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## **Evaluating Consumer Perceptions and Preferences for Pasture-Raised Pork in the Mississippi Delta of Arkansas**

**Paul W. Armah and Donald Kennedy**

This research provides baseline information about consumers' concerns, preferences, and market existence for pasture-raised pork in the Mississippi Delta area of Arkansas. Consumer preferences for pasture-raised pork are evaluated by examining the relationships between consumers' willingness to buy and their perception and acceptance of pasture-raised pork. The hypotheses were developed based on a market survey conducted during 1998. Using maximum-likelihood behavioral and demographic models, our results show consumer preferences drive the assured market that exists for pasture-raised pork in urban areas of the Delta among affluent, educated, health-conscious consumers who are prepared to pay a premium price for it.

**Key Words:** Arkansas, consumer preferences, market potential, Mississippi Delta, pasture-raised pork

Traditional row crops, such as cotton, rice, and soybeans, produced on large-scale farms, dominate agriculture in the Mississippi Delta of Arkansas. Many limited-resource farmers engaged in the production of these row crops are finding it very difficult to operate efficiently and to compete in the market place because they lack the necessary resources to achieve economies of scale in production. It is therefore essential that these farmers consider diversifying into some form of sustainable alternative agriculture to significantly improve their performance and income potential (Brown, Dagher, and McDowell, 1992). Unfortunately, limited-resource farmers in the Delta area of Arkansas lack knowledge of feasible alternative enterprises, markets, production practices, and the financial resources necessary to bring about a desired change (Rogers and Dagher, 1989). As global competition for row crops increases and consumer food preferences change, it is critical that limited-resource farmers develop the necessary knowledge and expertise to compete in the production and marketing of market-driven, ecologically friendly products which require less resources and enable them to improve their incomes.

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One such product is pasture-raised pork, a value-added product that has sparked a market niche in Minnesota (Cramer, 1990). Some of these pork products have been marketed under the U.S. Department of Agriculture (USDA)-approved "Pastureland Farms" label (i.e., the meat comes from pigs that are free to roam about on pasture, without sub-therapeutic levels of antibiotics and sulfa drugs). These pasture-raised pork operations have transformed the rural communities where they are located and can serve as models for other communities. The impact of pasture-raised pork on rural development is therefore a critical issue for sustainable agriculture, and could expand economic opportunities for limited-resource farmers in rural communities of eastern Arkansas.

Under a project funded by the Southern Region Sustainable Agriculture Research and Education (SARE) Program, limited-resource farmers were selected and given training to diversify into an alternative pork production system suitable for their farms and the region. These systems were designed to provide alternative, pasture-based approaches for producing swine on marginal cropland to provide these farms with supplemental income. Presently, these swine producers are using conventional markets; however, alternative markets need to be identified and developed to assist these farmers as the number of conventional markets declines.

As with many new food items, the market for pasture-raised pork is confined to niches, and consequently the availability of this product is not widely known to consumers in the Delta area. This is perhaps a result of supply. Nevertheless, limited-resource farmers can continue to adopt or allocate their production resources to the pasture-raised production system only if there is market potential for their pork products.

These farmers specifically want to know, among other things, how Delta consumers will perceive their pasture-raised pork. Might a "pasture-raised" label discourage Delta consumers from buying the pork? Will Delta consumers purchase their pasture-raised pork? What are the characteristics of Delta consumers who will buy pasture-raised pork? Will Delta consumers pay a premium for pasture-raised pork?

Our study seeks to answer these questions. Toward this end, we assess the market potential for pasture-raised pork in the Mississippi Delta of Arkansas by examining the relationships between Delta consumers' willingness to buy and pay premium prices for pasture-raised pork and consumer perceptions and acceptance of pasture-raised pork in the Delta area.

While this study examines the market potential for pasture-raised pork, the authors believe the preferences and willingness of Delta consumers to purchase and consume pasture-raised pork are likely to be influenced by their perceptions and attitudes toward this product as a healthy food source. A review of the literature shows many previous investigations of the characteristics influencing consumers' choices and/or preferences for various fresh and processed meats (e.g., Schupp, Gillespie, and Reed, 1998b; Erikson et al., 1998). To the best of our knowledge, however, none have examined the factors influencing consumer preferences for pasture-raised pork. Earlier studies on pasture-raised pork focused either on economic production analysis or on comparative production analysis of pasture and confined farrowing

systems (e.g., Bache and Foster, 1991; Honeyman, 1995; Ballard, 1998; Honeyman and Penner, 1998; Jennings et al., 1998).

