

learn about topics outside your major". Many of the students commented that they enjoyed having such a variety of diverse instructors, each a specialist in their area. They remarked that not only did this maintain interest, but it provided them a wide range of opinions and issues.

Students also were asked for suggestions for improvements. Many students expressed a desire to learn more about the risks associated with biotechnology. They felt that more time should have been allotted to the section of the course on socio-economic issues. While students appreciated having experts give the lectures, they felt the lecturers may be biased towards their research and therefore, too "pro" biotechnology. Students also suggested that all the reading material and handouts be distributed at the beginning of the course in a complete packet.

Education and Attitudes

In order to assess the impact of education on student attitudes regarding biotechnology, students were asked to complete a biotechnology-issues survey similar to a survey conducted by the Office of Technology Assessment (OTA, 1987) prior to the first lecture. They were asked 23 questions covering a wide range of biotechnology-related issues. The same survey was distributed upon completion of the course. Answers were analyzed on a before and after basis, to see what changes in attitudes and perceptions had occurred.

Results revealed that students' increased their level of understanding of the issues surrounding biotechnology. For example, students were asked whether they knew the meaning of a selected group of biotechnology-related scientific terms. Prior to taking the course an average of 47% of the students understood the meaning of the terms. This average increased to 90% following the course.

In questions involving risk assessment and perceptions of biotechnology, there were major differences in responses before and after the class. When asked whether the likelihood that genetically engineered products will present a serious danger to people or the environment, 47% answered "unlikely" before the course and 73% answered "unlikely" after the course. The results of the survey clearly show that education plays a major role in students' attitudes towards *issues in biotechnology*. These results are supported by other studies in which education diminished public mistrust of new technologies (Halbrendt et al., 1989; Terry and Tabot, 1988).

Conclusions

The positive feedback from course evaluations and the results of the biotechnology-issues surveys, underscore the importance of developing courses which address not only new technologies, but the related social and economic issues. Consistently, the students' assessment of the risks associated with biotechnology changed after taking the course. The change, in all cases, was a decrease in the likelihood that they were concerned. Education was shown to be effective in increasing the understanding of biotechnology and at the same time, allaying fears surrounding new and unknown methods and products.

Undergraduate Trend Study Of Agriculture Majors

Walter N. Taylor

This research was a continuation of a study begun in 1977 to describe students enrolled in higher education in agriculture in the South. In that study, data were collected from students in agriculture majors at 26 institutions, all but one being land-grant institutions. In 1982 and 1987, the 1977 study was replicated with undergraduate agriculture majors at Mississippi State University to determine changes that may have occurred and trends that may have developed over the five and ten year periods. Although, several notable changes had occurred, no major trends were identified.

Introduction

According to Reisch (1984), there are not many recruitment techniques that have not been already tried. For years, those responsible for recruiting have done so without really knowing the needs or desires of prospective students. Presently, recruitment techniques to attract rural, urban and suburban students must be used.

The initial profile of undergraduate students enrolled in agriculture majors in the South, including Mississippi State University, was compiled using the data extracted from the 1977 USDA/CSRS regional project, S-114 (Parent, 1979; Howell and Parent, 1979). In 1982, Bowen and Lee used the same design and instrumentation as in the S-114 project to collect data to analyze and describe trends that may have developed after five years for college of agriculture majors enrolled at Mississippi State University (Bowen and Lee, 1984). These researchers described and compared selected characteristics of students in the 1977 S-114 project with students enrolled in agriculture majors at Mississippi State University in 1982. Findings of the study, when compared to the 1977 data, showed that parents and college faculty continued to have the most influence on students choosing a major; and students continued "to select majors that helped them prepare for a specific career and lead a desired lifestyle" (1984, pp. 28-29). The researchers concluded that undergraduate students in agriculture majors in the College of Agriculture and Home Economics in 1982 were not

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(continued from previous column)

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Table 1. Sex of Agricultural Students in the College of Agriculture and Home Economics in 1977, 1982, and 1987

SEX	Southern Region		MSU		MSU		MSU	
	1977		1977		1982		1987	
	n	%	n	%	n	%	n	%
Male	2,244	73.0	106	80.9	175	76.4	145	78.40
Female	831	27.0	25	19.1	54	23.6	40	21.60
Total	3,075	100.0	131	100.0	229	100.0	185	100.00

'tremendously' different from those studied in 1977.

