

Future Agricultural Leaders' Perceptions on Their Industry



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Abstract

To gauge how agricultural students perceive environmental, social, and economic issues, it is necessary to determine what factors influence the risk and importance levels associated with current agricultural issues. Students ($n = 112$) at Louisiana Tech University majoring in agriculture were surveyed to gauge their perceptions on major issues in their industry. Issues identified by the students as the most important included: conserving natural resources, improving water quality and quantity, researching alternative fuels, and preserving endangered species. Statistical differences were found based on gender, GPA, age, academic major, background place of residence, among others. Overall, conserving natural resources and water quality and quantity issues were deemed more important than marketing, food preservation, technology, small farm survival, and labeling genetically altered food, indicating a preference for conserving rather than stimulating the economy or improving marketing or production practices.

Introduction

The U. S. agricultural industry is a highly diverse industry that operates in a globally competitive market. Technology has also not only improved production and marketing efficiencies, but created the need for a more educated work force. In a time of rising energy prices and concern over the environment, producers and agribusinesses must find a way to be more and more competitive in a world of scarcity. Perceptions of undergraduate students in agriculture will greatly impact future decisions in the agricultural industry. Many of the Agribusiness students go on to hold political offices or jobs with political influence in agricultural policy. Graduates also go on to work for many of the USDA regulatory agencies such as Natural Resource Conservation Services and the Foreign Agricultural Services that interpret and give preference to projects mandated under the Farm Bill. These leaders shape the economics, political and social environment in which agriculture operates (Elliott and Seldon, 1997; Rasinski and Smith, 1994). Current legislation shows a trend of increased environmental concern as evidenced by the 80% increase in environmental spending in the Farm Security and Rural Investment Act of 2002, which is the current agricultural legislation set to expire in

2007 as opposed to the legislation it replaced (Farm Security and Rural Investment Act, 2002).

In Louisiana, the current state of agriculture could alter students' perceptions about their industry. Thus, it is important to lay the background for the short and long term issues relating to the Louisiana agricultural industry. Recently, Louisiana has experienced many weather related losses and financial difficulties (LSU AgCenter). For long-term survival, producers are facing decisions on how to diversify and retrieve more income from their land. Hunting leases, value-added marketing, and carbon sequestration banking are a few of the options being explored to maintain future competitiveness with other states. Louisiana is also facing water shortages through the depletion of many of the underground aquifers. Wetlands continue to decrease with a loss of over 1500 square miles of since 1930. To compound these problems, Louisiana is a state where three-fourths of the Parishes are considered poverty Parishes (LSU AgCenter).

Students studying agriculture in undergraduate institutions form perceptions about the importance levels associated with a diverse array of topics in agriculture. These perceptions will accompany them into their careers, where they will become decision-makers, teachers, extension agents, managers, lobbyists, etc. As times change, it is important to understand which issues are of importance to these future agricultural industry leaders. For example, is small farm survival more or less important than controlling environmental runoff that could affect groundwater? What is the perceived riskiness of not addressing these issues? Many studies in other disciplines have determined undergraduate student perceptions in their industry; however, information in the agricultural industry is lacking (Bjornsen, 2000; Gilman and Handwerk, 2001; Love and Miller, 2003; Povey and Ransom, 2000). There are also studies exploring industry expectations from agricultural graduates as well as guidelines for teaching agricultural courses (Adrian, 1990; Barkley, 2001; Litzenberg, 1995; Vandever and Guedry, 1992). Still, there is a gap in the previous research efforts concerning the identification of perceptions for undergraduate agricultural majors on issues in their industry.

The purpose of this study was to determine the levels of importance that undergraduate agricultural students associate with current agricultural issues

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Future Agricultural

facing their industry. Specific objectives were to identify the most significant issues facing the agricultural industry and to determine what effect various demographic variables had on the perception of importance.

