shock or disturbance at time *t.* In general

(2) $$(Y_t - \delta) = \alpha_1(Y_{t-1} - \delta) + \alpha_2(Y_{t-2} - \delta) + ... + \alpha_p(Y_{t-p} - \delta) + u_t$$

is the case where Y_t is pth order autoregressive, or AR(p) process.

Another way of modeling Y is as follows:

(3) $$Y_t = \mu + \beta_0 u_t + \beta_1 u_{t-1}$$

where μ a constant and *u* is is white noise stochastic error term. In this case Y follows a first-order moving average, or an MA (1) process. More generally

(4) $$Y_t = \mu + \beta_0 u_t + \beta_1 u_{t-1} + \beta_2 u_{t-2} + ... + \beta_q u_{t-q}$$

is an MA(q) process.

It is also likely that Y has characteristics of both AR and MA and is therefore ARMA. Thus Y_t follows and ARMA (1, 1) process if it can be written as

(5) $$Y_t = \theta + \alpha_1 Y_{t-1} + \beta_0 u_t + \beta_1 u_{t-1}$$

This has one autoregressive and one moving average term. θ represents a constant term. In general in an ARMA (p, q) process, there will be p autoregressive and q moving average terms. An ARIMA model can be used to forecast future values of the time series. The goal is to obtain estimates $\hat{Y}_{T+l}$ as the forecast at origin date T for lead time l ($l \geq 1$) of Y_{T+l}. An ARIMA process can be expressed as a linear function of the current and past random shocks as

(6) $$Y_{T+l} = \mu + u_{T+l} + \psi_1 u_{T+l-1} + \psi_2 u_{T+l-2} + ...$$

where μ and the weights ψ_1, ψ_2 ….are determined as functions of the model parameters. The forecast can be written in the form:

(7) $$\hat{Y}_{T+l} = \mu + \psi_1 u_T + \psi_{l+1} u_{T-2} + ...$$

Input requirements from the estimation stage are the model parameter estimates $\hat{\beta}$ and the estimate of the error variance $\hat{\sigma}_u^2$. If a moving average component is present then estimated

residuals enter the forecast. The ψ_i weights are calculated and are used to estimate the forecast variance as $\hat{V}[e_{T+l}]$. A 95% confidence interval is computed as

$$\hat{Y}_{T+l} \pm 1.96 \ \hat{V}[e_{T+l}]^{1/2} \tag{8}$$

This 95% confidence interval is approximate. If the sample period set for the forecasting stage extends beyond the sample period used in the estimation stage, the computations of the variance of residuals is restricted to the sample period so that any post sample deterioration in the fit of the model will not be reflected in standard errors and confidence intervals (Shazam, 2004).

The models discussed above are based on the assumption that the time series are weakly stationary. But most time series, including the number of tourists chosen for this study are nonstationary i.e. they are integrated. If a time series is differenced d times to make it stationary, and ARMA (p, q) model is applied to it, then we say that the original time series is ARIMA (p, d, q), where p denotes the number of autoregressive terms, d the number of times the series has to be differenced to make it stationary, and q is the number of moving average terms.

Input-Output Framework

The input-output framework is used to study the multiplier effects of expenditures made by tourists in each of the sectors (industries). I-O analysis is a means of examining relationships within an economy both between businesses and between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. The resulting mathematical formulae allow one to examine the effects of a change in one or several economic activities on an entire economy (IMPLAN Pro, 1999). While primary I-O study is based on data directly collected from industries, IMPLAN uses secondary input-output data collected from other sources to construct the accounts. There are two phases in I-O analysis, descriptive and predictive modeling. The descriptive model includes information about local economic

interactions known as regional economic accounts. These tables describe a local economy in terms of the flow of dollars from purchasers to producers within the region. Trade flows are also part of the descriptive model. They describe the movement of goods within a region and the outside world. The initial IMPLAN data details all purchases including imported goods and services. When regional economic accounts (REA) are created, imports to the region are removed from the initial data, allowing examination of local inter-industry transactions and final purchases. The REA are used to construct local level multipliers and describe the response of the economy to a stimulus. The multipliers represent the predictive model

Input-output models make a number of assumptions. The basic ones include: (1) all firms in a given industry employ the same production technology (usually assumed to be the national average for that industry), and produce identical products; (2) there are no economies or diseconomies of scale in production or factor substitution; (3) I-O models are essentially linear – double the level of activity/production and you double all of the inputs, the number of jobs, etc; (4) the model doesn't explicitly keep track of time, but analysts generally report the impact estimates as if they represent activity within a single year; (5) the various model parameters are accurate and represent the current year; (6) I-O models are firmly grounded in the national system of accounts that relies on the North American Industry Classification System (NAICS codes) and various federal government economic censuses, in which individual firms report sales, wage and salary payments and employment; (7) the I-O models are generally a few years out-of-date, which usually is not a major problem unless the region's economy has changed significantly; (8) an I-O model represents the region's economy at a particular point in time (Stynes, 2006).