Studies by Slocombe (1986), Cole (1985) and Findlay and Rawles (1984) also found that parents and college professors had most influence on choice of major. Slocombe found that university literature and campus visitation influenced choice of major.

Purpose of the study

The purpose of this study was to describe trends that may have developed after ten years for college of agriculture majors. Objectives of the study were to: (1) describe the characteristics of students enrolled in agriculture majors in the College of Agriculture and Home Economics at Mississippi State University in 1987; (2) compare the characteristics of students enrolled in the College of Agriculture and Home Economics at Mississippi State University in 1977 and 1982 to those of students enrolled in 1987; (3) compare the characteristics of students enrolled in colleges of agriculture in the South in 1977 and at Mississippi State University in 1977, 1982 and 1987; and (4) identify enrollment trends that may have developed over a ten year period.

Procedures

Design and instrumentation for this study were identical to those for the 1977 and 1982 studies. Data collection procedures were identical to those used in the 1982 study. A list of all undergraduates enrolled in the College of Agriculture and Home Economics in the Fall of 1987 was obtained from the Dean of the College. A stratified random sample of 261 students was selected for the study. Students were stratified by major. Data collection extended over a four week period. Copies of the questionnaires were distributed to a faculty or staff contact for each major who, in turn, gave them to the students. Students returned the questionnaire to the contact persons. Those persons who had not returned the questionnaire after two weeks were mailed another copy.

Table 3. Residence Status of Agricultural Students in the College of Agriculture and Home Economics in 1977, 82, & 87.

Residence	Southern Region		MSU		MSU		MSU	
	1977		1977		1982		1987	
	n	%	n	%	n	%	n	%
Urban (10,000)	1,738	56.5	51	37.6	98	42.8	101	54.5
Rural, Non-farm	707	23.0	35	27.2	59	25.8	26	14.1
Rural, Farm	630	20.5	44	35.2	72	31.4	57	30.8
(Missing)	-	-	(1)	-	-	-	(1)	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0

Table 2. Classification of Agricultural Students in the College of Agriculture and Home Economics in 1977, 1982, and 1987

CLASS	Southern Region		MSU		MSU		MSU	
	1977		1977		1982		1987	
	n	%	n	%	n	%	n	%
Freshman	563	18.3	18	13.5	34	15.0	20	10.8
Sophomore	688	22.4	29	22.3	43	18.9	30	16.2
Junior	829	27.0	41	31.6	66	29.1	49	26.5
Senior	995	32.3	42	32.3	84	37.0	82	44.3
(Missing)	-	-	(1)	-	(2)	-	(4)	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0

During the fourth week, telephone calls were made to those who had not responded.

A total of 185 or 70.9% of the returned questionnaires were usable. Using data received from other sources, persons responding after two weeks, those responding after four weeks, and those who did not respond were compared on five variables: high school grade point average, college grade point average, classification, ACT scores, and sex. There were no significant differences found among the three groups on any of these variables.

Findings

The following findings relate to data collected over a ten-year time frame. Data were collected at three times: 1977, 1982 and 1987.

The age range of students enrolled in agriculture majors at Mississippi State University (MSU) was 18 to 36 years. Mean ages for the three years showed a slight increase from 20.9 years in 1977 to 21.0 in 1982 to 21.3 in 1987. The percentage of females pursuing agriculture majors in the College increased between 1977 and 1982; there was a slight decrease in this percentage between 1982 and 1987. Females comprised 19% of the 1977 sample, 24% of the 1982 sample, and 22% of the 1987 sample. Twenty-seven percent of the students in the 1977 Southern Region study were female (see Table 1).