Materials and Methods

To begin the study, faculty from the department of Agricultural Sciences were interviewed in person and by e-mail to determine twenty issues in the agricultural industry that were of current importance. Faculty members included professionals in the areas of Agricultural Business and Economics, Agricultural Education, Animal Science, and Plant Science with diverse training outside of the state of Louisiana. After careful analysis of the faculty suggestions, twenty issues were determined to stand out in terms of importance. There was consensus among the faculty to the issues that were of greatest importance. These issues included: minimizing groundwater contamination from animal feedlots, educating consumers about facts on genetically modified foods, Sparta aquifer depletion, continuing to provide agricultural subsidies, conserving wetlands, educating consumers on proper food handling techniques, incorporating technology into production agriculture, educating industry with management and financial skills, preserving endangered species, conserving natural resources, ensuring survival of the small farm, tracing origins of the food supply, requiring labeling of genetically modified foods, proper treatment of animals before slaughter, fertilizer run-off in to the water supply, utilizing plant by-products, utilizing animal by-products, research into alternative fuels, learning about marketing agricultural commodities, and creating freer trade among nations. The survey was designed to determine the level of importance of the identified issues. A Likert scale ranging from 1-7 with one being very unimportant, four being somewhat important, and seven being very important was used in the study. A not sure category was also included. Demographic information such as gender, age, background place of residence, background in agriculture, ethnicity, GPA, university classification, and agricultural major were also gathered. Gender was divided into male and female. Age was broken down in categories of 1) 18 to 20, 2) 21 to 23, 3) 24 to 26, 4) 27 to 30, 5) 31 to 40, and 6) 40+ years.

Background place of residence was divided into six categories: 1) farm or ranch, 2) rural area, not a farm/ranch, 3) town under 10,000, 4) town or city between 10,000 and 50,000, 5) city between 50,000 and 250,000, and 6) city over 250,000. Background in agriculture included questions concerning growing up dependent on farm income, being a member of 4-H or FFA, and whether students worked in production agriculture or agribusiness before or during college. Ethnicity categories included 1) White, 2) African-American, 3) Hispanic, 4) Asian-American, 5) Native American, and 6) other. GPA categories ranged from 1) 0.0 to 1.0, 2) 1.1 to 2.0, 3) 2.1 to 3.0, and 4) 3.1 to 4.0.

University classification included: 1) Freshman, 2) Sophomores, 3) Juniors, and 4) Seniors. Majors included all agricultural majors at Louisiana Tech University including 1) Agribusiness, 2) Agricultural Education, 3) Animal Science, 4) Plant Science and, 5) none of the above. Only students majoring in agriculture were included in the study.

The survey was administered to students in all agricultural classes and sections taught in the Spring Quarter of 2004. Faculty members were instructed to only allow students to take the survey once to prevent overlap from students in multiple agricultural courses. Also, the student instructions printed on the survey included a statement asking students not to take the survey more than once. Participation was voluntary and participants could quit at any time. The survey was administered by the faculty member in charge of the class and collected the same day on an informal basis. The data were entered and coded. Data were then ready for analysis, which was done with SPSS version 11.5 (SPSS Inc., 2004). A one-way ANOVA with a Scheffe post-hoc test was used for scaled items (Homack, 2001). Post-hoc test are typically used when ANOVA tests are statistically significant and there are more than two groups. The Scheffe procedure was chosen because it allows one to look beyond whether something is simply statistically significant, but where specifically these differences arise. This method allows one to determine differences in perceptions of importance based upon unique student characteristics. For example, if there are three groups; two, or three means could be different. The Scheffe procedure is one of the most flexible, conservative, and robust post-hoc tests as compared to alternative testing (Homack, 2001). The conservative nature comes from an increase in the critical value (Hinkle et al., 1998).

Results and Discussion

Comparisons were made in terms of gender, age, background place of residence, background in agriculture, ethnicity, GPA, classification, and the agricultural major to gauge the differences in perceptions for the 20 identified issues. Detailed results are outlined in the tables, while the text explains the overall importance of the findings.

One hundred and twelve undergraduate students completed the survey. Of the 112 students, 35.6% were male and 64.4% were female. Most students were 18 to 20 years (45.5%), with 38.6% between 21 to 23 years, 7.9% 24 to 26 years, 3.0% 27 to 30 years, 1.0% 31 to 40 years, and 4.0% over 40 years.

