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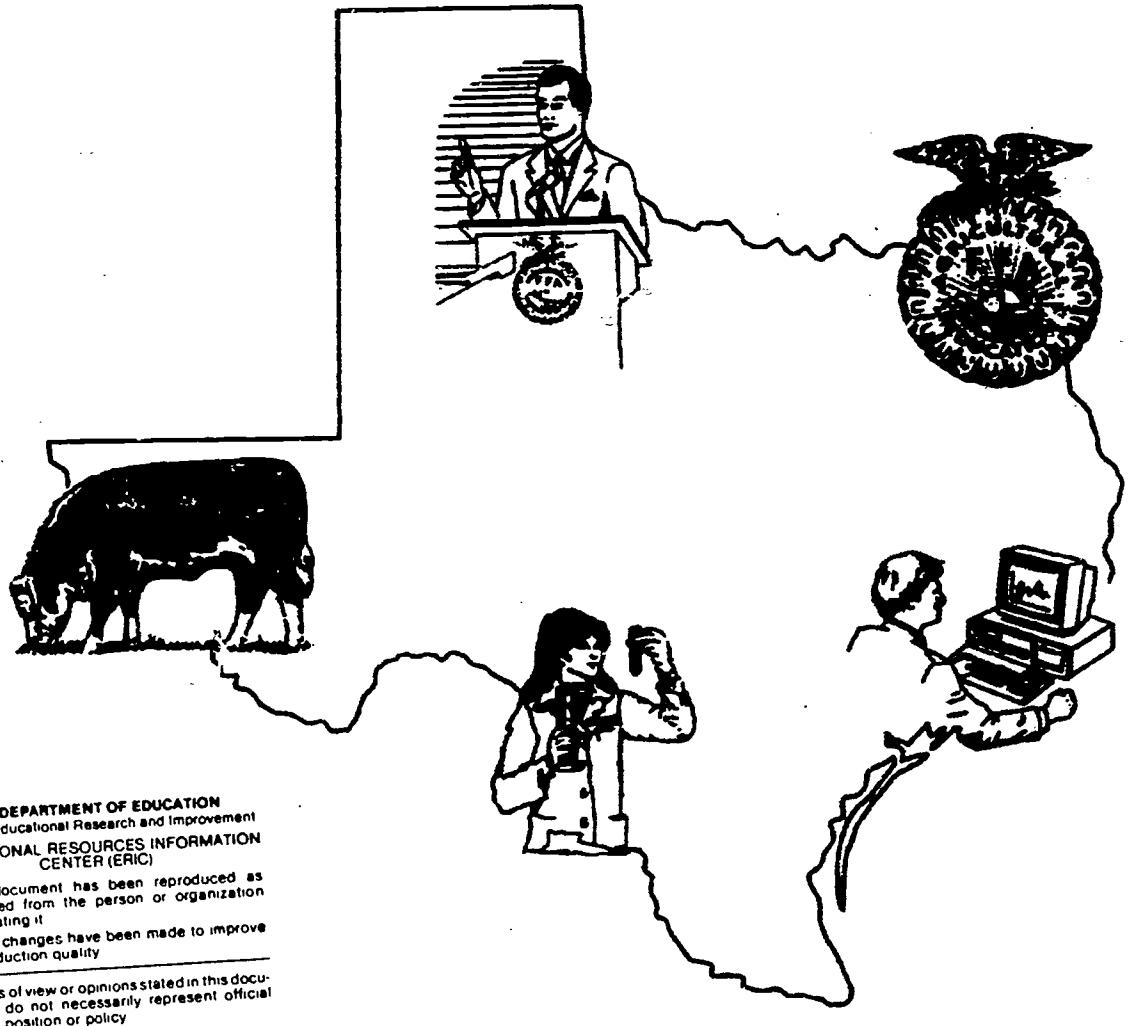
ABSTRACT

A study compared the attitudes of minority and nonminority Texas high school agriscience students toward agriculture. A cluster sample of 1,399 agriscience students in Texas high school courses called "Introduction to World Agricultural Science and Technology" and "Applied Agricultural Science and Technology" participated in the ex post facto research design study. A mailed questionnaire that collected information on demographics, educational and career goals, and reasons for enrolling in the courses was returned by 95 percent of subjects. The data were analyzed with descriptive statistics, correlational statistics, and analysis of variance. Results included the following: (1) minority students were more likely than nonminority students to be taking agriscience courses for reasons they considered beyond their control, whereas white students tended to enroll because of agriculture, agricultural education, and career reasons; (2) minority students perceived more barriers to enrolling and had more negative attitudes toward agriculture and agricultural occupations than did white students; and (3) the greater a student's perceived chance of attending college, the more positive that student was in enrolling in agriscience for agricultural and career reasons, the fewer barriers to enrolling he or she perceived, and the more positive his or her attitude toward agricultural careers. (The document contains 15 references and a copy of the questionnaire.) (CML)

Attitudes Toward Agriculture of Minority and Non-Minority Students Enrolled in an Introductory Agriscience Course in Texas



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Attitudes Toward Agriculture of Minority and Non-Minority Students Enrolled in an Introductory Agriscience Course in Texas

A Summary Report of Research

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Agriculturists in the United States are recognized worldwide as efficient and economical producers of agricultural products. Less than two percent of the American population is engaged in production agriculture with each farmer feeding 94 other people in the United States and 34 people abroad (American Farm Bureau Federation, 1991). Despite the small percentage of the American population involved in production agriculture, 20 percent of the workforce is employed in the food and fiber sector of the economy (U.S. Bureau of the Census, 1990).

Many of these off-farm occupations are in high technology fields that require advanced education and skilled workers. However, a 1980 United States Department of Agriculture (USDA) survey showed a deficit in the supply of college graduates with agricultural training (Coulter & Stanton, 1980). The deficit did not decrease during the 1980s, but instead was predicted to increase to a level of 20 percent by the 1990s (Loeslie, 1987). The United States, including Texas, is experiencing a demographic shift that will continue into the twenty-first century. It is predicted that in Texas, current minority groups will constitute over 50 percent of the State's population by the year 2025 (Murdock, Hoque, & Hamm, 1989). For that same year, the school age population in Texas should consist of 48 percent Hispanic, 36 percent White, and 14 percent Black (Murdock et al., 1989). In fact, there are already several school districts in Texas in which the combined total of minority students comprises a majority of the school age population. Therefore, it is possible that the increasing population of minority youth could be recruited into agricultural careers to eliminate the current and predicted shortages.

Throughout the twentieth century, high school agricultural education has served to prepare youth for agricultural careers. Today, agricultural

education can be a positive force to encourage young people to prepare for careers in agriculture that require higher education or specialized training, in addition to production agriculture careers. One of the national goals of agricultural education is "to serve all people and groups equally and without discrimination" (National Council for Agricultural Education, 1989, p. 4). Therefore, both the stated goal and the implied missions of the past indicate that agricultural education needs to develop strategies for recruiting and retaining diverse groups of students.

Statement of the Problem

Agriculture is a vital industry for the United States. The productivity of American farmers and agricultural workers has contributed to the country's high standard of living. The continued success of this industry depends upon a present and future supply of qualified agriculturists. Agricultural education must play a large role in training future agriculturists and preparing them for higher education in agriculture. Larke (1987) implored that educators must include minority students in these training and educational processes.

In 1990, the overall Texas student population was 49.5 percent White, 14.4 percent Black, 33.9 percent Hispanic, and 2.2 percent Asian-Americans, Native Americans, and others (Garcia, 1991). The secondary enrollment in Texas public schools for the 1990-91 school year was 51.9 percent White, 13.9 percent Black, 31.7 percent Hispanic, 2.3 percent Asian-Americans, and 0.2 percent Native Americans (Texas Education Agency, 1991). However, the percentage of minorities enrolled in agriscience courses did not reflect the percentage of minorities in either the overall school age population or the secondary school population. In the 1989-90 school year, the agricultural education enrollment in secondary schools in Texas was composed of 75.0

percent White, 6.0 percent Black, 18.0 percent Hispanic, and 1 percent Asian-Americans, Native Americans, and others (Eudy, 1991). The problem is that agriscience professionals do not know effective strategies for arousing interest in more minority students for agriscience education and agricultural careers. A study comparing the attitudes of minority and non-minority agriscience students toward agriculture and agriscience education should aid in answering questions about the disparity in ethnic representation in Texas agriscience education. Information from this study should help in developing recruitment and retention strategies for minorities in agriscience education.

Purposes and Objectives of the Study

The purposes of this study were to measure attitudes toward agriculture of students who were enrolled in an introductory agriscience course in Texas and to identify factors influencing minority and non-minority students to enroll in an introductory agriscience course in Texas.

Three objectives were identified in order to accomplish the purposes of the study:

1. To describe selected demographic, situational, career, and educational characteristics of minority and non-minority students enrolled in an introductory agriscience course;
2. To determine if interrelationships exist between and among selected demographic and situational characteristics, reasons for enrolling, perceived barriers to enrollment, and attitudes toward agriculture; and,
3. To compare minority and non-minority students enrolled in an introductory agriscience course in Texas on reasons for enrolling, perceived barriers, and attitudes toward agriculture.

Significance of the Study

Prior to 1985, agricultural education in Texas focused primarily on production agriculture. Beginning in 1988, a new semester-based course system shifted the emphasis toward agriscience education. The 23 semester courses offer diversity in course selection and can be attractive to the non-traditional agriculture student who does not have an interest in production agriculture (Briers, 1992). This change in emphasis has broadened agricultural education to include both traditional career preparation called "instruction in agriculture" and instruction for general agricultural knowledge and interest called "instruction about agriculture" (National Research Council, 1988). This new emphasis is needed to prepare students for high technology careers that are available in agriculture. It is also needed to educate students from non-farm backgrounds about agriculture and to expand the agricultural knowledge of farm students.