Data and Methods

There are two broad methods of quantitative forecasting for tourism demand, extrapolative and causal (Frechtling, 2001). For this study, extrapolative method (time series) which assumes that a variable's past course is crucial to predicting the future and also account for trends and seasonality is used. The Box-Jenkins (1976) approach which searches for the combination of two forecasting methods (moving average and autoregressive models) and their parameters that minimize the error in simulating the past series is used. The number of future visitors is predicted using the software Shazam. Historical data on number of visitors from 1977 through 2007 to the ADB counties is obtained from the Arkansas Tourism Department (Arkansas Tourism Report, 2007). The 2007 spring internet survey conducted by the State Tourism department provided the proportion of visitors who come specifically for agritourism activities as defined for this study. The activities included are camping (6.8 percent), hiking (6.1 percent), fishing/hunting (5.4 percent), antiques (3.6 percent), festivals (3.3 percent), bird watching (1.6 percent), other activities (4.5 percent). Aggregated, in 2007, about 32 percent of the total visitors came to the ADB region to participate in some type of agritourism activity. After the future values of tourists to the region are forecasted, the number of agritourists is estimated. For year 2012, it is assumed the share of agritourists remains at the 2007 level of 32 percent, and in 2017, it is assumed to increase to 40 percent. The Box-Jenkins method used in forecasting consists of three steps.

Identification: The time series is differenced 2 times to achieve stationarity which is reflected in the plot of the data and autocorrelogram. At this stage we also need to decide how many autoregressive (p) and moving average (q) parameters are necessary to yield an effective but still parsimonious model of the process (i.e. it has the fewest parameters and greatest number of

degrees of freedom among all models that fit the data). In practice, the numbers of the *p* or *q* parameters very rarely need to be greater than 2. For our study, we decide on an ARMA (1,1).

Estimation and Forecasting: At the next step, the parameters are estimated using function minimization procedures, so that the sum of squared residuals is minimized. The estimates of the parameters are used in the forecasting stage to calculate new values of the series and confidence intervals for those predicted values. The estimation process is performed on differenced data; before the forecasts are generated, the series is integrated (integration is the inverse of differencing) so that the forecasts are expressed in values compatible with the input data. In addition to the standard autoregressive and moving average parameters, ARIMA models also include a constant.

For estimating the total expenditure of the agritourists, the group is divided in two; hunters and non-hunters. Hunting is an extremely popular recreational pastime in Arkansas. A 2001 national survey shows that almost one-third of Arkansans hunted, and more than half participated in wildlife-watching activities. In 2001, hunters spent $517 million in Arkansas, of which 20 percent came from non-residents. Those who enjoy watching wildlife spent $244 million, with only 4 percent from non-residents (Farm Press, 2008). The websites of the various professional hunting clubs (Outfitters and Guides, 2008) in the region were used to get an estimate about the per hunter expenditure during a trip. We use a conservative estimate of $350 per person per trip. While the per hunter expenditure is higher than $350, the total number of hunters also includes visitors who come for fishing and thus the average value declines significantly. Similarly, to make an estimation of the direct benefits to rice farmers from leasing their land for hunting, we use a rate of $30 per acre based on a study done by Mississippi Outfitters (Mississippi Outfitters, 2008). About 30 percent of the total rice acreage in Arkansas

Delta is leased out for hunting purposes, which works to about 300, 000 acres of a total of 1,22 million acres in 2007 (Ducks.org). The total hunting expenditure is allocated to sectors based on the proportions provided by USFWS 2006 National Survey on Hunting, Fishing and Wildlife Recreation (Bowsite, 2008).

For the non-hunters, a study conducted in Kentucky is used to provide per capita expenditure of this group (Jensen et al. 2005). Based on the survey conducted, a total of $10.50 is spent per visitor in any of the activities within a farm, like farmers market, corn maze, u-pick farm etc. Further, 90 percent of visitors come for one day trips and thus do not stay in the area. We add another $10 per person toward buying gas, food, and other miscellaneous items for a total of $20.50 per person expenditure. The total expense of $10.50 is allocated equally within 3 sectors in IMPLAN (grain farming, vegetable and melon picking, and fruit farming). Similarly the balance $10 is allocated between food, gas, and miscellaneous expenses.

The forecasted values of future agritourists visitors and per-capita agritourists expenditure are used to estimate the total agri-tourism expenditures in the ADB region. In the second phase, these estimates are used as additional stimulus to the economy in years 2012 and 2017 to assess the economic impact. This is done using the input-output framework within the IMPLAN software. Results are then estimated on a per-capita basis.