Student's background place of residence on a farm or ranch was 26.7%, rural residence was 27.7%, towns under 10,000 was 8.9%, town or city between 10,000 and 50,000 was 21.8%, city between 50,000 and 250,000 was 8.9%, and in cities over 250,000 included 5.9% of the students. Only 23.8% of students surveyed grew up on a farm or ranch that supplied a substantial source of income. Students involved in 4-H and FFA totaled 57.4% and 30.7%, respectively. Students that had been employed in

production agriculture before attending college was 38.6%, while students employed in agribusiness totaled 25.7%.

The racial profile for the students was 94.0% white, 4.0% African-American, 1.0% Hispanic, and 1.0% Asian-American. GPA between 0.0 to 1.0, 1.1 to 2.0, 2.1 to 3.0, and 3.1 to 4.0 were 1.0%, 1.0%, 39.6%, and 58.4%, respectively. Freshmen represented 18.8%, sophomores 11.9%, juniors 31.7%, and seniors 37.6%. Most of the students in the department are Animal Science majors due to the strong pre-vet program offered. Approximately 62.4% of students surveyed were Animal Science majors. There were 15.8% Agribusiness majors, 7.9% Agricultural Education, and 13.9% Plant Science majors.

Overall, students listed conserving natural resources, improving water quality and quantity, researching alternative fuels, and preserving endangered species as the top five most important agricultural issues facing them today. Overall, students valued the environment very highly as well as preserving and researching alternatives for preserving nature in the future. Perhaps this is due to the strong production ties that northeast Louisiana has and the students that it draws. As agriculture sees better times, environmental issues also become more important. Table 1 indicates the mean rating and standard deviation for each of the current issues addressed in the study.

There were statistically significant differences in gender, age, major, residence, GPA, working in production agriculture, FFA membership, and whether one grew up on a farm as a substantial source of income. There were no statistical differences in whether a student was a member of 4-H or university classification. Females rated most of the issues as more important than the males. This might be due to an increased sensitivity that females have towards taking care of the land and natural resources. Table 2 shows where these differences arise. Students over the age of forty thought that incorporating technology into production agriculture was more important than 18 to 20 and 21 to 23 year olds, and thought that tracing origins of the food supply was more important than any other age group except 24 to 26 year olds (Table 3). This might be due to the fact that younger students have grown up with technology and are not as aware of the differences that the older students have likely witnessed over time. The only significant differences in major were among Agribusiness and Agricultural Education majors. Agribusiness majors rated incorporating technology into production agriculture as more important than Agricultural Education majors (Table 4). This might be due to the fact that Agribusiness majors are taught to be efficient, maximize profit, and minimize costs and be innovative managers in many Agribusiness and Agricultural Economic courses.

Students from the largest place of residence, cities over 250,000 in population, indicated a

Table 1. Current Agricultural Issues and the Level of Importance

Issue	Mean Importance Rating	Standard Deviation
Minimizing groundwater contamination from animal feedlots	5.23 ¹	1.76
Educating consumers on genetically modified organisms	4.85	1.65
Sparta aquifer depletion	5.54	1.99
Continuing to provide agricultural subsidies	5.32	1.89
Conserving wetlands	5.23	2.05
Educating consumers on proper food handling techniques	5.08	1.92
Incorporating technology into production agriculture	5.06	1.71
Educating industry with financial and management skills	5.05	1.73
Preserving endangered species	5.44	1.94
Conserving natural resources	5.68	2.03
Ensuring small farm survival	5.43	1.83
Tracing origins of the food supply	5.09	1.72
Required labeling of genetically modified organisms	4.95	1.74
Proper treatment of animals before slaughter	5.41	1.86
Fertilizer run-off into groundwater	5.61	1.80
Utilizing plant by-products	5.12	1.66
Utilizing animal by-products	5.05	1.78
Researching alternative fuels	5.59	1.73
Learning about marketing agricultural commodities	4.96	1.49
Creating free trade among nations	4.80	1.58

¹1= very unimportant, 4=somewhat important and 7=very important

Table 2. Comparison of Gender Ratings of Undergraduate Students.