Agriscience education must reflect the ethnic and racial diversity of the school-age population if it is to provide agricultural industry with qualified and prepared workers. Unfortunately, the enrollment in agriscience courses in Texas does not reflect the diversity of the school-age population. Agriscience education nationally and in Texas remains predominantly White and disproportionately male (National Research Council, 1988).

METHODOLOGY

Because the study was conducted after all of the factors had exerted their influence on the variables in question, ex post facto research methodology was used. According to Borg and Gall (1989), this is the appropriate methodology for this type of study and is useful in examining causal relationships.

Population and Sample

The population of the study consisted of all students enrolled in Agriscience 101, "Introduction to World Agricultural Science and Technology," and Agriscience 102, "Applied Agricultural Science and Technology," in Texas public schools during the Fall semester, 1991. These two courses are designed for beginning students in Agriscience Education (Texas Education Agency, 1990). The enrollment figures for Fall, 1990, which was the latest year available, were 18,818 for Agriscience 101 and 1,203 for Agriscience 102. There were approximately 1000 schools offering courses in agriculture during the 1990-91 school year (Eudy, 1991).

Because of the large size of the population, a census study was determined to be impractical; therefore, random sampling with the use of inferential statistics was employed. A cluster sample of all agriscience students in AGSC 101 and AGSC 102 for the Fall Semester, 1991 in 60 Texas schools was taken. The sample contained 1,399 total students.

Instrumentation

The sample was surveyed using a five-part mailed questionnaire with 96 total questions. Part I consisted of 12 items designed to collect demographic information on the student. Part II of the questionnaire contained six items to obtain information on the educational and career goals and plans of the student. Part III consisted of 33 questions designed to ascertain why the student enrolled in the course. The student responded to each question using a five point, Likert-type scale of "strongly disagree," "disagree," "neutral," "agree," and "strongly agree." Part IV was also constructed using a Likert-type scale and consisted of 19 questions. Part IV was designed to determine the student's attitudes toward perceived barriers to enrollment in an introductory agriscience course. The final section, Part V, consisted of 26

questions designed to determine the student's opinions on selected agricultural and agricultural education areas.

A draft copy of the questionnaire was presented to the faculty and doctoral students in the Department of Agricultural Education at Texas A&M University for their review and comments. From this meeting, revisions were made and the draft was pilot tested. As a result of the pilot test, the questionnaire was modified slightly to improve readability and clarity. The results of the pilot study, and the expertise of the researcher's graduate committee, were used to establish the content and face validity of the instrument.

Data Collection

On October 1, 1991, teachers in the selected agriscience departments were mailed an introductory letter that explained the study and asked for their participation. The mailing also included a yellow postage-paid response postcard on which the teachers indicate their desire to participate or not, the total number of AGSC 101 and 102 students in the department, and the size of the largest AGSC 101 or 102 class. On October 24, 1991, each of the agriscience departments in the sample was mailed a survey packet consisting of a cover letter, an instruction sheet for the teacher, a set of questionnaires to be reused for each AGSC 101 or 102 class, pre-coded optical scanning sheets for each student plus extras, a self-addressed postage-paid manila envelope, and enough number 2 pencils for the largest class size. On December 5, 1991, follow-up postcards were mailed to the 13 agriscience teachers who had not responded. To ensure as many responses as possible before Christmas vacation, the remaining 12 non-respondents were called during the week of December 11-19, 1991, with all 12 indicating a willingness to complete the study. By January 16, 1992, 57 of the 60 agriscience programs had responded. Therefore,

the response rate for this study was ninety-five percent.

Data Analysis

The data were analyzed through the mainframe computer at Texas A&M University using the software Statistical Package for Social Sciences Release 4.1 ($SPSS^X$). Descriptive statistics generated by $SPSS^X$ procedure FREQUENCIES were used to address Objective one. The overall sample frequency counts and percentages were generated first, then the data file was split by student ethnicity to obtain frequency counts and percentages for each ethnic group. The Asian-American and Native American groups had too few occurrences for valid statistical analyses; so, the data for these groups were not reported. The items gender, grade, 4-H, agricultural career (five years), and agricultural career (lifetime) all had fewer than five response categories. Student responses in other categories were not reported. Because of this, the percentages may not total 100.

Correlation statistics, procedures PEARSON CORR and NONPAR CORR, were used to determine the relationships between selected variables for Objective two. First, scales were developed which combined the items in Sections III, IV, and V into appropriate groupings. After the scales had been developed, the appropriate correlational techniques were used to examine relationships between the scales and selected demographic, educational, and career variables. To determine statistical significance, an alpha level of $p < .05$ was used for all analyses.

Analysis of Variance ($SPSS^X$ procedures ONEWAY and ANOVA) was used to compare various groups of subjects (levels of independent variables) on the scaled variables (dependent variables). These were performed to satisfy Objective three. To determine statistical significance, an alpha level of $p < .05$ was used for all analyses. If the ANOVA was statistically significant,

Duncan's Multiple Comparison post-hoc means test was used to determine which of the group means were different from the others.

FINDINGS AND DISCUSSION

The objectives were used as a guide for presenting the findings of the data analysis. Therefore, findings will be discussed by objective.

Findings Related to Objective One

The major focus of this study was on comparing minority and non-minority agriscience students. That is, ethnicity is the basic concern of the study; therefore, the findings are presented according to ethnicity. Due to the small number of Asian-American students and the problems described below with the Native American students, the only ethnic groups presented are Black, Hispanic, and White.

The sample contained an ethnic distribution similar to that of the population. Table 1 shows the sample distribution by ethnicity. Blacks were 6.3% of the sample, while Hispanic students made up 17%. Whites (72.5%) were a majority of the sample. Less than 1% of the sample identified themselves as Asian-American. Although less than 1% of the population is Native American, 47 students (3.4%) in the sample identified themselves as such. The ethnicity item on the questionnaire was worded "American Indian" in an attempt to avoid students identifying themselves as "Native American" because they were born in America. This confusion may be one explanation for the discrepancy. However, another explanation may be that adolescents feel pride in identifying themselves with whatever percentage of Native American ancestry they possess, no matter how small or none at all. An interesting finding was that five students did not respond to this question, even though all five had clearly and accurately answered the items surrounding the ethnicity item.

Table 1

Ethnicity of Students in the Sample

Ethnicity									
Black		Hispanic		White		Asian-American		Native American	
n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
88	(6.3)	237	(17.0)	1011	(72.5)	11	(0.8)	47	(3.4)

This sample contained a mixture of Black, Hispanic, and White teachers. As shown in Table 2, an overwhelming majority (93.0%) of students identified the ethnicity of their teacher as White. Less than 2% of the students had a Black teacher, and less than 6% an Hispanic teacher. However, 5.9% of Black students in the sample had a Black teacher, 27.8% of Hispanic students had an Hispanic teacher, and only 16 of the 1,011 White students (1.6%) had a Black or Hispanic teacher.

Table 2

Percentage of Students with Teachers of Each Ethnicity

	Teachers' Ethnicity[1]					
Ethnicity	Black		Hispanic		White	
of Student	n	(%)	n	(%)	n	(%)
Black	5	(5.9)	2	(2.4)	78	(91.8)
Hispanic	5	(2.3)	64	(27.8)	161	(70.0)
White	8	(0.8)	8	(0.8)	991	(98.4)
Overall	18	(1.4)	74	(5.6)	1230	(93.0)

[1] Includes only those students whose response to the item was Black, Hispanic, or White.

As shown in Table 3, the sample consisted of 71% males and 29% females. Over 32% of the White students were female. Females comprised 25% of the Black students and 16.6% of Hispanic students. Marshall (1990) stated that in 1980, 82.4% of program completers in agriculture were male; while in 1989 total program enrollment was 77% male. The proportion of females found in

this study indicate that the trend is for a larger proportion of females enrolling in agriscience education courses; however, the proportion is still far away from the virtually one to one ratio in the high school population. The proportion of minority females in agriscience education is even more dismal.

Table 3

Gender of Students in the Sample

Ethnicity	Gender	
	Male n (%)	Female n (%)
Black	66 (75.0)	22 (25.0)
Hispanic	196 (83.4)	39 (16.6)
White	681 (67.4)	330 (32.6)
Overall	992 (71.0)	405 (29.0)

The age distribution of the students in the sample is presented in Table 4. A majority of the students (72.5%) were 15 years old or younger. Another 25.1% of the sample were 16 to 17 years old, while only 2.4% were 18 years old or older. This distribution is consistent with the designation of the AGSC 101 and 102 courses as introductory. Hispanic and White students had similar distributions to the overall sample. Black students were more likely to be older, with only 51.2% being 15 years old or younger, while 5.7% were 18 years old or older.

Table 4

Age of Students in the Sample

Ethnicity	Age <=14 n (%)	15 n (%)	16 n (%)	17 n (%)	>=18 n (%)
Black	18 (20.5)	27 (30.7)	23 (26.1)	15 (17.0)	5 (5.7)
Hispanic	85 (35.9)	84 (35.4)	38 (16.0)	25 (10.5)	5 (2.1)
White	400 (39.6)	356 (35.2)	175 (17.3)	61 (6.0)	19 (1.9)
Overall	524 (37.5)	490 (35.0)	247 (17.7)	104 (7.4)	34 (2.4)

Table 5 shows the distribution of students by grade level. The sample consisted of 77.3% ninth graders, 12.2% tenth graders, 6.8% eleventh, and 3.7% twelfth. This is consistent with the designation of this course as an introductory course. However, only 60.2% of Black students were in the ninth grade, while 19.3% were tenth graders, 12.5% eleventh, and 8% twelfth. Hispanic and White students were again closer to the overall sample in distribution.