Findings

An examination of the correlogram shows that the sample autocorrelation function declines at higher lags to indicate a stationary process. The estimation converged in 18 iterations. The estimated equation is

$$Y_t - 0.2364Y_{t-1} = \hat{u}_t - 0.9282\hat{u}_{t-1} + 2.1276 \quad (9)$$

Where the AR(1) parameter is 0.2364 and the MA(1) parameter is 0.9282. The output also shows that the Ljung-Box-Pierce test statistics are less than the critical values from a chi-square distribution at any reasonable significance level. Therefore the hypothesis of white noise errors is not rejected.

The forecasted values along with the forecast confidence intervals are presented in Figure 3. The number of visitors increases from 2.68 million person trips in 2007 to 3.13 and 3.66 million person trips in 2012 and 2017 respectively i.e. a 16.8 and 16.9 percent increase during 2007-12, and 2012-17 respectively. An examination of the historical data suggest that the growth in tourists will be higher compared to the period 1987-2002 when the number of visitors increased by 8.7, 9.6, and 8.7 percent respectively during 1987-92, 1993-1997, and 1998-2002 respectively. The period 2003-2007 saw a sharp increase in tourists when the visitors percentage increased by over 22 percent. Due to this spike, the estimated model follows a higher growth trajectory into the future.

The total agritourism expenditure in the region, calculated as a product of number of agritourists and per capita expenditure will increase from approximately $80 million in 2012 to $132 million in 2017. Based on trends of visitors into the state and the continued focus of the state and local governments to promote tourism through advertising and development of infrastructure, it is likely that the increasing trend of visitors will continue into the future. Since the study uses forecasts for 5 and 10 years, the estimates are expected to be reliable subject to future uncertainties that might hinder leisure travel decisions.

As illustrated in Figure 2, within the region, there are significant differences in the number of tourists into the 15 counties. While Craighead, and Crittenden counties account for about 41 percent of the total visitors into the region, Chicot, Clay, Cross, Lee, and Poinsett

counties account for about 9 percent of the total visitors into the region. The differences in the flow of visitors can be ascribed not only to presence of major tourist attractions, but also to the disadvantaged economies in the less visited regions.

In the second phase of the study, the economic impact on the region was estimated. The major agritourism expenditure is broadly in 6 major sectors; agritourism activities related to farms and agricultural producers, lease rentals collected by rice farmers for allowing hunting, auto transportation, food, lodging, entertainment and general merchandise. Potential economic impact for 2012 and 2017 including output, employment, value-added and taxes collected are presented in Tables 1 - 4. For purpose of brevity, the 528 sectors in IMPLAN are aggregated into 20 broad categories which are reported.

As illustrated in Table 1, a total of 2,044 and 3,354 jobs will be created in the region as a result of agritourism expenditures. Maximum jobs will be created in the retail trade sector which includes food, beverage stores, gas stations, general merchandise, sporting goods etc. Accommodation and food services sectors which include hotels, motels, other accommodations, food services, drinking places will generate another 347 and 596 jobs in 2012 and 2017 respectively. Agriculture sector which also is a major beneficiary of hunting and other agri based recreation activities has 320 and 430 new jobs that will be created in 2012 and 2017 respectively. There will be 398 and 656 indirect and induced jobs created in 2012 and 2017 as a result of the influx of one-day agritourists and hunters, and birdwatchers etc to the Arkansas delta region.

The impact on output or sales shown in Table 2 in the region also follows trends that exist in employment. In 2012 and 2017, the region will add a total of (including direct, indirect and induced) $113 and $151 million in output as a result of agritourism expenditures. Agriculture, forestry, fish and hunting will add $21 and $28 million in 2012 and 2017

respectively. As mentioned earlier, farmers generate revenue by leasing large rice farms, and also by attracting tourists for various other types of agri-based recreation and leisurely activities. Output in retail trade of which hunting equipment stores (categorized as sporting goods stores) account for a large share, show a major increase in output, with approximately $43 and $57 million in 2012 and 2017 respectively. Similarly, accommodation and food services add output to the tune of $16 and $23 million for the same periods. Due to indirect and induced effects, most of the sectors in the local economy experience an increase in their output levels. Table 3 illustrates the value-added in the region due to the visiting tourists. A total of $59 and $98 million is value-added during 2012 and 2017 respectively. This includes labor income of $37 and $63 million in 2012 and 2017 respectively i.e. about 68. 5 percent of total value added for the same periods. Other proprietary income and indirect business taxes account for the balance value-added of $22 and $35 million to the regional economy in 2012 and 2017 respectively.

The total tax impacts of agritourism illustrated in Table 4 are to the tune of $17 and $28 million in 2012 and 2017 respectively. In both the periods, the total tax was almost equally divided between federal and state/local government. Among the major components of the tax that the federal government receives, income tax, social security tax (employee and employer contributions) account for about 59 percent of the total federal tax. Similarly, the sales and property taxes at the state and local level account for approximately 40 percent of the total tax received.