We are unaware of any previous research on socioeconomic and behavioral factors influencing Delta consumers' choices or preferences for pasture-raised pork over conventional-grown pork. In addition, the term "pasture-raised pork" has not been clearly defined in the literature or in marketing cycles, and could refer to a large variety of pork characteristics. Pasture-raised pork products are relatively new in the Delta area. This may complicate the development or identification of markets for pasture-raised pork. While other studies have also examined consumer usage of labels on processed fresh meat (e.g., Piedra, Schupp, and Montgomery, 1996; Schupp, Gillespie, and Reed, 1998a), none specifically evaluated consumer usage of labels on pasture-raised pork.

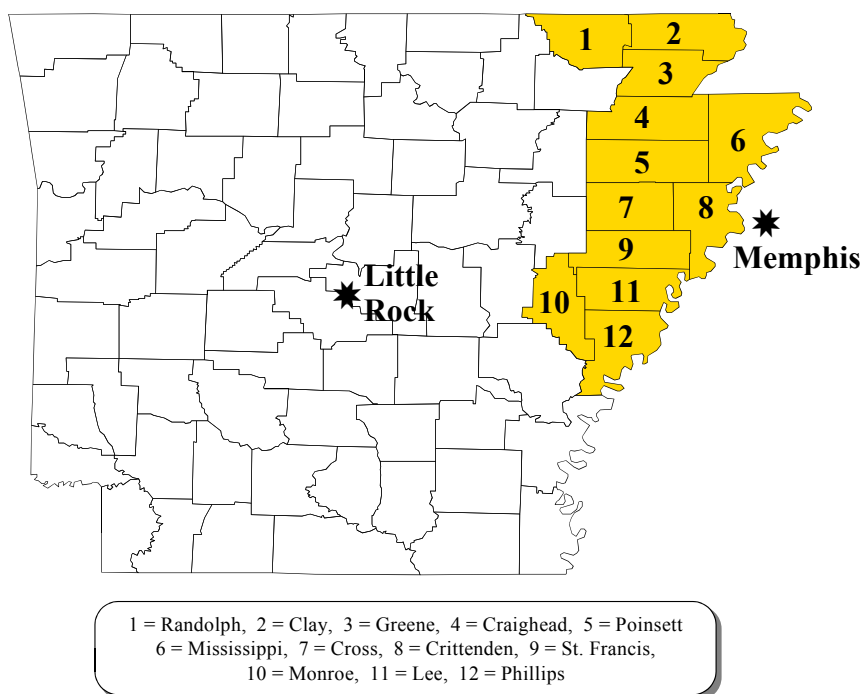
In order to determine if Delta consumers considered conventional and pasture-raised pork as environmentally sound, healthy food products, the project investigators proposed consideration of the following relationship assumptions:

- Choice of purchase of pork may differ by socioeconomic characteristics of respondents in the Delta area. This hypothesis is based on previous research showing the relationship of socioeconomic characteristics to consumer purchase decisions (Lin, 1995; Nayga, 1997).
- Preferences for pasture-raised pork may differ by behavioral characteristics of Delta consumers. Based on this premise, the investigators hypothesized that health-conscious urban consumers in the Delta may prefer pasture-raised pork to conventionally (confined) produced pork—a theory supported by the fact that pasture-raised pork is naturally produced without antibiotics or hormones.
- If Delta consumers view pasture-raised pork products as lean and of high quality, they may pay a premium for them over conventionally raised pork products.

The project investigators believe that testing these hypotheses may be helpful in assessing the extent of market potential for pasture-raised pork in the Delta area of Arkansas. Identifying the extent and specific consumer characteristics of this market may also provide guidance for limited-resource farmers considering raising hogs on pasture.

## Methods

The hypotheses were developed based on results of a market survey conducted in Arkansas over May–November of 1998. The project investigators held that accurate description of market opportunities and consumer preferences for pasture-raised pork must precede thoughtful research analysis; therefore the focus of the market survey was both descriptive and analytical. The study randomly selected a sample of 1,200 households from 12 agricultural districts in the Mississippi Delta area of



**Figure 1. Map of Arkansas showing 12 Mississippi Delta counties and two major cities comprising the survey area**

Arkansas for mail and personal interviews. These 12 agricultural districts are Clay, Crittenden, Cross, Craighead, Greene, Mississippi, Monroe, Lee, Poinsett, Phillips, Randolph, and St. Francis counties. Two cities, Little Rock and the nearby Tennessee border city of Memphis, were also included in the sample because they possess households with diverse socioeconomic backgrounds, have large markets for lean meat, and are therefore potential markets for pasture-raised pork. The study employed a stratified random sampling procedure whereby the number of surveys conducted was higher in districts with higher populations. A map of the survey area is presented in figure 1.