Table 5

Grade Level of Students in the Sample

Ethnicity	Grade Level 9 n (%)	10 n (%)	11 n (%)	12 n (%)
Black	53 (60.2)	17 (19.3)	11 (12.5)	7 (8.0)
Hispanic	188 (80.0)	28 (11.9)	13 (5.5)	6 (2.6)
White	788 (78.2)	115 (11.4)	68 (6.7)	37 (3.7)
Overall	1077 (77.3)	170 (12.2)	95 (6.8)	52 (3.7)

Table 6 shows the residence of the agriscience education students. Students in the sample were more likely to live on a farm or ranch than the general United States population. This percentage (17.6%) is much higher than the less than 5% of the American population that lives, works, or receives

income from a farm. Another 25% of the sample resided in a rural area, but not on a farm or ranch. The largest percentage of students (31%) identified their residence as small town (population of less than 5,001). The remainder of the sample (26.3%) lived in an urban (population of more than 50,000) or suburban area (population of 5001 to 50,000). White students tended to reside on a farm or in a rural area (46.3%). Black students were less likely than Whites to live on a farm or in a rural area (35.6%), more likely to live in a small town (35.6%), and equally likely to live in an urban or suburban area (28.7%). The Hispanic students in the sample were more likely to live in a small town (51.9%).

Table 6

Residence of Students in the Sample

Ethnicity	Place of Residence									
	Farm		Rural		Small Town		Suburban		Urban	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Black	12	(13.8)	19	(21.8)	31	(35.6)	19	(21.8)	6	(6.9)
Hispanic	26	(11.0)	47	(19.8)	123	(51.9)	33	(13.9)	8	(3.4)
White	195	(19.4)	271	(26.9)	259	(25.7)	216	(21.4)	66	(6.6)
Overall	245	(17.6)	349	(25.0)	432	(31.0)	284	(20.4)	84	(6.0)

As Table 7 details, a majority (59.8%) of Agriscience 101 students in the sample did not have any brothers or sisters who had taken or were taking agriscience courses. However, 26.8% of the sample had one sibling who had taken or was taking agriscience courses. Another 13.4% of the sample had more than one sibling with agriscience course experience. Black students (61.4%) and Hispanic students (65.4%) were somewhat more likely to not have any brothers or sisters with agriscience course experience than White students (58.2%).

Table 7

Number of Siblings Who Have Taken Agriscience Courses

Ethnicity	Number 0 n (%)	1 n (%)	2 n (%)	3 n (%)	4 n (%)
Black	54 (61.4)	20 (22.7)	10 (11.4)	1 (1.1)	3 (3.4)
Hispanic	155 (65.4)	49 (20.7)	19 (8.0)	9 (3.8)	5 (2.1)
White	588 (58.2)	294 (29.1)	84 (8.3)	34 (3.4)	11 (1.1)
Overall	837 (59.8)	375 (26.8)	120 (8.6)	45 (3.2)	22 (1.6)

Membership in 4-H was not prevalent within this sample (See Table 8). Agriscience students who were also 4-H members, or had ever been members, constituted only 36.5% of the sample. White students (39.3%) were more likely than Blacks and Hispanics to be past or present 4-H members. Only 34.9% of Blacks and 22.4% of Hispanics were either present or past 4-H members.

Table 8

Membership in 4-H

Ethnicity	Current or Previous Membership Yes n (%)	No n (%)
Black	30 (34.9)	56 (65.1)
Hispanic	52 (22.4)	180 (77.6)
White	395 (39.3)	609 (60.7)
Overall	505 (36.5)	877 (63.5)

Tables 9 through 11 depict the post-graduation plans of students in the sample, their chances of attending a college or university if eligible for admission, and their chances of majoring in an agriculturally-related field if eligible for admission. While 64.9% of the sample planned to attended college after graduation, only 55.1% rated their chances of attending as "considerable" or "great." The students were asked what their chances of

majoring in an agriculturally-related field were if they were eligible for admission to a college or university. Over one-third of the sample (36.4%) rated their chances as "considerable" or "great."

White students (69.9%) were more likely than Black and Hispanic students to plan to attend college and were also more likely (58.4%) to rate their chances of attending as "considerable" or "great." Only 12.8% of White students rated their chances as "little" or "none." White students were also more optimistic about their chances of majoring in an agriculturally-related field. Only 32.1% of White students rated their chances of majoring in an agriculturally-related field as "little" or "none." Black students (56.8%) and Hispanic students (51.3%) were less likely to plan to attend college. They were also more pessimistic about their chances of attending a college. For Black students, only 37.8% rated their chances as "considerable" or "great," while 17.1% said "little" or "none." For Hispanic students, the percentages were 34.0% for "considerable" or "great" and 17.8% for "little" or "none." Black and Hispanic students were also less likely to want to major in an agriculturally-related field. For Black students, the percentage rating their chances as "little" or "none" was 45.4%. For Hispanic students, the percentage rating "little" or "none" was 47.9%.

Table 9

Educational and Career Plans After High School

Ethnicity	Post-Graduation Plans									
	Work		Military		Vocational Training		College		Other	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Black	10	(11.4)	17	(19.3)	9	(10.2)	50	(56.8)	2	(2.3)
Hispanic	61	(25.8)	31	(13.1)	23	(9.7)	121	(51.3)	0	(0.0)
White	101	(10.0)	101	(10.0)	93	(9.2)	705	(69.9)	8	(0.8)
Overall	184	(13.2)	164	(11.8)	132	(9.5)	905	(64.9)	10	(0.7)

Table 10

Chance of Attending College if Eligible

Ethnicity	Chance of Attending									
	None		Little		Average		Considerable		Great	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Black	7	(8.0)	8	(9.1)	31	(35.2)	13	(14.8)	29	(33.0)
Hispanic	22	(9.4)	43	(18.4)	66	(28.2)	53	(22.6)	50	(21.4)
White	41	(4.1)	88	(8.7)	290	(28.8)	236	(23.4)	352	(35.0)
Overall	70	(5.5)	147	(10.6)	408	(29.3)	321	(23.1)	445	(32.0)

Table 11

Chance of Majoring in an Agriculturally-Related Field

Ethnicity	Chance of Majoring									
	None		Little		Average		Considerable		Great	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Black	17	(19.3)	23	(26.1)	22	(25.0)	13	(14.8)	13	(14.8)
Hispanic	54	(22.9)	59	(25.0)	56	(23.7)	51	(21.6)	16	(6.8)
White	97	(9.6)	227	(22.5)	294	(29.1)	214	(21.2)	178	(17.6)
Overall	179	(12.8)	325	(23.3)	384	(27.5)	294	(21.1)	214	(15.3)

Students were asked whether they thought they would be employed in an agricultural career within five years, and within their entire working career (See Tables 12 and 13). A majority (52.9%) of the students did not see

themselves in an agricultural career within five years after high school graduation. However, at some point within their entire working career, a majority (54.7%) did see themselves employed in an agricultural career. Although 51.2% of White students did not see themselves in an agricultural career within five years, 58.1% did expect to be involved in agriculture within their working career. Black and Hispanic students were more negative in their attitudes toward a career in agriculture both within five years (respectively, 61.4% and 58.7% said "no") and within their entire working career (respectively, 50.0% and 54.0% said "no").

Table 12

Agricultural Career Plans Within Five Years

Ethnicity	Possibility of Employment in Agriculture: Definitely Not n (%)	Probably Not n (%)	Probably Yes n (%)	Definitely Yes n (%)
Black	22 (25.0)	32 (36.4)	23 (26.1)	9 (10.2)
Hispanic	39 (16.5)	100 (42.2)	83 (35.0)	15 (6.3)
White	74 (7.3)	443 (43.9)	356 (35.3)	132 (13.1)
Overall	143 (10.2)	596 (42.7)	489 (35.0)	163 (11.7)

Table 13

Agricultural Career Plans Within Working Career

Ethnicity	Possibility of Employment in Agriculture: Definitely Not n (%)	Probably Not n (%)	Probably Yes n (%)	Definitely Yes n (%)
Black	15 (17.0)	29 (33.0)	28 (31.8)	14 (15.9)
Hispanic	35 (14.8)	93 (39.2)	89 (37.6)	18 (7.6)
White	72 (7.1)	344 (34.1)	389 (38.5)	198 (19.6)
Overall	133 (9.5)	487 (34.8)	526 (37.6)	239 (17.1)

Findings Related to Objective Two

Parts III, IV, and V of the instrument were used to address Objectives two and three. The individual questions in these parts were groups into scales used to measure underlying constructs. Correlational statistics were used to measure the relationships between and among the variables and scales. Correlational coefficients were calculated using Pearson product-moment, point-biserial, and Spearman's Rho. The ranges used for describing the correlation relationships were as follows: .85 or higher represents a very high relationship, .65 to .84 represents a high relationship, .35 to .64 represents a moderate relationship, .20 to .34 represents a slight relationship, and .00 to .19 represents a negligible relationship (Borg and Gall, 1989).

Tables 14 through 23 show the correlation coefficients for the 12 scales and selected variables. The personal variables are grouped into those variables over which the student has no control, those that relate to influential persons, those over which the student has control, and those that relate to agriculture. Using the criteria set forth by Borg and Gall (1989), we see that the variables over which the student has no control have a negligible practical significance. However, Borg and Gall also cautioned that in certain circumstances, low correlations do have practical significance.

First, minority students were more likely than non-minority students to take the agriscience courses because of Disavowance reasons (See Table 14). Non-minority students tended to enroll because of Agriculture/Agricultural Education and Good Feeling reasons than minority students. Career preparation also tended to attract non-minority more than minority students. Older students were more likely to be in the class because of Disavowance reasons. Female students tended to enroll because of agriculture and agricultural

education reasons. Male students were more likely to enroll because of Disavowance reasons. Students who live in more urbanized areas tended to have lower means for all of the scales.