The percentage of seniors in the 1987 MSU sample continued to increase while the numbers of juniors and sophomores continued to decline when compared to data from the previous studies. Table 2 shows that seniors comprised 32% of the 1977 MSU sample, 37% in 1982 and 44% in 1987. In the 1977 Southern Region Study, 32% of the sample were seniors. Juniors dropped from 32% in 1977 to 29% in 1982 and further to 27% in 1987. The decrease in sophomores was from 22% in 1977 to 19% in 1982 to 16%

Table 4. Marital Status of Agricultural Students in the College of Agriculture and Home Economics in 1977, 1982, and 1987

Marital Status	Southern Region		MSU		MSU		MSU	
	1977		1977		1982		1987	
	n	%	n	%	n	%	n	%
Single	2,654	86.3	109	83.3	212	92.6	163	88.1
Married	421	13.7	21	16.2	17	7.4	20	10.8
(Missing)	-	-	(1)	-	-	-	(2)	00.0
Total	3,075	100.0	131	100.0	229	100.0	185	100.1

Table 5. Type of High School Attended by Students Enrolled in the College of Agriculture and Home Economics in 1977, 1982, and 1987.

Type of School	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
	n	%	n	%	n	%	n	%
Public	2,715	88.3	88	68.2	130	57.0	111	60.0
Private, Religious	206	6.7	9	7.0	20	8.8	13	7.0
Private, Non-Religious	154	5.0	32	24.8	78	34.2	55	29.7
(Missing)	-	-	(2)	-	(1)	-	(6)	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0

in 1987. The 1977 Southern Region study was comprised of 27% juniors and 22% sophomores.

The MSU samples showed a continuing increase of students from urban areas. Thirty-eight percent of the 1977 students resided in urban areas, 43% in 1982 and 55% in 1987. Students from urban areas comprised 57% of the 1977 Southern Region Study. Rural, non-farm students in the MSU samples decreased from 27% in 1977 to 26% in 1982 then substantially to 14% in 1987. In the 1977 Southern Region Study, 23% of the students were rural, non-farm (see Table 3).

Married undergraduates in agriculture majors at MSU decreased by nine percent, between 1977 and 1982. Table 4 shows that this number increased by four percent between 1982 and 1987.

While the MSU students who graduated from public high school dropped from 68% in 1977 to 57% in 1982, this figure rose slightly to 60% in 1987. Students who graduated from public high schools made up 88% of the 1977 Southern Region study. (see Table 5).

MSU students enrolled in agriculture majors in 1977 and 1982 had mean high school grade point averages of 2.95 and 2.96, respectively. The mean high school grade point average for the 1987 students was 2.92. Data from the 1977 Southern Region study revealed a mean high school grade point average of 3.01. (see Table 6).

The data revealed that 77% of the 1977 MSU students in agriculture majors had not taken agricultural classes while in high school. The percentage decreased to 76% in 1982 and 70% in 1987. Seventy-five percent of the students in the 1977 Southern Region Study did not enroll in high school agricul-

Table 7. Students Enrolled in the College of Agriculture and Home Economics in 1977, 1982, and 1987 Who Took Vocational Agriculture Classes in High School.

Agricultural Classes Taken	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
	n	%	n	%	n	%	n	%
Yes	770	25.0	29	22.7	56	24.5	55	29.7
No	2,305	75.0	99	77.3	173	75.5	130	70.3
(Missing)	-	-	(3)	-	-	-	-	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0

Table 6. High School Grade Point Averages for Students Enrolled in the College of Agriculture and Home Economics in 1977, 1982, and 1987.

Grade	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
	n	%	n	%	n	%	n	%
A	686	22.3	28	21.6	51	22.3	38	20.5
B	1,747	56.8	67	51.5	119	52.2	95	51.4
C	630	20.5	35	26.9	56	24.6	46	24.9
D	12	.4	-	-	2	.9	5	2.7
(Missing)	-	-	(1)	-	(1)	-	(1)	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0
Mean GPA:	3.01		2.95		2.96		2.92	

ture classes. Sixty percent of the students in both the 1977 and 1982 studies indicated that agriculture was not offered in their high schools. This figure declined to 51% in 1987. These data are shown in Table 7.

In both 1977 and 1982, 49% of the agriculture majors came directly to MSU after graduation. Thirty-eight percent of the 1977 sample transferred from 2-year colleges; 40% used this route in 1982. Forty-three percent of the students in the 1987 study came directly to Mississippi State University while 42% transferred from 2-year colleges. Data from the 1977 Southern Region survey indicated that 65% enrolled after high school and 18% transferred from 2-year colleges.

Data in Table 8 show that students in all three samples had attained a variety of work experiences. Approximately 60% in each of the MSU samples had home farm experience. Nearly 50% of each sample had been employed on farms other than the home farm. Almost 90% of the students in both the 1977 and 1982 studies had non-agricultural work experience; however, this dropped to 78% for students in the 1987 study.