Issue	Gender	Std.		Significance
		Mean	Deviation	
Minimizing groundwater contamination from animal feedlots	male	4.67	1.90	0.015*
	female	5.55	1.60	
Sparta aquifer depletion	male	4.66	2.16	0.001***
	female	4.98	1.52	
Continuing to provide agricultural subsidies	male	4.83	2.12	0.05*
	female	5.61	1.69	
Conserving wetlands	male	4.61	2.12	0.022*
	female	5.59	1.94	
Educating consumers on proper food handling techniques	male	4.42	1.89	0.009**
	female	5.45	1.85	
Preserving endangered species	male	4.67	1.81	0.003**
	female	5.86	1.90	
Conserving natural resources	male	4.86	2.32	0.002**
	female	6.14	1.70	
Required labeling of genetically modified organisms	male	4.49	1.76	0.049*
	female	5.21	1.69	
Proper treatment of animals before slaughter	male	4.64	1.62	0.001***
	female	5.85	1.85	
Fertilizer run-off into groundwater	male	5.03	2.01	0.015*
	female	5.94	1.59	
Utilizing plant by-products	male	4.61	1.75	0.019*
	female	5.43	1.54	
Researching alternative fuels	male	4.97	2.02	0.007**
	female	5.94	1.43	

***, ** Significant at p=0.05, 0.01, or 0.001, respectively using ANOVA with Scheffe post-hoc testing.

¹1= very unimportant, 4=somewhat important and 7=very important

Table 3. Comparison of Age Ratings of Undergraduate Students.

Issue	Age	Mean	Std.	
			Deviation	Significance
Incorporating technology into production agriculture	18 - 20	4.66 a*	1.96	0.022*
	21 - 23	5.00 a	1.37	
	24 - 26	5.88 ab	1.24	
	27 - 30	6.33 ab	0.58	
	31 - 40	n/a	n/a	
Tracing origins of the food supply	18 - 20	4.78 a*	1.66	0.016*
	21 - 23	4.87 a	1.85	
	24 - 26	6.50 b	0.54	
	27 - 30	6.33 a	0.58	
	31 - 40	n/a	n/a	
	40+	7.00 b	0.00	

*, **, *** Significant at p=0.05, 0.01, or 0.001, respectively using ANOVA with Scheffe post-hoc testing where those means not sharing a letter are significantly different.
 1 = very unimportant, 4=somewhat important and 7=very important

number of issues were less important than their smaller counterparts including: education on GMO's, required labeling of GMO's, proper food handling techniques, and learning to market agricultural commodities (Table 5). One explanation for this finding might be that students raised in more rural areas, are likely to be more in touch with agriculture and either depend on it for income, or know someone

who does. This would shape their perception on the importance these issues hold, as opposed to students from the outside looking in. Students with higher GPA's tended to be less concerned about the issues than students with lower GPA's, with the exception of required labeling of genetically modified organisms. If a student worked in production agriculture before or during their college experiences, they tended to perceive the following issues as less important: minimizing groundwater contamination from feedlots, Sparta aquifer depletion, education on proper food handling, incorporating technology in production agriculture, minimizing fertilizer run-off into groundwater, utilizing plant by-products, and creating freer trade (Table 6). This might be due to the fact that students actually working in production agriculture experience the status quo nature of agricultural operations. They could perceive many agricultural courses as very theoretical and not applicable in real working situations.

Table 4. Comparison of Major Ratings of Undergraduate Students.

Issue	Major	Mean	Std.	
			Deviation	Significance
Incorporating technology into production agriculture	Agribusiness	5.81 b**	1.33	0.029*
	Agricultural Education	3.63 a	2.45	
	Animal Science	5.02 ab	1.50	
	Plant Science	5.21 ab	2.08	

*, **, *** Significant at p=0.05, 0.01, or 0.001, respectively using ANOVA with Scheffe post-hoc testing where those means not sharing a letter are significantly different.
 1 = very unimportant, 4=somewhat important and 7=very important

Table 5. Comparison of Residence Ratings of Undergraduate Students.