Following Dillman's (1991) survey design, a mail questionnaire was designed and distributed to the sampled population. Nonresponsive households were followed up with telephone interviews. As an incentive to participate, respondents were provided with a lottery ticket for a chance to win one of three \$100 gift certificates. The combined mailed surveys and personal interviews produced an overall response rate of approximately 45%. Following elimination of unusable surveys with incomplete or missing information, the final number of survey respondents was 480, representing a final response rate of 40%. The authors believe the gift certificate award may have influenced the high response rate, although its impact was not verified during the research.

In assessing the extent of market opportunity and preference for pasture-raised pork, respondents provided a “Yes” or “No” answer to questions about whether they would buy and eat pasture-raised pork, and whether they would pay a few cents per pound more for pasture-raised pork over conventional pork. To analyze these choices, the project investigators used a maximum-likelihood logit estimation based on the following cumulative logistic probability function:

$$(1) \quad P_i = F(Z_i) = \frac{1}{1 + e^{-Z_i}} = \frac{1}{1 + e^{-(\alpha + \beta X_i)}}$$

where  $P_i$  is the probability that the  $i$ th household will make a certain choice, given the observed level of  $X_i$ . The maximum-likelihood model assures consistency and asymptotic normality of parameter estimates for large samples (Capps and Kramer, 1985).

While the parameter estimates from the maximum-likelihood analysis only indicate a direction of influence on probability, the actual changes in the probability are provided by the magnitude of the marginal probability effects (Maddala, 1988). An appropriate regression estimate of equation (1), given (0, 1) dependent variables, is the logarithm estimate of the odds that a choice  $P_i$  will be made given  $X_i$  (Pindyck and Rubinfeld, 1991). This can be shown as:

$$(2) \quad \log\left(\frac{P_i}{1 - P_i}\right) = Z_i = \alpha + \beta X_i.$$

The cumulative logistic probability model, which can estimate the log of the odds that a particular decision will be made, yields large sample properties of consistency and asymptotic normality of the parameter estimates allowing conventional tests of significance to be applied. In this scenario, the likelihood of a household buying pasture-raised pork and/or paying a premium price for pasture-raised pork over conventional-produced pork were chosen as functions of a set of predetermined variables.

In analyzing consumer answers (“Yes” = 1, “No” = 0) as to whether they would buy and pay a premium price for pasture-raised pork over conventional-grown pork, the dependent variables  $CHS$  and  $PAY$  were used as functions of household behavior and socioeconomic characteristics, respectively, in model specifications (3) and (4):

$$(3) \quad CHS = \beta_0 + \sum_{k=1}^n \beta_k \mathbf{BehVar} + \sum_{k=1}^n \beta_k \mathbf{SocVar},$$

$$(4) \quad PAY = \gamma_0 + \sum_{k=1}^n \gamma_k \mathbf{BehVar} + \sum_{k=1}^n \gamma_k \mathbf{SocVar},$$

where **BehVar** represents variables of consumer behavior toward pasture-raised pork, **SocVar** represents consumer socioeconomic variables, and  $\beta$ 's and  $\gamma$ 's represent parameter estimates. The explanatory behavior and socioeconomic variables hypothesized to influence equations (3) and (4) are defined in table 1.