Table 14

Correlation Coefficients of Personal (No Control) Variables with Enroll Scales

Scale	Personal Variable			
	Minority[a] Status	Age	Gender[b]	Residence[c]
Agriculture	-.24**	-.11**	.09**	-.13**
Influential Persons	-.07**	-.02	-.001	-.13**
Agricultural Career	-.17**	-.10**	.03	-.13**
Disavowance	.19**	.14**	-.15**	.05*
Good Feeling	-.13**	-.05	.09**	-.06*

* p<.05 ** p<.01

[a] non-minority = 0; minority = 1
[b] male = 0; female = 1
[c] farm = 0; rural = 1; small town = 2; suburban = 3; urban = 4

It is interesting to note that students who were a different ethnicity from their teacher tended to have lower scores for the four scales for enrollment that are "positive" in nature. These positive scales are Agriculture/Agricultural Education, Influential Persons, Agricultural Career, and Good Feeling. The correlations for this variable mirror those of the minority status variable. By looking at Table 2 for Objective one, we can see that there are very few minority students whose teacher is a different minority. There are also very few non-minority students who have a minority teacher. These findings may mean that this variable is actually just another measure of student minority status.

The more siblings with previous agriscience experience a student has,

the more that student tends to enroll because of Agriculture/Agricultural Education reasons. Those students also tend to enroll more because of Influential Persons. One may suspect that the sibling(s) influenced the student.

Table 15

Correlation Coefficients of Personal (Influential Persons) Variables with Enroll Scales

Scale	Personal Variable			
Teacher	Student/[a] Ethnicity	Father's Education	Mother's Education	Siblings[b] Enrolled
Agriculture	-.21**	.13**	.08**	.12**
Influential Persons	-.06*	.11**	.05*	.19**
Agricultural Career	-.17**	.10**	.04	.06*
Disavowance	.18**	-.07**	-.09**	.002
Good Feeling	-.14**	.06*	.03	.06*

* p<.05 ** p<.01

[a] student/teacher of same ethnicity = 0; student/teacher of different ethnicity = 1

[b] none = 0; one = 1; two = 2; three = 3; four or more = 4

The variables over which the student had some control showed statistically significant correlations with most of the Reasons for Enrolling scales (See Table 16). Again, using Borg and Gall's criteria (1989), the levels of correlation are negligible. It is interesting to note that an increasing chance of attending college is positively correlated with the four "positive" scales and that Agriculture/Agricultural Education and Agricultural Careers scales have slight practical significance.

Table 16

Correlation Coefficients of Personal (Control) Variables with Enroll Scales

Scale	Personal Variable		
	Final[a] Grades	Plans After[b] High School	Chance of College
Agriculture	-.20**	.15**	.24**
Influential Persons	-.06*	.05*	.07**
Agricultural Career	-.19**	.14**	.20**
Disavowance	.13**	-.16**	-.14**
Good Feeling	-.13**	.10**	.15**

* p<.05 ** p<.01

[a] As and Bs = 0; Bs and Cs = 1; Cs and Ds = 2; Ds and Fs = 3; Fs = 4
[b] work = 0; military = 1; vocational/technical training = 2; college = 3; other = 4

The variables connected with agriculture show moderate correlations for most of the scales (See Table 17). The Influential and Disavowance scales have negligible correlations. Students with a greater chance of being involved in agriculture tended to enroll because of Agriculture/Agricultural Education and Career reasons.

Table 17

Correlation Coefficients of Personal (Agriculture) Variables with Enroll Scales

Scale	Personal Variable: Chance of Agriculture	Agriculture Career (Near)	Agriculture Career (Far)
Agriculture	.47**	.42**	.44**
Influential Persons	.21*	.19**	.16**
Agricultural Career	.52**	.46**	.50**
Disavowance	-.17**	-.06*	-.13**
Good Feeling	.33**	.30**	.30**

* p<.05 ** p<.01

Correlation coefficients for the four Barriers to Enrolling scales are presented in Tables 18 through 20. Using the criteria set forth by Borg and Gall (1989), we see that the variables over which the student has no control have a negligible practical significance. However, minority status approached "slight" practical significance. Older, urban, and minority students tended to have higher barrier scales scores. Female students tended to have lower barrier scales scores.

Table 18

Correlation Coefficients of Personal (No Control) Variables with Barrier Scales

Scale	Personal Variable			
	Minority[a] Status	Age	Gender[b]	Residence[c]
Personal Negative	.18**	.12**	-.12**	.08**
Teacher Negative	.15**	.08**	-.20**	.07**
Course Negative	.18**	.10**	-.12**	.10**
Agriculture Negative	.15**	.07**	-.13**	.06*

* p<.05 ** p<.01

[a] non-minority = 0; minority = 1
[b] male = 0; female = 1
[c] farm = 0; rural = 1; small town = 2; suburban = 3; urban = 4

Most of the variables over which the student has control have slight practical significance. Students who made poor grades, and students who rated their chance of attending college as less, were more likely to perceive barriers to enrolling in the course. Students who planned to go to work or into the military after high school, also tended to score higher on the barriers scales.

Table 19

Correlation Coefficients of Personal (Control) Variables with Barrier Scales

Scale	Personal Variable: Final[a] Grades	Plans After[b] High School	Chance of College
Personal Negative	.22**	-.22**	-.26**
Teacher Negative	.22**	-.17**	-.22**
Career Negative	.19**	-.14**	-.20**
Agriculture Negative	.20**	-.17**	-.23**

* p<.05 ** p<.01

[a] As and Bs = 0; Bs and Cs = 1; Cs and Ds = 2; Ds and Fs = 3; Fs = 4
[b] work = 0; military = 1; vocational/technical training = 2; college = 3; other = 4

The personal variables related to agriculture were all correlated to the barriers scales. All of the variables show statistical significance and most showed slight to moderate practical significance. The correlations showed that the more a student is interested in agriculture as a career, the less likely are these factors to be barriers for enrollment.

Table 20

Correlation Coefficients of Personal (Agriculture) Variables with Barrier Scales

Scale	Personal Variable Chance of Agriculture	Agriculture Career (Near)	Agriculture Career (Far)
Personal Negative	-.26**	-.19**	-.24**
Teacher Negative	-.22**	-.14**	-.19**
Course Negative	-.36**	-.32**	-.34**
Agriculture Negative	-.35**	-.29**	-.31**

* p<.05 ** p<.01

Correlation coefficients for the three Personal Opinion about Agriculture scales are presented in Tables 21 through 23. Using the criteria set forth by Borg and Gall (1989), we see that most of the variables over which the student has no control have a negligible practical significance. Minority students tended to have less positive opinions about the availability of agricultural careers for them, the diversity of agriculture, and the knowledge and expertise required in agricultural occupations. For the variable age, older students tended to have lower scale scores. Students who live in more urbanized areas also tended to have lower means for the scales.

Table 21

Correlation Coefficients of Personal (No Control) Variables with Personal Opinion Scales

Scale	Personal Variable			
	Minority[a] Status	Age	Gender[b]	Residence[c]
Personal Career	-.19**	-.05*	.01	-.10**
Agricultural Occupations	-.20**	-.06*	.09**	-.09**
Occupational Requirements	-.20**	-.09**	.06*	-.10**

* $p<.05$ ** $p<.01$

[a] non-minority = 0; minority = 1
[b] male = 0; female = 1
[c] farm = 0; rural = 1; small town = 2; suburban = 3; urban = 4

All of the variables over which a student has control showed statistically significant correlations with the Personal Opinion scales. The correlation levels also approached slight practical significance. It is interesting to note that students with lower final grades tended to have less positive opinions about agriculture.

Table 22

Correlation Coefficients of Personal (Control) Variables with Personal Opinion Scales

Scale	Personal Variable: Final[a] Grades	Plans After[b] High School	Chance of College
Personal Career	-.15**	.12**	.18**
Agricultural Occupations	-.23**	.18**	.24**
Occupational Requirements	-.22**	.14**	.21**

* p<.05 ** p<.01

[a] As and Bs = 0; Bs and Cs = 1; Cs and Ds = 2; Ds and Fs = 3; Fs = 4
[b] work = 0; military = 1; vocational/technical = 2; college = 3; other = 4

The personal variables related to agriculture all showed significant correlations with the opinions scales. Most of the correlations were in the slight range of practical significance. However, the Personal Career scale had moderate correlations with all of the variables. Students with the greatest possibility of an agricultural career tended to be the most positive about opportunities for them in agriculture.

Table 23

Correlation Coefficients of Personal (Agriculture) Variables with Personal Opinion Scales

Scale	Personal Variable: Chance of Agriculture	Agriculture Career (Near)	Agriculture Career (Far)
Personal Career	.54**	.54**	.56**
Agricultural Occupations	.30**	.27**	.29**
Occupational Requirements	.33**	.28**	.32**

* p<.05 ** p<.01

Findings Related to Objective Three

Objective three was to compare minority and non-minority students enrolled in an introductory agriscience course in Texas on reasons for enrolling, perceived barriers, and attitudes toward agriculture. Items 19 through 94 were used to construct the scales used in these analyses. Items 1 through 18 were the demographic and educational variables used for comparisons. One-way analysis of variance and Duncan's Multiple Comparison post-hoc means test were used to determine differences in students' perceptions. The 12 scales for enrollment, barriers, and personal opinions were used as the dependent variables and selected demographic and situational variables were used as independent variables. An alpha level of .05 was set a priori to determine statistical significance of the F statistic as well as the experimentwise error rate for the multiple comparisons test. Only those ANOVAs with statistically significant F values were reported. The mean scale scores are based on 0 "strongly disagree," 1 "disagree," 2 "neutral," 3 "agree," and 4 "strongly agree."

Tables 24 through 26 show the ANOVA results for the selected scales by the variable MINORITY STATUS. For this variable, students who identified their ethnicity as Black or Hispanic were coded as "yes"; students who identified their ethnicity as White were coded as "no." Table 24 showed that non-minorities were more likely than minorities to enroll in the agriscience course because of agricultural and agricultural education course reasons. The means for the Agricultural Career scale showed the same pattern. On the other

hand, the Disavowance scale shows that minority students more so than non-minority students enrolled in the agriscience course for reasons perceived to be out of their control. On the Good Feeling scale, non-minority agriscience students were more likely than minority students to identify this construct as a reason for enrolling in the course.