Table 5 gives a comparison of employment multiplier in 7 sectors within IMPLAN in the ADB region, Craighead, Crittenden (relatively economically prosperous counties), Lee and Chicot (economically depressed and high poverty counties) counties. It is evident that the average Type I & II multiplier values are higher in Craighead and Crittenden (they have the

highest number of visitors) compared to Lee and Chicot counties (with very low share of visitors to the region). The reason the multiplier values are lower in each of counties is due to the presence of multiplier value with zero value in some sectors; 2 in Crittenden, 1 in Craighead, 4 in Lee and 3 in Chicot.

Conclusion and Discussion

Using the ARIMA forecasting technique makes the predictions credible and reliable compared to most other available statistical techniques. It is observed that agritourism as a share of aggregate tourism contributes significantly to the ADB regional economy. Counties that attract more visitors (shown in Figure 2) are the relatively economically prosperous counties of the region. Due to this the multiplier effects of each dollar spent by agritourists is higher compared to the counties that attract fewer tourists (Table 5). Crittenden County with the maximum visitors ranks highest in per capita distribution of travel expenditure generated and per capita employment generated in 2006. The impacts are greater also because of their larger and more diversified economies due to which there is less leakage from those counties. Additionally, due to the already existing tourism infrastructure and network, those areas find it easier to attract more tourists. On the other hand, Lee County that has the lowest number of visitors is ranked lowest in the indices cited above. Counties at the lower end of the ladder on the major indices estimated are trapped in a cycle of low economic activity, fewer tourists, and lesser economic impact from which it is hard to recover. There is a ripple effect at work through time wherein the unattractiveness of the economically disadvantaged regions partially due to lack of adequate focus on tourism draws fewer visitors. The low multiplier values (Table 5) due to pre-existing economic conditions in turn result in tourism expenditures not translating into output and

employment growth being as pronounced as in the other relatively prosperous regions. This further leads to not enough importance being attached to tourism and this vicious cycle continues to be repeated in those counties from which they are unable to recover.

The presence of the economically depressed counties dilutes the economic impact of the region to certain degree. For example, Arkansas County, designated as high poverty region attracts a large number of hunting visitors, but due to low employment, output and tax multipliers, the economic impacts are below other economically prosperous counties. Increased focus to develop and advertise these counties will not only help bring in more tourists, it will reinvigorate the local economies and allow them to reap greater benefits in the long run.

Additionally, agriculture in the ADB region is in a critical phase. USDA projected that Arkansas rice producers in the delta region will plant 1.22 million acres of long, medium and short grain rice in 2007. This was 13.2 percent below the 2006 level and below 20 percent over the average of the past five (2002-2006) years. The reduction in U.S. rice acreage was expected due to the added cost of production, lack of adequate pricing opportunities, other crop alternatives for many Mississippi River Valley Delta producers, trade barriers, and the biotech rice issue. The cost of production increased, i.e. a 2,300 acre rice farm that had fuel costs of around $60,000 in 2004 will have costs in excess of $135,000 this production season. Rice prices never reached or stayed at a level sufficient to encourage additional planted acreage. Strong global demand for commodities as a group coupled with the demand for corn in the production of ethanol has Arkansas and Mississippi River Valley Delta producers expanding their feed grain acreage. Rice is one of the most protected commodities in the world. A good example is South Korea’s unwillingness to include rice in the U.S. and South Korea trade agreement. Lastly, the

biotech rice issue put additional uncertainty into the market and limited planting seed availability (Agricultural and Food Policy, 2008).

Agritourism offers an opportunity for the regions farming community to rely on an additional source to augment their income levels. In spite of the potential, there has been no organized study at the state or regional level to list the agritourism operations in the region. The first step toward a better understanding will be to undertake a survey to assess the existing agri based recreation enterprises in the region. Residents need to use word of mouth to publicize the presence of agritourism attractions within their communities with friends and relatives in nearby cities and within the state. Agritourism does not require huge expenditures, rather careful planning to use available farm resources for recreation purposes with minimal damage to the environment. The popularity of farmers' markets is increasingly becoming a key driver of economic development in many rural and urban areas. However, not all the counties in the ADB region have farmers markets. Local communities should organize to set up farmers markets within a 30-40 mile radius of their farms. Some of the benefits of farmers' markets include: showcasing local produce and products, encouraging visitors from other areas, showcasing the local and regional areas, allowing for community events to be incorporated , providing distribution opportunities for small businesses, valuable contribution to the economic development of the area as money is spent locally, and infrastructure development.

The results and strategy outlined reinforce the adoption of agritourism as a strategy for economic and rural development for a number of reasons. The most important of them is to initiate a discussion on the growing importance of agritourism and what the state and local governments need to do to help local farming communities get involved in starting an agritourism activity. In an era of increasing input costs, and the challenges in global trade, use

agritourism as a supplementary economic growth engine in rural counties to promote long-term economic growth that provides financial cushion to farmers during good times and insurance during unfavorable times. Studies such as this provide reliable information to state and local government officials engaged in policy-making to assess the growing significance of agritourism and any changes that might be required in public funding or promoting certain areas. Highlighting the role of internet in reaching out to a wider audience and using it as a medium to access information from agritourism entities in other parts of the world and experiment them in rural counties. Make efforts to make popular destinations currently favored by visitors sustainable in the long run. Using agritourism as a way to revitalize rural communities and reversing the rural out-migration as well as combating rural poverty in the regions high poverty counties.