**Table 1. Explanatory and Socioeconomic Variables**

Variable	Description/Definition
<b>DEPENDENT VARIABLES:</b>	
<i>CHS</i>	I would buy and eat pasture-raised pork [yes = 1, no = 0]
<i>PAY</i>	I would pay more per pound for pasture-raised pork [yes = 1, no = 0]
<b>SOCIOECONOMIC VARIABLES (SocVar):</b>	
<i>URBAN</i>	Urban population > 20,000 = 1, otherwise = 0; base = rural population ( <i>RURAL</i> )
<i>FEMALE</i>	Gender variable, where respondent is female = 1, otherwise = 0
<i>EDUC</i>	Education (where base = less than high school): <ul style="list-style-type: none"> <li>• <i>EDUC/LHSCH</i>: Less than high school = 1, otherwise = 0</li> <li>• <i>EDUC/HSCH</i>: High school = 1, otherwise = 0</li> <li>• <i>EDUC/PHSCH</i>: Post high school = 1, otherwise = 0</li> </ul>
<i>AGE</i>	Age of respondent in years
<i>MARITAL</i>	Marital status, where respondent is married ( <i>MRD</i> ) = 1, otherwise = 0
<i>JOB</i>	Employment, where respondent works full or part-time = 1, otherwise = 0
<i>INCOME</i>	Household income (where base = <i>INCOME2</i> ): <ul style="list-style-type: none"> <li>• <i>INCOME1</i>: Household income &lt; \$25,000 = 1, otherwise = 0</li> <li>• <i>INCOME2</i>: Household income &gt; \$25,000 but &lt; \$50,000 = 1, otherwise = 0</li> <li>• <i>INCOME3</i>: Household income &gt; \$50,000 = 1, otherwise = 0</li> </ul>
<i>HOUSE</i>	Household has one or more child = 1, otherwise = 0
<b>BEHAVIOR VARIABLES (BehVar):</b>	
<i>AWARE</i>	Respondent has heard of pasture-raised pork = 1, otherwise = 0
<i>PREF</i>	Pasture-raised preferred over conventional-produced pork = 1, otherwise = 0
<i>QUALITY</i>	Quality is important in pork purchasing decision = 1, otherwise = 0
<i>LOCAL</i>	Locally produced pork is preferred = 1, otherwise = 0
<i>LABEL</i>	Label is useful in pork purchasing decision = 1, otherwise = 0
<i>LEAN</i>	Respondent considers pasture-raised pork lean = 1, otherwise = 0
<i>HEALTHY</i>	Respondent views pasture-raised pork as healthy = 1, otherwise = 0

Preliminary runs were conducted to evaluate the impact of various independent variables within the behavior and socioeconomic groupings to establish their rate of influence on the dependent variables (*CHS* and *PAY*). The description of base independent variables and omitted variable categories in the *CHS* and *PAY* models are reported in table 2.

## Results

Our analysis estimated the extent of the predictive accuracy for both the *CHS* and *PAY* models. The *CHS* model correctly classified 74% of the respondents as either those who will buy and eat pasture-raised pork or who will not buy and eat pasture-

**Table 2. Response Frequency Rates and Description of Base Independent Variables in the CHS and PAY Models (with omitted categories identified)**

Survey Question/Variable	Response	Fre- quency	%	Std. Dev.
<b>DEPENDENT VARIABLES:</b>				
• Will you choose/buy pasture-raised pork over conventional pork? ( <i>CHS</i> )	Yes	331	0.69	0.4833
	No	149	0.31	0.4833
• Will you pay more for pasture-raised pork over conventional pork? ( <i>PAY</i> )	Yes	282	0.59	0.4356
	No	198	0.41	0.4356
<b>SOCIOECONOMIC VARIABLES (SocVar):</b>				
• Respondent's community: ( <i>URBAN</i> )	Urban	287	0.60	0.5009
	( <i>RURAL</i> ) Rural <sup>a</sup>	193	0.40	0.5009
• Respondent's gender: ( <i>FEMALE</i> )	Female	303	0.63	0.4795
	( <i>MALE</i> ) Male <sup>a</sup>	177	0.37	0.4795
• Education: ( <i>EDUC/PHSCH</i> )	Post high school	251	0.52	0.4123
	( <i>EDUC/HSCH</i> ) High school	166	0.35	0.4622
	( <i>EDUC/LHSCH</i> ) Less than high school <sup>a</sup>	63	0.13	0.4126
• Respondent's age: ( <i>AGE</i> )	Less than 30 years <sup>a</sup>	138	0.29	0.4731
	30 or more years	342	0.71	0.4731
• Marital status: ( <i>MARITAL/MRD</i> )	Married	307	0.64	0.5002
	( <i>MARITAL/SNGL</i> ) Single	122	0.25	0.3184
	( <i>MARITAL/WID-DVR</i> ) Widowed/divorced <sup>a</sup>	51	0.11	0.4792
• Employment: ( <i>JOB</i> )	Employed/retired	423	0.88	0.4891
	Unemployed <sup>a</sup>	57	0.12	0.4891
• Household income: ( <i>INCOME1</i> )	Income < \$25,000 <sup>a</sup>	67	0.14	0.3104
	( <i>INCOME2</i> ) Income > \$25,000 and < \$50,000	137	0.29	0.4872
	( <i>INCOME3</i> ) Income > \$50,000	276	0.57	0.4533
<b>BEHAVIOR VARIABLES (BehVar):</b>				
• Aware of pasture-raised pork products ( <i>AWARE</i> )	Yes	277	0.58	0.3928
	No <sup>a</sup>	203	0.42	0.3928
• Would prefer pasture-raised over conventional-produced pork ( <i>PREF</i> )	Yes	313	0.65	0.4153
	No <sup>a</sup>	167	0.35	0.4153
• Prefer local pasture-raised pork to non-local produced pork ( <i>LOCAL</i> )	Local area pork	271	0.56	0.3606
	Outside local area pork <sup>a</sup>	209	0.44	0.3606
• Pasture-raised label will be useful in buying decisions ( <i>LABEL</i> )	Yes	332	0.69	0.3122
	No <sup>a</sup>	148	0.31	0.3122
• Consider pasture-raised pork leaner than conventional pork ( <i>LEAN</i> )	Yes	321	0.67	0.3609
	No <sup>a</sup>	159	0.33	0.3609
• Consider pasture-raised healthier than conventional pork ( <i>HEALTHY</i> )	Yes	296	0.62	0.2143
	No <sup>a</sup>	184	0.38	0.2143
• What would you consider as important when buying pasture-raised pork?	Product quality ( <i>QUALITY</i> )	298	0.62	0.4991
	No antibiotics/hormones ( <i>AN/HM</i> )	139	0.29	0.3493
	Animal rights ( <i>RIGHTS</i> ) <sup>a</sup>	43	0.09	0.4091