Table 24

Analysis of Variance of Students' Reason for Enrolling Scale Scores by Students' Minority Status[1]

Scale	Minority Status	Mean	Standard Deviation	F Ratio	F Prob.
Agriculture	Yes	2.3343	.6823	85.2702	<.01
	No	2.7343	.6590		
Agricultural Career	Yes	2.5608	.9762	42.7569	<.01
	No	2.9604	.9506		
Disavowance	Yes	1.5600	.8704	52.0622	<.01
	No	1.1681	.8465		
Good Feeling	Yes	2.3200	.6706	24.4697	<.01
	No	2.5439	.7102		

[1] Includes only those students who responded to all items which comprised the scale.

The Barriers to Enrollment scales (Table 25) show an opposite effect from the Reasons for Enrolling scales. All of the Barriers scales have means below 2.0 which may lead to the conclusion that none of these constructs are barriers to enrolling in an agriscience course. However, the range of scores for the individual scales included students' scores that approached "strongly agree." Therefore, another interpretation may be that any one barrier is enough to keep students from enrolling even though overall barriers are low. Also, one must remember that regardless of perceived barriers, all students in

this study did enroll. Students who had the opportunity to enroll, but did not may tend to have higher scores for the Barriers scales. Consequently, for analysis purposes, a higher mean will be described as a perception of a greater barrier to enrolling.

Minority students were more likely to perceive barriers to enrolling than non-minority students. Non-minority students perceived the teacher as being the least barrier, while minority students perceived other students as being the greatest barrier to enrolling. The Teacher Negative scale yielded the lowest mean among minority students, indicating that the teacher was the least significant barrier to their enrolling.

Table 25

Analysis of Variance of Students' Barriers to Enrollment Scale Scores by Students' Minority Status[1]

Scale	Minority Status	Mean	Standard Deviation	F Ratio	F Prob.
Personal Negative	Yes	1.5930	.7898	46.0754	<.01
	No	1.2198	.8768		
Teacher Negative	Yes	1.3710	.8434	32.1939	<.01
	No	1.0356	.9415		
Course Negative	Yes	1.5522	.8224	44.7291	<.01
	No	1.1674	.9213		
Agriculture Negative	Yes	1.4758	.8640	33.5023	<.01
	No	1.1367	.9256		

[1] Includes only those students who responded to all items which comprised the scale.

Table 26 shows the students' Personal Opinions by Minority Status. For all three scales, non-minority students had the more positive attitudes. Non-minority students saw more career opportunities for themselves in agriculture, more occupational diversity within agriculture, and showed more agreement that occupations in agriculture require knowledge and expertise. For all three scales, minority students approached "neutral" in their attitudes.

Table 26

Analysis of Variance of Students' Personal Opinions Scale Scores by Students' Minority Status[1]

Scale	Minority Status	Mean	Standard Deviation	F Ratio	F Prob.
Personal Career	Yes	2.3512	.7935	47.4834	<.01
	No	2.7209	.8298		
Agricultural Occupations	Yes	2.4563	.7491	55.7732	<.01
	No	2.8064	.7165		
Occupational Requirements	Yes	2.3051	.7205	56.4975	<.01
	No	2.6370	.6669		

[1] Includes only those students who responded to all items which comprised the scale.

Tables 27 through 29 show the ANOVA results for the selected scales by the variable GENDER. Because there were only two response categories for this variable, no post-hoc means tests were necessary.

Table 27 showed that females were more likely than males to enroll in the agriscience course because of agricultural and agricultural education course reasons. On the other hand, the Disavowance scale shows that males more than females enrolled in the agriscience course for reasons perceived to be out of their control. On the Good Feeling scale, female agriscience students were more likely than males to identify this construct as a positive reason for enrolling in the course.

Table 27

Analysis of Variance of Students' Reason for Enrolling Scale Scores by Gender[1]

Scale	Gender	Mean	Standard Deviation	F Ratio	F Prob.
Agriculture	Male	2.6036	.7132	11.1857	.0008
	Female	2.7406	.5996		
Disavowance	Male	1.3440	.8776	33.1536	<.01
	Female	1.0516	.8033		
Good Feeling	Male	2.4509	.7047	11.2174	.0008
	Female	2.5922	.7055		

[1] Includes only those students who responded to all items which comprised the scale.

All of the Barrier scales (Table 28) had means below 2.0 for both males and females. For all four Barriers scales, females had lower mean scores than males. The Teacher Negative scale mean for females approached "strongly disagree." Female students in agriscience courses saw the teacher as less of a barrier to enrollment than male students. The course itself and other students in the course were identified as the greatest barriers to enrollment by male students.

Table 28

Analysis of Variance of Students' Barriers to Enrolling Scale Scores by Gender[1]

Scale	Gender	Mean	Standard Deviation	F Ratio	F Prob.
Personal Negative	Male	1.3714	.8831	20.6974	<.01
	Female	1.1382	.8142		
Teacher Negative	Male	1.2315	.9684	58.2845	<.01
	Female	0.7406	.7552		
Course Negative	Male	1.3280	.9318	20.5895	<.01
	Female	1.0838	.8428		
Agriculture Negative	Male	1.2913	.9539	24.1349	<.01
	Female	1.0249	.8072		

[1] Includes only those students who responded to all items which comprised the scale.

Male and female agriscience students both agreed that agriculture is a diverse industry and that agricultural occupations require knowledge and expertise. Female students had higher means than male students for both scales. Female students agreed more than male students that agricultural occupations encompass a wide array of careers.

Table 29

Analysis of Variance of Students' Personal Opinions Scale Scores by Gender[1]

Scale	Gender	Mean	Standard Deviation	F Ratio	F Prob.
Agricultural Occupations	Male	2.6835	.7593	11.5372	.0007
	Female	2.8392	.6747		
Occupational Requirements	Male	2.5337	.7146	5.0596	.0247
	Female	2.6270	.6360		

[1] Includes only those students who responded to all items which comprised the scale.

Tables 30 through 32 show the ANOVA results for the selected scales by the dichotomous variable of enrollment in 4-H. Because there were only two response categories for this variable, no post-hoc means tests were necessary.

Table 30 showed that students who were 4-H members were more likely than non-members to enroll in the agriscience course because of agricultural and agricultural education reasons. These students also were more likely to enroll because of influential persons. In addition, members more than non-members enrolled in the course because of Agricultural Career and Good Feeling reasons.

Table 30

Analysis of Variance of Students' Reason for Enrolling Scale Scores by 4-H Membership[1]

Scale	Member	Mean	Standard Deviation	F Ratio	F Prob.
Agriculture	Yes	2.8723	.6214	89.7956	<.01
	No	2.5170	.6826		
Influential Persons	Yes	1.8100	.9448	41.0855	<.01
	No	1.4795	.9019		
Agricultural Career	Yes	3.0625	.8932	29.6362	.0008
	No	2.7705	.9911		
Good Feeling	Yes	2.6024	.6775	16.6368	.0008
	No	2.4391	.7170		

[1] Includes only those students who responded to all items which comprised the scale.

The ANOVA results for the Barriers scales are presented in Table 31. Students who were not 4-H members perceived the other students in the course and the agriscience teacher as barriers to enrollment. Students who were or had been 4-H members approached "strongly disagree" on the scale measuring the teacher as a barrier. Table 31 shows that the agriscience course itself presented more of a barrier to non-members than to members. An interesting finding was that past or present 4-H members more than non-members perceived the negative image of agriculture as a barrier to enrollment.

Table 31

Analysis of Variance of Students' Barriers to Enrollment Scale Scores by 4-H Membership[1]

Scale	Member	Mean	Standard Deviation	F Ratio	F Prob.
Personal Negative	Yes	1.1215	.8729	34.8628	<.01
	No	1.4086	.8573		
Teacher Negative	Yes	0.9930	.9248	12.2071	.0005
	No	1.1756	.9301		
Course Negative	Yes	1.1134	.9104	18.7478	<.01
	No	1.3350	.9087		
Agriculture Negative	Yes	1.2611	.9291	7.6191	.0059
	No	1.1182	.9145		

[1] Includes only those students who responded to all items which comprised the scale.

In Table 32, the students Personal Opinions are compared by 4-H membership status. For all three scales, students who were 4-H members had higher mean scores than students who were non-members. Both groups of students had the highest means for the Agricultural Occupations scale, which measures the students' opinions about the diversity of agriculture. Students who were 4-H members showed the most agreement with the ideas that there were agricultural opportunities available to them and that agriculture is a diverse industry.

Table 32

Analysis of Variance of Students' Personal Opinions Scale Scores by 4-H Membership[1]

Scale	Member	Mean	Standard Deviation	F Ratio	F Prob.
Personal Career	Yes	2.8095	.8265	31.3081	<.01
	No	2.5462	.8251		
Agricultural Occupations	Yes	2.8595	.7135	23.3101	<.01
	No	2.6590	.7424		
Occupational Requirements	Yes	2.6739	.6618	18.5130	<.01
	No	2.5053	.7003		

[1] Includes only those students who responded to all items which comprised the scale.

SUMMARY, CONCLUSIONS AND IMPLICATIONS, AND RECOMMENDATIONS

Summary of Findings Related to Objective One

Objective one was to describe selected demographic, situational, career, and educational characteristics of minority and non-minority students enrolled in an introductory agriscience course. The findings were as follows:

1. The sample had an ethnic distribution of 72.5% White, 6.3% Black, 17.0% Hispanic, 0.8% Asian-American, and 3.4% Native American students. It contained a larger percentage of self-identified Native American students than the population.

2. A majority of the students (91.4%) had a White teacher. However, 27.0% of Hispanic students had an Hispanic teacher and 5.7% of the Black students had a Black teacher. Only 1.6% of White students had a Black or Hispanic teacher.

3. There were 992 males and 405 females in the sample. Females made up proportionally more of the White students (32.6%) than Black (25.0%) or

Hispanic (16.6%) students.

4. The sample consisted of 37.5% 14 year olds, 35.0% 15 year olds, 17.7% 16 year olds, 7.4% 17 year olds, and 2.4% 18 year olds or older. The distribution of Black students had more 18 year olds (5.7%) and the distribution of Hispanic students had fewer 18 year olds (2.1%).