In the ADB region where agriculture is still dominant, agritourism can create new jobs which can help to reduce the high unemployment rates in the region. Local governments can also benefit from tax revenue generated to develop infrastructure and promote more agritourism activities. Forecasting future agritourists arrivals and the likely economic impacts accurately are helpful for businesses, and farmers interested to adopt agritourism. Businesses can set marketing goals, simulate the impact of future events on demand, determine operational requirements, and study the financial feasibility of new infrastructure. From a policy maker's perspective, it helps to understand the economic consequences of visitor's better and enables them to budget revenues for additional public investment in meeting the needs of the projected tourists, and ensure adequate infrastructure development including roads, highways, airports, energy and water utilities etc. Overall, sound demand forecast can reduce risks of decisions and the costs of attracting and serving the tourists (Frechtling, 2001).

References

Agricultural and Food Policy, Agri Outlook Radio, Number 42
http://www.aragriculture.org/agfoodpolicy/radio/may2007/042_05082007_audio.htm

Arkansas Tourism, Economic Report Accessed on 12/23/2007
http://www.arkansas.com/economic_report05/APT%20annual%20P72_106.pdf

Arkansas Delta Byways (ADB), Accessed on 04/21/2008
http://www.deltabyways.com/region.htm

Box, G.E.P., and Jenkins, G.M., Time Series Analysis: Forecasting and Control, Holden-Day, 1976

Bowsite.com, Accessed on 04/30/2008
http://bowsite.com/bowsite/features/articles/2006survey/

Ducks.org, http://www.ducks.org/Page1767.aspx, Accessed 04/25/2008

Farm Press, Accessed on 04/26/2008
http://deltafarmpress.com/news/farming_wildlife_leases_reduce/

Fretchling Douglas C., *Forecasting Tourism Demand: Methods and Strategies,* Butterworth Heinemann, Boston, 2001

Gujarati. N. D. *Basic Econometrics,* Third Edition, McGraw-Hill, Inc, 1995

Hall Derek, Lesley Roberts and Morag Mitchell, (Ed.), *New Directions in Rural Tourism,* Ashgate Publishing, 2003

IMPLAN, Minnesota IMPLAN Group, Inc., 2003

Jensen, K., G. Dawson., M. Bruch., J. Menard, and B. English. *Agri-tourism in Tennessee: Current Status and Future Growth, 2003-2004.* Agri-Industry Modeling and Analysis Group. Department of Agricultural Economics, The University of Tennessee, July 2005. http://web.utk.edu/~aimag/pubs/agritour.pdf

Jolly, D. and K. Reynolds. *Consumer Demand for Agricultural and On-Farm Nature Tourism*. Small Farm Center, University of California-Davis, 2005.

Long, P and Lane. B, 'Rural Tourism Development', in W. C. Gartner and D.W. Lime (eds), *Trends in Outdoor Recreation, Leisure and Tourism,* CAB International, Wallingford, pp 299-308.

Mississippii Outfitters, Accessed on 04/23/2008
http://www.outfitters.org/leasing.html

Outfitters and Guides, http://www.outfittersandguides.com/arkansas.htm
Accessed, April 29, 2008

Ramsey M., and Nathan A. Schaumleffel, Agritourism and Rural Economic Development, *Indiana Business Review*, Vol. 81, No.3, 2006.

Regional Economic Information System (REIS), 1969-2005, U. S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, Washington, D.C., 2005

Shazam for Windows, Standard Edition, 2004

Southern Governors Association, Tourism Task Force (SGATTF), *Report and Recommendations*, January 31, 2002.

Stynes Daniel J., "Economic Impact of Tourism"
http://www.msu.edu/course/prr/840/econimpact/pdf/ecimpvol1.pdf,
Accessed on Dec 27, 2006

United States Department of Agriculture (USDA) United States Department of Agriculture, Accessed: December 2007.
http://www.ers.usda.gov/Briefing/incomepovertywelfare/HighPoverty/

Young. Matt, Rice and Ducks
http://www.ducks.org/Page2892.aspx, Accessed 04/26/2008