<sup>a</sup> Denotes variable categories omitted from analysis.



**Table 3. CHS and PAY Logit Model Estimates of the Pasture-Raised Pork Market, Mississippi Delta Area of Arkansas, 1998**

Variable	Select and Buy ( <i>CHS</i> Model)			Pay More ( <i>PAY</i> Model)		
	Estimate	Marginal Probability	Standard Error	Estimate	Marginal Probability	Standard Error
<b>SOCIOECONOMIC VARIABLES (SocVar):</b>						
Constant	-1.2133*	-0.7435	0.6374	-0.7273	-0.1325	0.7301
<i>URBAN</i>	1.3922**	0.2834	0.7124	0.4913*	0.2342	0.2938
<i>RURAL</i>	0.2682	0.0768	0.3278	-0.4324*	-0.1724	0.2331
<i>FEMALE</i>	0.3225	0.1133	0.3423	0.2644	0.0916	0.4211
<i>EDUC/PHSCH</i>	1.1251**	0.3725	0.5336	0.7123*	0.1435	0.3779
<i>EDUC/HSCH</i>	0.0344	0.0827	0.4318	0.0672	-0.1135	0.4437
<i>AGE</i>	0.4411*	0.2842	0.5016	0.0325	0.0711	0.5128
<i>MARITAL/MRD</i>	0.0572	0.0938	0.4539	0.4432	0.0518	0.4623
<i>JOB</i>	0.4327*	0.1414	0.2952	0.1011*	0.1713	0.0546
<i>INCOME2</i>	0.0637	0.0081	0.3916	-0.0122	-0.1048	0.4549
<i>INCOME3</i>	0.3413**	0.2711	0.1465	0.3314**	0.1964	0.1439
<i>HOUSE</i>	0.0871	0.0932	0.4221	-0.0342	0.0157	0.5137
<b>BEHAVIOR VARIABLES (BehVar):</b>						
<i>AWARE</i>	0.0526	0.0416	0.4185	0.0074	-0.0046	0.4469
<i>PREF</i>	0.0711	0.0684	0.4278	0.0682	0.0093	0.3823
<i>LOCAL</i>	1.0126*	0.3214	0.0592	0.7528*	0.1253	0.3816
<i>LABEL</i>	0.6278**	0.1132	0.2948	0.3144**	0.0927	0.1476
<i>LEAN</i>	0.0514	0.0785	0.4323	0.0487	0.0094	0.5271
<i>QUALITY</i>	0.5735**	0.1864	0.2492	0.4932*	0.1063	0.2709
<i>AN/HM</i>	-0.7193*	-0.2133	0.3663	-0.5126*	-0.1976	0.2134
LogL = -335.32, $\chi^2 = 31.41^*$			LogL = -315.78, $\chi^2 = 30.14^*$			

Note: Single and double asterisks (\*) denote statistical significance at the 0.10 and 0.05 levels, respectively.

raised pork (representing 355 correct predictions by the model). Similarly, approximately 69% of the respondents were correctly classified by the *PAY* model as those who will pay more or will not pay more for pasture-raised pork over conventional-grown pork (331 correct predictions).