Fathers were rated by students in all three samples as having the greatest influence on their choice of college major; mothers were rated second. College teachers/advisors and college friends were also influential regarding choice. As shown in Table 9, all three groups assigned the same ranking to these individuals.

Career preparation was rated by students in all samples as the most important factor in their choice of college major. Lifestyle was the second most important factor. Data from the three samples were similar for all the factors and are presented in Table 10.

Table 8. Work Experience of College of Agriculture and Home Economics Students in 1977, 1982, and 1987.

Work Experience	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
	n	%Yes	n	%Yes	n	%Yes	n	%Yes
Home farm experience	1,561	50.8	75	61.5	141	66.8	109	58.9
Other farm employee	1,549	50.4	53	48.2	113	54.1	87	47.0
Other work experience	1,869	60.9	110	89.4	177	88.1	144	77.8

Table 9. Individuals Influencing Choice of Major for College of Agriculture and Home Economics Students Included in 1977, 1982, and 1987 Samples.

Individual Of Influence	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
	(n=3,075)	x Rank	(n=131)	x Rank	(n=229)	x Rank	(n=185)	x Rank
Father	1.87	1	2.06	1	2.11	1	1.93	1
Mother	1.79	2	1.82	2	1.87	2	1.86	2
College teacher/ advisor	1.56	3	1.61	3	1.50	3	1.62	3
College friend	1.51	4	1.44	4	1.47	4	1.55	4
Brother	1.36	6	1.42	5	1.37	6	1.25	11
Veterinarian	1.33	10	1.37	6	1.28	8	1.28	9
H. S. friend	1.36	6	1.33	7	1.32	7	1.29	8
Former student	1.35	8	1.32	8	1.43	5	1.36	6
Sister	1.28	12	1.30	9	1.24	11	1.24	12
Other teacher/ principle	1.35	8	1.26	10	1.26	9	1.30	7
H. S. counselor	1.29	11	1.21	11	1.21	13	1.51	5
Vo-Ag. teacher	1.34	9	1.18	12	1.25	10	1.27	10
Extension agent	1.18	13	1.16	13	1.22	12	1.21	13

Means: 1=No Influence, 2=Some Influence, 3=Very Influential

Conclusions and recommendations

For the MSU students, there appears to be trends developing in terms of the numbers of students from urban areas and those who enroll in high school agriculture courses. Recruitment efforts should focus on urban as well as rural area students and should not be limited to those enrolled in high school agriculture.

The parents of students in agriculture majors in 1987 continued to have strong influence on their children regarding choice of major and students continued to select majors that will prepare them for careers and lead to desired lifestyles. Parents of prospective students should be included in the recruitment process and prospective students should be provided with current career information. Data from this study did not support some of the trends thought to have been developing in students who select agriculture majors when compared to data from the 1982 study.

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Table 10. Importance of Selected Factors on Choice of Major by College of Agriculture and Home Economics Students in 1977, 1982, and 1987

Factor	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
	(N=3,075)	x Rank	(N=131)	x Rank	(N=229)	x Rank	(N=185)	x Rank
Career prep	2.68	1	2.66	1	2.76	1	2.60	1
Style of life	2.18	2	2.18	2	2.13	2	2.06	2
Prior ag experience	1.76	5	1.94	3	1.90	4	1.85	5
Good income	1.84	4	1.91	4	1.77	5	1.88	4
Help others	2.09	3	1.90	5	1.95	3	1.90	3
College crses	1.45	6	1.43	6	1.37	6	1.40	6
College Adv	1.31	9	1.34	8	1.32	8	1.29	9
Scholarships/ financial aid	1.40	7	1.34	8	1.31	9	1.38	7
Family	1.27	10	1.31	9	1.34	7	1.32	8
Friends	1.22	12	1.26	10	1.27	12	1.28	10
Better grades	1.26	11	1.25	11	1.28	11	1.40	6
H. S. counselor	1.21	13	1.18	12	1.16	13	1.17	11
H. S. courses	1.33	8	1.17	13	1.28	11	1.28	10

Means: 1=No Importance, 2=Some Importance, 3=Very Important

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