Figure 1. 15-county Arkansas Delta Byways region

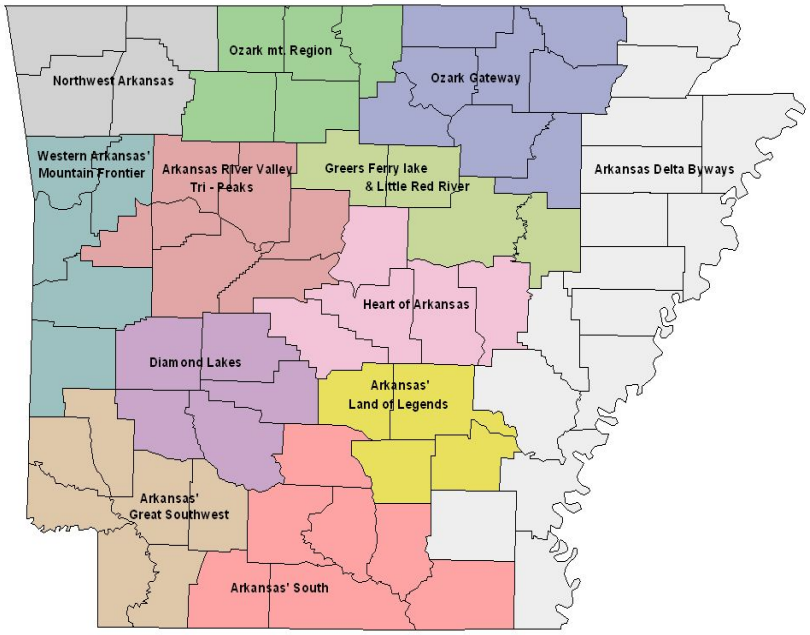
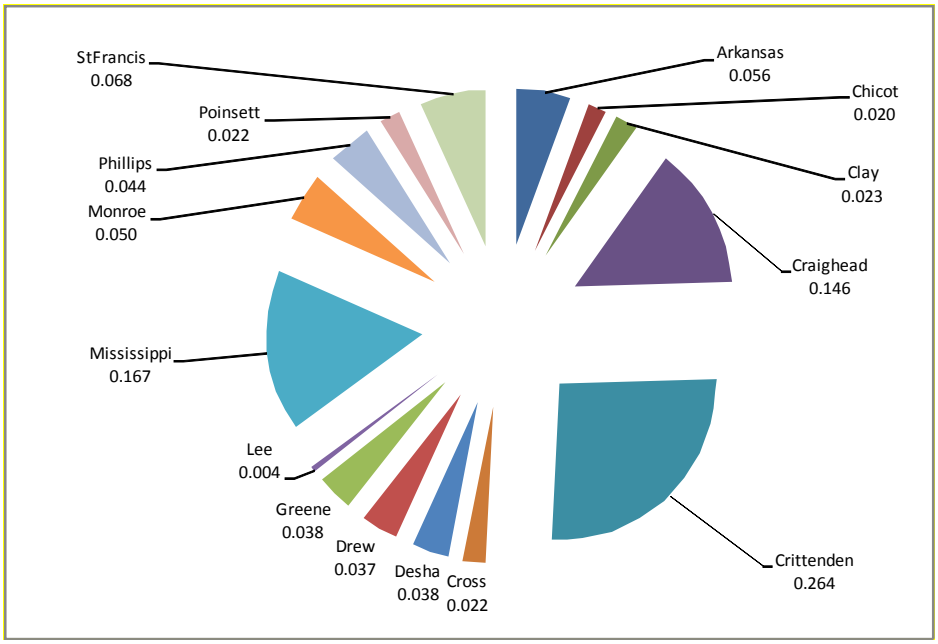


Figure 2. Tourist share of counties in Arkansas Delta Byways (2007)



(Source: Arkansas State Tourism Department, 2007 Report)