Results of the logit analysis for the *CHS* and *PAY* models are presented in table 3. The  $\chi^2$  statistics in table 3 show that both models are significant at the 0.10 level. The variable *URBAN* (which equaled 1 if the household was located in a town with a population >20,000 people) was estimated with a positive sign and was significant at the 0.05 level in the *CHS* model. This finding reveals that consumers living in urban areas of the Delta were 28% more likely to buy and eat pasture-raised pork. In the *PAY* model, the *URBAN* variable is significant at the 0.10 level, indicating that consumers in the urban areas of the Delta who will buy and eat pasture-raised pork were also 23% more likely to pay more for it over conventional-grown pork.

In the *CHS* model, only 7% of the households living in rural areas of the Delta (*RURAL*) were more likely to buy and eat pasture-raised pork. In the *PAY* model, however, the sign on this variable changed. This suggests that although some rural households were likely to buy and eat pasture-raised pork, they were less willing than urban households to pay more for it. The implication is a potential market exists for pasture-raised pork among urban consumers in the Delta.

The age variable (*AGE*) was significant and positive in the *CHS* model but insignificant in the *PAY* model. Our results show that Delta consumers older than 30 years were 28% more likely than younger consumers to buy and eat pasture-raised pork, but were only 7% more likely to pay more for it over conventional-grown pork. A possible explanation for the positive sign is that consumers over 30 years of age living in urban areas of the Delta are concerned with health and environmental problems resulting from conventional-grown pork.

The base education category was the group with less than a high school education. The variable *EDUC/PHSCH* (denoting consumers with post high school education) was positive and significant in both the *CHS* and *PAY* models, but the variable *EDUC/HSCH* (consumers with high school education) was not significant in either model. *CHS* and *PAY* model results for the *EDUC/PHSCH* variable show, respectively, that the post high school group was 37% more likely to buy and eat pasture-raised pork than the base group, and that these highly educated Delta consumers were also 14% more likely to pay a premium for pasture-raised pork compared to those with less than a high school education.

The employment variable (*JOB*) was significant under both models at the 0.10 level with the hypothesized positive sign; Delta consumers who were employed were 14% more likely to buy and eat pasture-raised pork, and 17% more likely to pay more for it than their unemployed counterparts.

The *INCOME3* variable (the highest income households) had positive signs and was significant at the 0.05 level in both the *CHS* and *PAY* models. From our model results, households with income greater than \$50,000 were 27% more likely to buy and eat pasture-raised pork, and 19% more likely than those with the lowest incomes to pay a premium for it over conventional-grown pork. This finding likely points to the awareness of wealthier consumers concerning their diet and health—i.e., they tend to prefer and pay more for natural and healthy food products. This result is consistent with intuition, and may support findings reported by previous studies on meat nutrition that high-income consumers are more likely than low-income consumers to read meat labels for nutrition and health facts (e.g., Piedra, Schupp, and Montgomery, 1996).

We had expected married households to buy and pay more for pasture-raised pork. We also expected households with children to provide home meals that were healthy, containing fewer hormones, fat, and other similar nutrients (Guthrie et al., 1995; Schupp, Gillespie, and Reed, 1998a). However, the *MARITAL/MRD* (married consumers) and *HOUSE* (households with one or more child) variables were insignificant in both the *CHS* and *PAY* models.

The importance of quality when considering product purchase (*QUALITY*) was significant at the 0.05 and 0.10 levels in the *CHS* and *PAY* models, respectively. The marginal probability results for this variable reveal that Delta consumers surveyed were 18% more likely to buy and eat, and 10% more likely to pay more for pasture-raised pork over conventional-grown pork—verifying these consumers consider pasture-raised pork to be of higher quality than conventional-grown pork.