5. The sample consisted of 77.3% ninth graders, 12.2% tenth graders, 6.8% eleventh graders, and 3.7% twelfth graders. Black students were more likely to be in lower grades (60.2% in ninth grade); Hispanic students were more likely to be in the ninth grade (80.0%).

6. Students in the sample identified their place of residence in one of five categories. The distribution was 17.6% on a farm or ranch, 25.0% in a rural area, 31.0% in a small town, 20.4% in a suburban area, and 6.0% in an urban area. More Black students (6.9%) were from an urban area and more Hispanic students (51.9%) lived in a small town.

7. A majority of students in the sample (59.8%) did not have any brothers or sisters who had taken or were taking agriscience courses. Both Black (61.4%) and Hispanic (65.4%) students were more likely than White students (58.2%) to not have any siblings with agriscience course experience.

8. Only 36.5% of the sample had ever been a 4-H member. Black (34.9%) and Hispanic (22.4%) students were less likely than White students (39.3%) to have been 4-H members.

9. A majority of the sample (64.9%) planned to attend college after high school graduation. Another 13.2% planned to go straight to work, 11.8% into the military, and 9.5% into vocational training. Hispanic students (25.8%) were more likely to go to work than White (10.0%) or Black (11.4%) students. Black students (19.3%) were more likely to enter the military than White (10.0%) or Hispanic students (13.1%).

10. A majority of students (55.1%) identified their chance of attending college as "considerable" or "great." More Hispanic students (9.4%) identified their chances as "none" than White (4.1%) or Black (8.0%) students.

11. The students identified their chance of majoring in an agriculturally-related field if they were eligible for admission to a college or university. Hispanic (22.9%) and Black (19.3%) students identified their chances as "none" more than White students (9.6%). On the other hand, more White (17.6%) and Black (14.8%) students than Hispanic students (6.8%) identified their chances as "great."

12. Students were asked to evaluate their chances of being involved in an agricultural career within five years. Black students (25.0%) were most likely and White students (7.3%) were least likely to answer "definitely not." On the other end of the scale, White students (13.1%) were most likely and Hispanic students (6.3%) were least likely to answer "definitely yes."

13. Students were asked to evaluate their chances of being involved in an agricultural field within their working career. Black students (17.0%) were most likely and White students (7.1%) were least likely to answer "definitely not." On the other end of the scale, White students (19.6%) were most likely and Hispanic students (7.6%) were least likely to answer "definitely yes."

Summary of Findings Related to Objective Two

Objective two was to determine if interrelationships exist between and among selected demographic and situational characteristics, reasons for enrolling, perceived barriers to enrollment, and attitudes toward agriculture. The findings were as follows:

1. The four Reasons for Enrolling scales yielded Cronbach's Coefficient Alphas that ranged from .67 to .84. The Alphas for the four Barriers to

enrolling scales ranged from .75 to .86. The three Personal Opinions scales had Alphas of .73 to .85.

2. The Reasons for Enrolling scales were related to many of the selected variables. Most of the relationships were negligible to slight; however, the scales were moderately related to the three chance of involvement in agriculture variables.

3. The Barriers to Enrolling scales were related to many of the selected variables. However, the relationships were negligible to slight.

4. The Personal Opinions scales were related to many of the selected variables. Most of the relationships were negligible to slight; however, the scales were moderately related to the three chance of involvement in agriculture variables.

5. The Reasons for Enrolling, Barriers to Enrollment, and Personal Opinions scales showed moderate to high correlations within themselves. Correlations between scales in different areas showed slight to moderate relationships.

Summary of Findings Related to Objective Three

Objective three was to compare minority and non-minority students enrolled in an introductory agriscience course in Texas on reasons for enrolling, perceived barriers, and attitudes toward agriculture. The findings were as follows:

1. The minority status of the student and the Reasons for Enrolling scales are related. For the Agriculture, Agricultural Careers, and Good Feeling scales, non-minority students had higher mean scores than minority students. For the Disavowance scale, minority students had the higher mean.

2. The minority status of the student and the Barriers to Enrollment scales were related. For all four scales, minority students had higher mean

scores than non-minority students.

3. The minority status of the student and the Personal Opinions scales were related. For each scale, non-minority students had higher mean scores than minority students.

The findings above were from comparisons between minority and non-minority students. The remainder of the findings for Objective three were from selected demographic and situational variables.

4. Gender and the Reasons for Enrolling scales of Agriculture, Disavowance, and Good Feeling were related. Female students had higher mean scores for Agriculture and Good Feeling and a lower mean score for Disavowance.

5. Gender and the Barriers to Enrolling scales were related. Male students had higher mean scores for the Personal Negative, Teacher Negative, Course Negative, and Agriculture Negative scales.

6. Gender and the Personal Opinions scales of Agricultural Occupations and Occupational Requirements were related. Female students had higher mean scores for both scales.

7. Membership in 4-H and the scales of Agriculture, Influential Persons, Agricultural Career, and Good Feeling were related. For all four scales, students who were 4-H members had higher mean scores.

8. Membership in 4-H and the Barriers to Enrolling scales were related. Students who had never been a 4-H member had higher mean scores for the scales of Personal Negative, Teacher Negative, and Course Negative; however, they had a lower mean for the Agriculture Negative scale.

9. Membership in 4-H and the Personal Opinions scales were related. For all three scales, past or present 4-H members had higher means.

Conclusions and Implications

The conclusions of this study and implications from the conclusions are presented below. Each conclusion is based on the findings of the study as summarized in the previous section.

1. The ethnic composition of AGSC 101 and 102 classrooms was not proportional to that of Texas public schools. Minority students, especially minority female students, were underrepresented in these two introductory agriscience courses. These two courses are the gateway to future enrollment in agriscience courses. Unless minority enrollment in AGSC 101 and 102 is increased, overall minority enrollment in agriscience education will continue to be small.

2. Most agriscience students had a White teacher. If, as the literature suggests, students need role models of their own ethnicity to guide them into educational programs and subsequently into occupations, then minority students will continue to perceive agricultural occupations as not desirable for them unless more minority teachers are employed.

3. Black students, more than White or Hispanic students, wait until after the ninth grade to enroll in AGSC 101 or 102. If more Black students could be persuaded to enroll in agriscience courses in the ninth grade, then they would possibly continue their enrollment into later grades. This should increase the opportunities for Black students to enter agricultural occupations at higher than entry level positions.

4. Black and Hispanic students had less of a rural background than White students. Emphasis on the urban aspects of agriculture may be helpful in recruiting minority students into agriscience education.

5. Minority agriscience students, especially Hispanic students, did not have 4-H experience to the same extent as White students. Because 4-H

membership is related to a positive attitude toward agriculture, involving minority youth in 4-H might lead to higher enrollments in agriscience education.

6. The scales used in this study had relatively high internal consistency. Therefore, the scales did an adequate job of measuring reliably the underlying constructs they were designed to measure. The presence of this reliability gives more authority to the conclusions based on the scales.

7. Older students perceived more barriers to enrolling in agriscience courses and were more negative in their attitudes about career opportunities and the diversity of agriculture. However, the low correlations suggest that attitudes are formed before the ninth grade and remain fairly consistent after that.

8. Female agriscience students perceived fewer barriers to enrolling than male students. One conclusion from this may be that the recruitment efforts aimed at females have reduced barriers and negative perceptions. An implication from this would be that deliberate efforts to attract minority students would also lower barriers and negative perceptions.

9. Rural students more than urban students were attracted to agriscience courses because of agricultural, career, and sense of well-being reasons. The traditional aspects of agricultural education did not appeal as much to urban students. A greater focus on aspects of the courses that urban students can relate to may attract more urban students, and consequently more minority students.

10. Minority students were less inclined to enroll in AGSC 101 and 102 courses for agricultural or career reasons, and more likely to feel that they were in the course because of circumstances beyond their control. They perceived more barriers to enrolling and had more negative attitudes toward

agriculture and agricultural occupations. Until minority students' perceptions change and barriers to enrollment are removed, greater minority participation in agriscience education should not be expected.

11. The greater a student's chance of attending college, the more positive that student was in enrolling in agriscience for agricultural and career reasons. That student also perceived fewer barriers to enrolling and had a more positive attitude toward agricultural careers and the diversity of agriculture. One implication of this conclusion is that efforts to make agriscience education more attractive to college-bound students have succeeded. Again, deliberate efforts to change the image of agriculture and agricultural education to one that is attractive to minority students should work to reduce barriers and negative images.

12. The greater a student's chance of majoring in an agriculturally-related field, the more positive that student was about enrolling in agriculture and about the career opportunities and diversity in agriculture. That student also perceived fewer barriers to enrollment. These conclusions imply that positive attitudes toward agriculture, agricultural education, and agricultural careers are intertwined. Also, they lead one to infer that positive intervention in one area may affect positively a student's attitudes about or plans in agriculture.

13. Students who planned to be involved in agriculture within the next five years were more positive in their attitudes and perceived fewer barriers.

14. Students who planned to be involved in agriculture within their working career were more positive about enrolling in agriscience courses, perceived fewer barriers to enrollment, and agreed more that agricultural careers were available and that agriculture was a diverse field.

Recommendations

Recommendations for Practice

Based on the findings, conclusions, and implications of this study, the following recommendations for practice are made concerning increasing minority participation in agriscience education and agriculture.

1. Adolescents seem to form attitudes regarding agriculture by the ninth grade. Because few minority students had either 4-H experience or siblings enrolled in agriscience, they lack early, positive images of agriculture and agricultural education. Agricultural education should focus awareness and informational activities on the elementary grades and should conduct recruitment activities no later than the middle school grades.

2. The literature reveals that positive role models of the same ethnicity can be influential factors for students to enroll in agriscience course and ultimately pursue agricultural careers. Agriscience education should work to increase the number of minority teachers in public schools. On an immediate basis, agriscience teachers should utilize minority agricultural professionals as guest speakers, job placement coordinators, chaperones, and assistants for FFA activities. In addition, minorities should be depicted in instructional materials.