Issue	Residence	Mean	Std.	
			Deviation	Significance
Educating consumers on genetically modified organisms	farm or ranch	4.52 ab**	1.81	0.032*
	rural area / not a farm or ranch	4.82 ab	1.28	
	town under 10,000	5.44 ab	1.51	
	town or city 10,000 - 50,000	5.00 ab	1.69	
	city 50,000 - 250,000	6.00 b	0.87	
	city over 250,000	3.33 a	2.34	
Educating consumers on proper food handling techniques	farm or ranch	4.96 ab**	1.79	0.340*
	rural area / not a farm or ranch	5.21 ab	1.79	
	town under 10,000	5.11 ab	2.03	
	town or city 10,000 - 50,000	5.18 ab	2.04	
	city 50,000 - 250,000	6.22 b	1.09	
	city over 250,000	2.83 a	2.23	
Required labeling of genetically modified organisms	farm or ranch	4.96 ab**	1.61	0.004**
	rural area / not a farm or ranch	4.52 ab	1.72	
	town under 10,000	5.89 b	1.36	
	town or city 10,000 - 50,000	5.14 ab	1.71	
	city 50,000 - 250,000	6.11 b	0.60	
	city over 250,000	3.00 a	2.28	
Learning about marketing agricultural commodities	farm or ranch	4.96 ab***	1.65	0.002**
	rural area / not a farm or ranch	4.79 ab	1.40	
	town under 10,000	5.43 b	1.27	
	town or city 10,000 - 50,000	5.35 b	1.09	
	city 50,000 - 250,000	6.00 b	0.89	
	city over 250,000	2.83 a	1.17	

*, **, *** Significant at p=0.05, 0.01, or 0.001, respectively using ANOVA with Scheffe post-hoc testing where those means not sharing a letter are significantly different.
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Perhaps an implication for educators is to show these linkages, and involved some applied homework or assignments. Students involved in FFA (Future Farmers of America) thought that the Sparta aquifer depletion (Louisiana Tech University and surrounding areas water supply)

was less important than those not involved in FFA. Students growing up with farm income as a substantial source of income tended to think the following issues were less important than those who did not: Sparta aquifer depletion, conservation of natural resources, minimizing fertilizer run-off into groundwater, utilizing plant by-products, and researching alternative fuels. This perception may arise from being in a situation where production goals do not always work well with keeping an agricultural operation solvent. Therefore, those involved in agriculture might view environmental concerns as cost-prohibitive and prohibitive to their operation when regulated.

From a teaching standpoint, meeting environmental goals does not necessarily imply impractical production methods or a loss of income. Precision farming and organic farming are two examples of

Table 6. Comparison of Working in Production Agriculture Ratings of Undergraduate Students.

Issue	Work in Production Agriculture		Std.		Significance
	No	Yes	Mean	Deviation	
Minimizing groundwater contamination from animal feedlots	No		5.54	1.50	0.026*
	Yes		4.74	2.02	
Sparta aquifer depletion	No		6.13	1.48	0.000***
	Yes		4.59	2.35	
Educating consumers on proper food handling techniques	No		5.39	1.75	0.041*
	Yes		4.59	2.09	
Incorporating technology into production agriculture	No		5.34	1.38	0.047*
	Yes		4.64	2.06	
Fertilizer run-off into groundwater	No		6.07	1.53	0.001***
	Yes		4.90	1.96	
Utilizing plant by-products	No		5.39	1.56	0.050*
	Yes		4.71	1.74	
Creating freer trade among nations	No		5.07	1.45	0.040*
	Yes		4.39	1.70	

*, **, *** Significant at p=0.05, 0.01, or 0.001, respectively using ANOVA with Scheffe post-hoc testing.
¹ 1= very unimportant, 4=somewhat important and 7=very important

responses to the environment that may increase profit margins. There was a lack of importance that students' placed on some of the marketing and trade issues. Free trade agreements continue to increase in numbers and the international relationships that must be respected to export products is a large outlet for agricultural sales. Perhaps additional readings and updates could help students understand and appreciate some of these issues, not just the production issues.

Summary

Students were very interested in the survey. Many asked about the results weeks after the initial survey. Females tended to evaluate issues as more important than males, while students with higher GPA's tended to perceive many of the issues as less important than those with lower grades. Conserving natural resources and water quality and quantity issues were deemed more important than marketing, food preservation, technology, small farm survival, and labeling genetically altered food. Students indicated preferences for conserving rather than stimulating the economy or improving production or marketing practices. This is consistent with the current farm legislation which has increased spending on conservation efforts and encouraged protection of the environment. Marketing and technology issues, although still considered important issues, have taken a backseat to preservation and conservation concerns.

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