The variable *AN/HM* (identifying consumers who do not like the use of antibiotics and hormones in animals) was negative and significant at the 0.10 level in both the *CHS* and *PAY* models. The marginal probability results for this variable reflect that Delta households surveyed were 21% less likely to buy and eat pasture-raised pork containing antibiotics and hormones, and were also 19% less likely to pay more for pasture-raised pork over conventional-grown pork if the product contained antibiotics and hormones. Results under both the *CHS* and *PAY* models show the *LABEL* variable (consumers consider a label to be useful in their buying decision) was positive and significant at the 0.05 level. Delta consumer-respondents were 11% more likely to buy and eat, and 9% more likely to pay more for pork labeled as pasture-raised over conventional-grown pork.

The implication for the *AN/HM* and *LABEL* results reported above is that Delta respondents regard the attributes of fat, antibiotics, hormones, etc., as important considerations in their pork buying decision. Our results support findings of earlier studies that health and diet-conscious consumers considered it important that fat content, antibiotic use, and hormone use be included on food nutrient labels (Guthrie et al., 1995; Moutou and Brester, 1998; Morreale and Schwartz, 1995; Schupp, Gillespie, and Reed, 1998a; Nayga, 1996).

The variable *LOCAL* was based on the survey question asking respondents if they would buy and pay more for locally produced pasture-raised pork than for non-locally produced pork. *LOCAL* had positive signs and was significant at the 0.10 level in both the *CHS* and *PAY* models, indicating that Delta consumers who would consume pasture-raised pork were 32% more likely to buy locally produced than non-locally produced pork products. Similarly, Delta consumers who would consume pasture-raised pork were 12% more likely to pay a premium for the locally produced product over a non-locally produced product. Based on similar purchase behavior findings reported in previous studies (e.g., Govindasamy, Italia, and Thatch, 1998), we offer two possible reasons for the likelihood of Delta consumers to buy and pay more for a locally produced product over others. First, they may believe locally produced pasture-raised pork is fresher, and second, these consumers wish to patronize local producers.

### Summary and Implications

The scope of this market survey did not permit inclusion of cost-benefit analysis information to help prospective farmers determine the minimum number of hogs, acreage, methods, and inputs needed to viably evaluate the potential of the alternative

“pasture-fed” hog production practices. However, it has provided the baseline information about the type of consumers who will buy pasture-raised pork, and their concerns and preferences for pasture-raised pork in the Delta area.

The market policy implication from the survey results is that the market for pasture-raised pork in the Mississippi Delta of Arkansas would be driven by consumer preferences. The health-conscious urban consumers in this niche market are prepared to pay a premium over conventional-grown pork if they can obtain the pasture-raised pork they want. Therefore, to expand into pasture-raised pork production enterprises, limited-resource farmers must produce the pork product needed to meet the preferences of the identified niche market. Such enterprises can help these farmers produce value-added agricultural products which offer premium value, and thereby improve their incomes.

Male survey respondents with less than high school education, younger respondents, households with no children, those residing in rural areas of the Delta, and households with annual incomes less than \$50,000 were less likely to buy or pay high prices for pasture-raised pork over conventional-grown pork. Delta consumers who are more likely to purchase pasture-raised pork are more likely to exhibit socio-economic characteristics of higher income and education levels and to live in urban areas. Delta consumers reporting concerns about health and the use of antibiotics and hormones in commercially produced pork are more likely to purchase pasture-raised pork. Our findings suggest a market for pasture-raised pork may exist in the urban areas of the Delta among affluent, health-conscious consumers who can pay a premium for these products. Consequently, pasture-raised pork producers must adopt a unique niche-marketing strategy that targets high-income, health-conscious, urban consumers.

While this study supports a market for pasture-raised pork and can be replicated for other farming communities, the findings cannot be easily applied to other monocultural agricultural areas. Further research is needed on consumer perceptions and preferences toward pasture-raised pork, as well as a focus on the following related areas of investigation:

- development of other value-added pasture-raised pork products;
- analysis of competitive aspects of pasture-raised pork relative to conventional-grown livestock products in the Mississippi Delta of Arkansas;
- development of effective marketing strategies for pasture-raised pork; and
- analysis of the profitability and cost of production and processing practices that will be used for pasture-raised pork.

These areas of future research could provide the necessary information on the size of the market for pasture-raised pork, and could also provide guidance and incentive for successfully igniting the production of pasture-raised pork among limited-resource farmers in the Delta area.