3. Because minority students were more likely to enroll for disavowance reasons, educators need to discourage the practice of dumping these students into agriscience courses. This should include efforts to change the negative perception of agriculture that guidance counselors and others in influential roles may hold.

4. The findings of this study imply that image enhancement efforts aimed at female and college-bound students have been successful in reducing perceived barriers to enrollment for these students. Consequently,

agriscience education should now conduct planned, deliberate efforts to reduce perceived barriers for minority students.

5. Local agriscience teachers need minority recruitment strategies and publications available on demand. These strategies and publications should be developed based on research and should be supplied to teachers in a self-contained, ready-to-use form.

6. Once minority students have enrolled in one agriscience course, efforts need to be made to ensure their success and continued enrollment. These retention efforts should be based on research and should be supplied to agriscience teachers in a self-contained, ready-to-use form.

Recommendations for Additional Research

The findings of this study led the researcher to propose the following recommendations for additional research.

1. The comparisons of minority and non-minority students in this study were between students already enrolled in the agriscience course. Research should be conducted comparing minority students not enrolled in an agriscience course with those enrolled in an agriscience course.

2. Additional research of a qualitative nature should be conducted with minority completers of agriscience programs. This research would provide case studies of successful minority agriscience students to be used in recruitment and retention efforts.

3. Past research has shown that influential persons have an impact on student course selection and eventual career selection. Students of all ethnicities had means approaching "disagree" for the Influential Persons scale in this study. Further research should be conducted to determine if the wording of the items influenced the students' answers or, if in fact, people thought to be influential really do not have much influence on whether a

student participates in agriculture courses.

4. Further research should be conducted to examine the phenomenon of minority students more so than non-minorities enrolling for disavowance reasons.

5. Further research should be conducted comparing the attitudes of minority students and non-minority students toward other vocational programs or other science programs and agriscience education.

6. The particular school setting and the characteristics of the agriscience department may be a factor in a minority student's decision whether to enroll in an agriscience course. Further research should be conducted to provide case studies on minority student recruitment and retention efforts of agriscience programs.

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APPENDIX

Instrument

SURVEY OF BEGINNING AGRISCIENCE STUDENTS IN TEXAS

The Department of Agricultural Education at Texas A&M University is conducting a survey of beginning agriscience students in Texas. Your agriscience program has been selected at random to participate in the study. Your answers are very important because you represent many other beginning agriscience students across the state.

Agriculture and agriscience education have changed considerably over the past decade. We are interested in learning what YOU think about agriculture and agriscience education and why YOU decided to take this course. Your opinions are valuable to us. Please answer each question seriously. The scantron sheets have been coded so that we know which schools have replied, but we will not be able to identify individual students. You will not put your name on the scantron sheet or anywhere else. So, no one will know how you answered these questions.

This survey should take about 20 - 25 minutes to complete. Please take your time and answer each question honestly and accurately. Some of the questions may look the same, so please read each one carefully. You will mark all of your answers on the scantron sheet that your teacher has given you. Please fill in only one bubble for each question.' If you make a mistake, make sure you completely erase it. Other students must use these question booklets, so please do not write in them. Read the instructions for each section carefully. Make sure that you are using a Number 2 pencil to mark the scantron sheet. You may now begin.

MARKING INSTRUCTIONS

CORRECT MARK

●

INCORRECT MARKS

⊗ ⊘ ⊙ ◒

- USE A NO. 2 PENCIL ONLY
- DARKEN THE CIRCLE COMPLETELY
- ERASE CLEANLY ANY MARKS YOU WISH TO CHANGE
- DO NOT MAKE ANY STRAY MARKS ON THIS FORM

PLEASE GO ON TO THE NEXT PAGE »

Part I: STUDENT INFORMATION

The purpose of Part I of the survey is to find out some information about you. Please complete the following items and fill in the bubble on the answer sheet that corresponds to the number of each question. Answer each item as best you can. Do not leave any items blank. If you do not understand a particular item, please ask your instructor for help.

1. I am _____ .
   A. 14 YEARS OLD OR YOUNGER
   B. 15 YEARS OLD
   C. 16 YEARS OLD
   D. 17 YEARS OLD
   E. 18 YEARS OLD OR OLDER

2. My gender is _____ .
   A. MALE
   B. FEMALE

3. I consider myself as an _____ .
   A. AFRICAN-AMERICAN (BLACK)
   B. ANGLO (WHITE, NON-HISPANIC)
   C. HISPANIC (INCLUDES PEOPLE OF MEXICAN, PUERTO RICAN, CUBAN, CENTRAL OR SOUTH AMERICAN DESCENT)
   D. ASIAN-AMERICAN OR PACIFIC ISLANDER
   E. AMERICAN INDIAN (INCLUDES PEOPLE FROM THE ORIGINAL NORTH AMERICAN TRIBES)

4. I am in the _____ grade in school.
   A. 9TH
   B. 10TH
   C. 11TH
   D. 12TH

5. I live _____ .
   A. ON A FARM OR RANCH THAT MY PARENTS/GUARDIANS OWN, MANAGE, OR WORK
   B. IN A RURAL AREA, BUT NOT ON A FARM OR RANCH
   C. IN A SMALL TOWN OF 5,000 PEOPLE OR FEWER
   D. IN A SMALL CITY OR SUBURB WITH A POPULATION GREATER THAN 5,000 BUT FEWER THAN 50,000 PEOPLE
   E. IN AN URBAN AREA, A LARGE CITY OF MORE THAN 50,000 PEOPLE

6. My final grades for most of my classes are _____ .
   A. As and Bs
   B. Bs and Cs
   C. Cs and Ds
   D. Ds and Fs
   E. Fs

7. My teacher is _____ .
   A. AFRICAN-AMERICAN (BLACK)
   B. ANGLO (WHITE, NON-HISPANIC)
   C. HISPANIC (INCLUDES PEOPLE OF MEXICAN, PUERTO RICAN, CUBAN, CENTRAL OR SOUTH AMERICAN DESCENT)
   D. ASIAN-AMERICAN OR PACIFIC ISLANDER
   E. AMERICAN INDIAN (INCLUDES PEOPLE FROM THE ORIGINAL NORTH AMERICAN TRIBES)

PLEASE GO ON TO THE NEXT PAGE >>

8. Including me, there are _____ people in my family (include your parent(s)/guardian(s) and brothers/sisters).
   A. 1 - 2
   B. 3 - 4
   C. 5 - 6
   D. 7 - 8
   E. 9 OR MORE

9. What is the highest level of education that your father/male guardian has completed?
   A. LESS THAN A HIGH SCHOOL DIPLOMA
   B. A HIGH SCHOOL DIPLOMA OR GED
   C. AN ASSOCIATE DEGREE (TWO-YEAR COLLEGE DEGREE) OR TECHNICAL CERTIFICATION
   D. A BACHELOR'S DEGREE (FOUR-YEAR COLLEGE DEGREE)
   E. AN ADVANCED DEGREE (MASTER'S DEGREE, PH.D., M.D., D.V.M., ETC.)

10. What is the highest level of education that your mother/female guardian has completed?
   A. LESS THAN A HIGH SCHOOL DIPLOMA
   B. A HIGH SCHOOL DIPLOMA OR GED
   C. AN ASSOCIATE DEGREE (TWO-YEAR COLLEGE DEGREE) OR TECHNICAL CERTIFICATION
   D. A BACHELOR'S DEGREE (FOUR-YEAR COLLEGE DEGREE)
   E. AN ADVANCED DEGREE (MASTER'S DEGREE, PH.D., M.D., D.V.M., ETC.)

11. How many of your brothers/sisters have taken (or are taking) agriculture classes?
   A. NONE
   B. 1
   C. 2
   D. 3
   E. 4 OR MORE

12. Are you now, or have you ever been, a member of 4-H?
   A. NO
   B. YES

PLEASE GO ON TO THE NEXT PAGE >>>

Part II: EDUCATIONAL PLANS

The purpose of Part II of the survey is to find out your future goals and plans. Please complete the following items and fill in the bubble on the answer sheet that corresponds to the number of each question. If you do not understand a particular item, please ask your instructor for help.

13. After I finish high school, I plan to _____ .
    A. GET A FULL-TIME OR PART-TIME JOB
    B. ENTER THE MILITARY
    C. ATTEND A TRADE SCHOOL OR VOCATIONAL/TECHNICAL SCHOOL
    D. ATTEND A COLLEGE OR UNIVERSITY
    E. NOT GO TO WORK NOR TO SCHOOL

14. If you are eligible for admission to a college or university after high school, what are your chances of attending?
    A. NONE
    B. LITTLE
    C. AVERAGE
    D. CONSIDERABLE
    E. GREAT

15. If you are eligible for admission to a college or university after high school, what are your chances of majoring in an agriculture-related field?
    A. NONE
    B. LITTLE
    C. AVERAGE
    D. CONSIDERABLE
    E. GREAT

16. What is the highest degree that you can realistically plan to receive (based on your current situation)?
    A. I DON'T EXPECT TO GRADUATE FROM HIGH SCHOOL
    B. A HIGH SCHOOL DIPLOMA
    C. AN ASSOCIATE DEGREE OR TECHNICAL CERTIFICATION (BEYOND A HIGH SCHOOL DIPLOMA, BUT LESS THAN A BACHELOR'S DEGREE)
    D. A BACHELOR'S DEGREE (FOUR-YEAR COLLEGE DEGREE)
    E. AN ADVANCED DEGREE (MASTER'S DEGREE, PH.D., M.D., D.V.M., ETC.)