Figure 3. Original data series and forecast values of tourists into ADB region

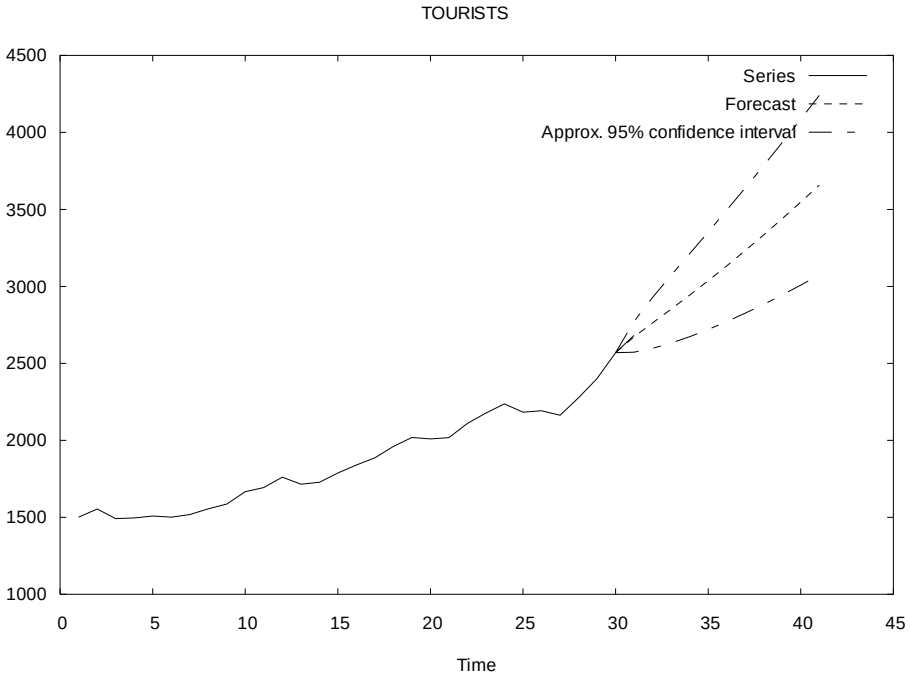


Table 1: Employment Impacts of Future Agritourists in 2012 and 2017

Industry	2012				2017			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Ag, Forestry, Fish & Hunting	280	38	2	320	372	55	4	430
Mining	0	0	0	0	0	0	0	0
Utilities	0	1	1	2	0	2	2	3
Construction	0	6	2	8	0	9	3	13
Manufacturing	0	7	6	14	0	12	11	23
Wholesale Trade	0	6	8	14	0	9	13	22
Transportation & Warehousing	0	9	5	14	0	15	9	23
Retail Trade	1,047	4	63	1,114	1,779	6	106	1,891
Information	0	3	3	6	0	6	5	10
Finance & Insurance	0	4	9	13	0	6	15	21
Real Estate & Rental	0	15	13	28	0	24	21	45
Professional- Scientific & Tech Services	0	6	6	12	0	10	10	20
Management of Companies	0	3	1	3	0	4	1	5
Administrative & Waste Services	0	11	9	20	0	19	15	34
Educational Services	0	0	4	4	0	0	6	6
Health & Social Services	0	0	66	66	0	0	111	111
Arts- Entertainment & Recreation	0	1	6	8	0	2	10	13
Accomodation & Food services	306	5	36	347	528	8	61	596
Other Services	0	4	31	36	0	7	52	59
Government & Non NAICs	12	2	3	17	20	4	5	29
Total	**1,646**	**124**	**274**	**2,044**	2,698	198	458	3,354

Table 2. Output Impacts of Future Agritourists in 2012 and 2017 (dollars)

	2012				2017			
Industry	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Ag, Forestry, Fish & Hunting	19,866,244	1,303,027	152,357	21,321,628	26,553,600	1,585,165	218,998	28,357,762
Mining	0	117	107	224	0	157	146	303
Utilities	0	356,317	423,454	779,771	0	470,803	567,988	1,038,791
Construction	0	427,908	169,270	597,178	0	613,263	244,761	858,024
Manufacturing	0	2,556,308	1,681,296	4,237,604	0	3,229,547	2,325,855	5,555,402
Wholesale Trade	0	659,204	867,467	1,526,671	0	857,441	1,176,452	2,033,892
Transportation & Warehousing	0	883,708	543,007	1,426,715	0	1,225,138	764,623	1,989,761
Retail Trade	39,648,644	206,149	3,537,112	43,391,904	52,248,432	269,523	4,555,174	57,073,132
Information	0	686,084	662,507	1,348,590	0	953,768	919,751	1,873,520
Finance & Insurance	0	574,143	1,404,339	1,978,482	0	751,476	1,878,829	2,630,305
Real Estate & Rental	0	1,719,864	1,374,453	3,094,317	0	2,200,725	1,864,502	4,065,228
Professional- Scientific & Tech Services	0	529,222	548,716	1,077,938	0	698,864	718,713	1,417,577
Management of Companies	0	427,231	114,494	541,725	0	504,310	132,751	637,060
Administrative & Waste Services	0	464,951	348,918	813,868	0	643,366	482,583	1,125,949
Educational Services	0	1,283	121,972	123,255	0	1,733	162,943	164,676
Health & Social Services	0	337	5,885,581	5,885,919	0	418	7,183,543	7,183,961
Arts- Entertainment & Recreation	0	41,053	237,187	278,240	0	59,479	342,108	401,587
Accomodation & Food services	14,301,917	215,713	1,738,027	16,255,657	19,894,080	297,223	2,363,116	22,554,418
Other Services	0	339,607	1,295,824	1,635,432	0	418,172	1,787,311	2,205,483
Government & Non NAICs	2,765,708	620,166	3,292,040	6,677,914	3,510,720	725,941	5,967,400	10,204,061
Total	76,582,513	12,012,394	24,398,126	112,993,031	102,206,832	15,506,510	33,657,545	151,370,890

Table 3. Value-added impacts of Future Agritourists in 2012 and 2017 (dollars)