## References

- Bache, D. H., and J. R. Foster. (1991). "Pork production systems with business analyses: The two-litter pasture system (farrow-to-farrow)." *Pork Industry Handbook*. Pub. No. AS-440, Iowa State University, Ames.
- Ballard, E. N. (1998). "Outdoor swine production." In proceedings of Cooperative Extension Service seminar, *Alternative Swine Production Systems for Illinois* (pp. 1–3), held 31 March–1 April 1998, Effingham, IL. Cooperative Extension Service, University of Illinois, Urbana-Champaign.
- Brown, A., M. Dagher, and D. McDowell. (1992). "The African-American farmer: Meeting the production, marketing, and policy changes." *American Journal of Agricultural Economics* 74, 820–825.
- Capps, O., Jr., and R. A. Kramer. (1985). "Analysis of food stamp participation using qualitative choice models." *American Journal of Agricultural Economics* 67, 49–59.
- Cramer, C. (1990). "Profitable pork on pasture." *The New Farm* 12, 4.
- Dillman, D. A. (1991). "The design and administration of mail surveys." *Annual Review of Sociology* 17, 225–249.
- Erikson, G., T. I. Wahl, R. A. Jussaume, and H. Shi. (1998). "Product characteristics affecting consumers' fresh beef cut purchasing decisions in the United States, Japan, and Australia." *Journal of Food Distribution Research* 29(3), 16–25.
- Govindasamy, R., J. Italia, and D. Thatch. (1998). "Consumer awareness of state-sponsored marketing programs: An evaluation of the Jersey Fresh Program." *Journal of Food Distribution Research* 29(3), 7–15.
- Guthrie, J. F., J. J. Fox, L. E. Cleveland, and S. Welsh. (1995). "Who uses nutrition labeling, and what effects does label use have on diet quality?" *Journal of Nutrition Education* 27, 163–172.
- Honeyman, M. S. (1995). "Sustainable swine production in the U.S. Corn Belt." *Journal of Alternative Agriculture* 6(2), 63–70.
- Honeyman, M. S., and A. Penner. (1998). "Outdoor vs. indoor pig production in Iowa: An economic and production comparison." In proceedings of Cooperative Extension Service seminar, *Alternative Swine Production Systems for Illinois* (pp. 54–56), held 31 March–1 April 1998, Effingham, IL. Cooperative Extension Service, University of Illinois, Urbana-Champaign.
- Jennings, D., B. Lubben, G. Bullen, and D. Oswald. (1998). "A comprehensive analysis of pasture and confinement farrowing systems." In proceedings of Cooperative Extension Service seminar, *Alternative Swine Production Systems for Illinois* (pp. 8–12), held 31 March–1 April 1998, Effingham, IL. Cooperative Extension Service, University of Illinois, Urbana-Champaign.
- Lin, C. T. J. (1995). "Demographic and socioeconomic influences on the importance of food safety in food shopping." *Agricultural and Resource Economics Review* 24(2), 190–198.
- Maddala, G. S. (1988). *Introduction to Econometrics*. New York: Macmillan Publishing Company.

- Morreale, S. J., and N. E. Schwartz. (1995). "Helping Americans eat right: Developing practical and actionable public nutrition education messages based on the ADA survey of American dietary habits." *Journal of the American Dietetic Association* 95, 305–308.
- Moutou, C., and G. W. Brester. (1998). "Trends in U.S. wheat-based food consumption: Nutrition, convenience, and ethnic foods." *Journal of Food Distribution Research* 29(2), 1–14.
- Nayga, R. M., Jr. (1996). "Determinants of consumers' use of nutritional information on food packages." *Journal of Agricultural and Applied Economics* 28(2), 303–312.
- . (1997). "Impact of socio-demographic factors on perceived importance of nutrition in food shopping." *Journal of Consumer Affairs* 31(1), 1–9.
- Piedra, M., A. Schupp, and D. Montgomery. (1996). "Consumer use of nutrition labels on packaged meats." *Journal of Food Distribution Research* 27(2), 42–47.
- Pindyck, R., and D. Rubinfeld. (1991). *Econometric Models and Economic Forecasts*. New York: McGraw-Hill.
- Rogers, F., and M. A. Dagher. (1989). "Marketing channels for small fruits and vegetables in southeast Arkansas." Paper presented at USDA-Apprenticeship Program Seminar, University of Arkansas at Pine Bluff.
- Schupp, A., J. Gillespie, and D. Reed. (1998a). "Consumer awareness and use of nutrient labels on packaged fresh meats: A pilot study." *Journal of Food Distribution Research* 29(2), 24–30.
- . (1998b). "Consumer choice among alternative red meats." *Journal of Food Distribution Research* 29(3), 35–43.