	2012				2017			
Industry	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Ag, Forestry, Fish & Hunting	10,651,350	778,251	58,485	11,488,087	16,538,540	1,135,245	97,745	17,771,530
Mining	0	69	64	133	0	115	106	221
Utilities	0	194,909	221,518	416,427	0	321,803	370,218	692,022
Construction	0	168,774	61,095	229,869	0	279,638	102,107	381,745
Manufacturing	0	511,699	329,379	841,078	0	808,711	550,485	1,359,196
Wholesale Trade	0	406,856	535,394	942,251	0	652,159	894,795	1,546,954
Transportation & Warehousing	0	442,241	250,638	692,879	0	721,589	418,886	1,140,475
Retail Trade	25,446,680	119,548	2,052,472	27,618,700	43,478,856	202,839	3,430,258	47,111,952
Information	0	217,856	261,125	478,981	0	370,642	436,413	807,055
Finance & Insurance	0	300,942	656,499	957,442	0	488,199	1,097,195	1,585,394
Real Estate & Rental	0	957,786	753,932	1,711,718	0	1,509,524	1,260,032	2,769,556
Professional- Scientific & Tech Services	0	213,777	244,014	457,791	0	357,812	407,816	765,627
Management of Companies	0	150,763	40,403	191,166	0	256,522	67,525	324,047
Administrative & Waste Services	0	204,471	153,027	357,498	0	343,723	255,751	599,474
Educational Services	0	327	43,837	44,164	0	553	73,264	73,816
Health & Social Services	0	104	2,539,457	2,539,561	0	174	4,244,147	4,244,321
Arts- Entertainment & Recreation	0	23,119	125,346	148,466	0	39,355	209,489	248,844
Accomodation & Food services	5,327,804	77,546	594,702	6,000,053	9,156,228	131,830	993,915	10,281,972
Other Services	0	113,082	535,618	648,700	0	184,485	895,168	1,079,653
Government & Non NAICs	558,233	126,387	2,573,071	3,257,691	930,856	204,695	4,300,324	5,435,875
Total	41,984,067	5,008,509	12,030,075	59,022,651	70,104,480	8,009,610	20,105,638	98,219,728

Table 4. Tax Impacts of Future agritourists in ADB region in 2012 and 2017 (dollars)

		2012	2017
Federal Government Non Defense		Total	Total
	Corporate Profits Tax	797,708	1,302,376
	Indirect Bus Tax: Custom Duty	166,679	280,814
	Indirect Bus Tax: Excise Taxes	531,971	896,244
	Indirect Bus Tax: Fed NonTaxes	180,699	304,434
	Personal Tax: Estate and Gift Tax		0
	Personal Tax: Income Tax	2,668,985	4,453,796
	Personal Tax: NonTaxes (Fines- Fees)		0
	Social Ins Tax- Employee Contribution	2,199,160	3,692,153
	Social Ins Tax- Employer Contribution	1,793,186	3,061,863
	Sub Total	8,338,387	13,991,680
State/Local Govt Non Education	Corporate Profits Tax	118,575	193,592
	Dividends	336,302	549,063
	Indirect Bus Tax: Motor Vehicle Lic	68,033	114,619
	Indirect Bus Tax: Other Taxes	167,013	281,376
	Indirect Bus Tax: Property Tax	1,457,720	2,455,910
	Indirect Bus Tax: S/L NonTaxes	252,609	425,585
	Indirect Bus Tax: Sales Tax	4,979,320	8,388,965
	Indirect Bus Tax: Severance Tax	22,102	37,237
	Personal Tax: Estate and Gift Tax		0
	Personal Tax: Income Tax	738,270	1,231,940
	Personal Tax: Motor Vehicle License	46,777	78,056
	Personal Tax: NonTaxes (Fines- Fees)	36,007	60,084
	Personal Tax: Other Tax (Fish/Hunt)	31,155	51,989
	Personal Tax: Property Taxes	11,681	19,491
	Social Ins Tax- Employee Contribution	17,082	29,167
	Social Ins Tax- Employer Contribution	55,411	94,614
	Sub Total	8,338,056	14,011,688
	Total	16,676,444	28,003,368

Table 5. Comparison of Employment Multipliers in Selected Counties in the Arkansas Delta Byways Region

IMPLAN Code	Sector	ADB		Crittenden		Craighead		Lee		Chicot	
		Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II
2	Grain Farming	1.16	1.34	1.07	1.21	1.15	1.33	1.14	1.24	1.12	1.23
3	Veg/Melon Farming	1.54	2.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Fruit Farming	1.43	2.52	0.00	0.00	1.39	2.18	0.00	0.00	0.00	0.00
407	Gas Stations	1.06	1.25	1.06	1.23	1.06	1.26	1.04	1.18	1.02	1.11
409	Sporting Goods	1.01	1.13	1.01	1.09	1.01	1.14	0.00	0.00	0.00	0.00
479	Hotels/Motels	1.05	1.18	1.05	1.16	1.06	1.20	0.00	0.00	1.02	1.09
481	Food Services	1.09	1.22	1.08	1.20	1.10	1.25	1.04	1.10	1.05	1.11
	Average	**1.19**	**1.64**	**0.75**	**0.84**	**0.97**	**1.19**	**0.46**	**0.50**	**0.60**	**0.65**