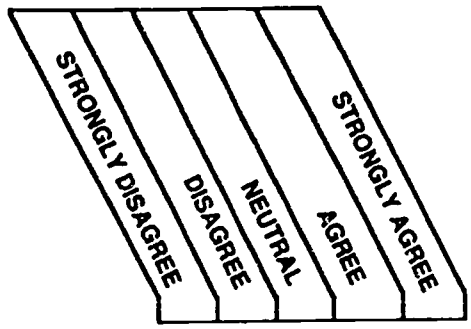
17. Within five years after you graduate from high school or college, do you see yourself employed in an agricultural career? _____
    A. DEFINITELY NOT
    B. PROBABLY NOT
    C. PROBABLY YES
    D. DEFINITELY YES

18. During your entire working career, do you ever see yourself employed in an agricultural career?_____
    A. DEFINITELY NOT
    B. PROBABLY NOT
    C. PROBABLY YES
    D. DEFINITELY YES

PLEASE GO ON TO THE NEXT PAGE >>>>

Part III: ENROLLMENT INFORMATION

The purpose of Part III of the survey is to find out why you enrolled in this agriscience class. Please respond to each statement based on your feelings or attitudes and fill in the bubble on the answer sheet that corresponds to the number of each question. Make sure that you bubble in the correct letter. If you do not understand a particular item, please ask your instructor for help.



I ENROLLED IN THIS AGRISCIENCE COURSE BECAUSE...

19. I thought I'd like the class.	A	B	C	D	E
20. I thought I'd like the teacher.	A	B	C	D	E
21. The teacher in this class is a role model for me.	A	B	C	D	E
22. I can be a member of the FFA.	A	B	C	D	E
23. I enjoy working with animals.	A	B	C	D	E
24. Agriscience classes are fun.	A	B	C	D	E
25. My involvement in 4-H got me interested in the class.	A	B	C	D	E
26. I want to participate in fairs and shows.	A	B	C	D	E
27. I can have a project and/or earn money through work experience.	A	B	C	D	E
28. The semester course fit into my schedule.	A	B	C	D	E
29. There are no courses required before taking this one.	A	B	C	D	E
30. I get to learn how to do things rather than just learn things out of a textbook.	A	B	C	D	E
31. My involvement in agriculture at home got me interested in this class.	A	B	C	D	E
32. There are many awards to be earned in the agriscience program.	A	B	C	D	E

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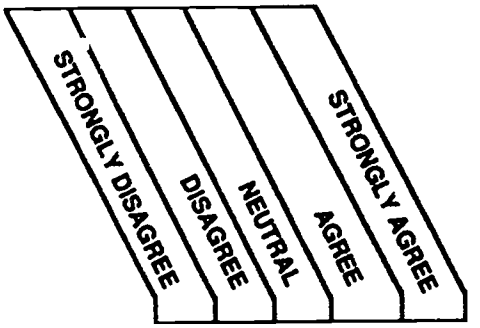


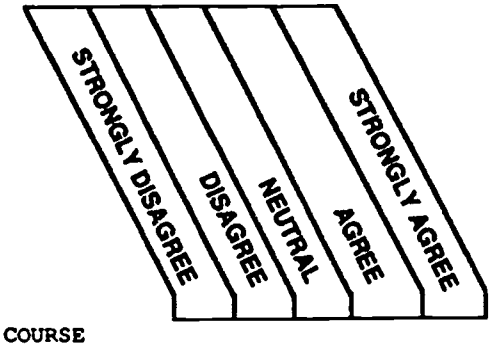
I ENROLLED IN THIS AGRISCIENCE COURSE BECAUSE...

33. There are many scholarships available to agriscience students.	A	B	C	D	E
34. My father/male guardian suggested I take the class.	A	B	C	D	E
35. My counselor or principal suggested I take the class.	A	B	C	D	E
36. The agriscience teacher suggested I take the class.	A	B	C	D	E
37. My brother(s)/sister(s) suggested I take the class.	A	B	C	D	E
38. Other relatives suggested I take the class.	A	B	C	D	E
39. My mother/female guardian suggested I take the class.	A	B	C	D	E
40. My friends suggested I take the class.	A	B	C	D	E
41. Being in this class gives me a sense of acceptance and belonging.	A	B	C	D	E
42. The other students in the class are a lot like me.	A	B	C	D	E
43. Some of my friends are in the class.	A	B	C	D	E
44. I believe it will benefit me in later life.	A	B	C	D	E
45. This class will prepare me for an agricultural career.	A	B	C	D	E
46. I believe I can use the things I learn in this class.	A	B	C	D	E
47. Many of the jobs in the community are in agriculture.	A	B	C	D	E
48. I needed an elective class.	A	B	C	D	E
49. I was put in this class by my counselor.	A	B	C	D	E
50. It is a required class.	A	B	C	D	E
51. The agriscience program in this school is respected.	A	B	C	D	E

PLEASE GO ON TO THE NEXT PAGE >>>>>>>

Part IV: BARRIERS TO ENROLLING

The purpose of Part IV of the survey is to find out reasons that may have made it difficult for you to enroll in this agriscience class. Please respond to each statement based on your feelings or attitudes and fill in the bubble on the answer sheet that corresponds to the number of each question. If you do not understand a particular item, please ask your instructor for help.



FOR ME, ENROLLING IN THIS AGRISCIENCE COURSE WAS DIFFICULT BECAUSE...

52.	The students in this class are not like me.	A	B	C	D	E
53.	I do not feel as if I belong in this agriscience course.	A	B	C	D	E
54.	I have had negative experiences in my contacts with agriscience students outside of class.	A	B	C	D	E
55.	My friends did not recommend this course to me.	A	B	C	D	E
56.	My family does not approve of this course.	A	B	C	D	E
57.	I feel that I would be discriminated against in this class by the teacher.	A	B	C	D	E
58.	The teacher in this class is not like me.	A	B	C	D	E
59.	The agriscience teacher acts "cold" toward me.	A	B	C	D	E
60.	I have had negative experiences in my contacts with the agriscience teacher outside of class.	A	B	C	D	E

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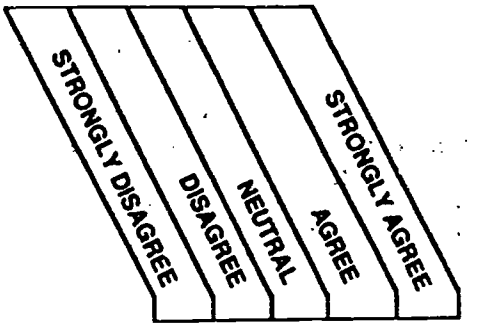

FOR ME, ENROLLING IN THIS AGRISCIENCE COURSE WAS DIFFICULT BECAUSE...

61.	The ceremonies, contests, awards, and activities of the FFA do not interest me.	A	B	C	D	E
62.	This class does not prepare me for a career.	A	B	C	D	E
63.	This class is not a part of the advanced or college prep curriculum.	A	B	C	D	E
64.	This class is inappropriate for me. (either too easy or too hard)	A	B	C	D	E
65.	The general atmosphere/environment of this class does not feel right for me.	A	B	C	D	E
66.	I cannot relate to the image that agriculture has in this school and community.	A	B	C	D	E
67.	Agriculture is a low-paying occupation.	A	B	C	D	E
68.	Agriculture is a low-status occupation.	A	B	C	D	E
69.	Agriculture involves only physical labor.	A	B	C	D	E
70.	There are no career opportunities for me in agriculture.	A	B	C	D	E

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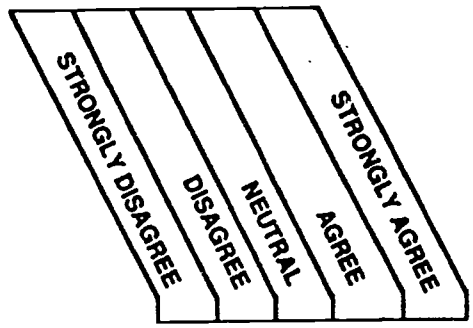
Part V: AGRICULTURAL OPINIONS

The purpose of Part V of the survey is to find out your feelings toward agriculture. Please respond to each statement based on your feelings or attitudes and fill in the bubble on the answer sheet that corresponds to the number of each question. If you do not understand a particular item, please ask your instructor for help.



71.	Agricultural industry has many job opportunities.	A	B	C	D	E
72.	There are good paying jobs in agriculture.	A	B	C	D	E
73.	I am capable of getting a good job in an agricultural occupation.	A	B	C	D	E
74.	The only way to get a good agricultural job is to know somebody in agriculture.	A	B	C	D	E
75.	Someday I would like to manage a business in agriculture.	A	B	C	D	E
76.	Most jobs in agriculture are minimum wage jobs.	A	B	C	D	E
77.	Agriculture is just farming and ranching.	A	B	C	D	E
78.	Landscaping and floral design are a part of agricultural industry.	A	B	C	D	E
79.	Agriculture includes marketing, merchandising, and sales of agricultural products.	A	B	C	D	E
80.	There are agricultural job opportunities in education, communication, and information.	A	B	C	D	E
81.	Many researchers and scientists are involved in the agricultural industry.	A	B	C	D	E
82.	Agriculture includes the design of farm machinery.	A	B	C	D	E

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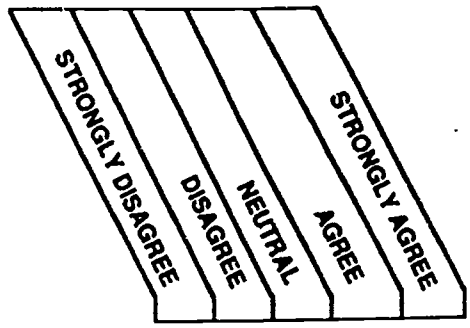


83.	Food processing and food inspection are a part of agricultural industry.	A	B	C	D	E
84.	Forestry and natural resource management are a part of agriculture.	A	B	C	D	E
85.	Management positions in agriculture require training or experience.	A	B	C	D	E
86.	It takes people with special training to work in agriculture.	A	B	C	D	E
87.	It takes too much money to get started in an agricultural career.	A	B	C	D	E
88.	Agricultural jobs require basic skills such as reading, writing, and arithmetic.	A	B	C	D	E
89.	Many leaders in agriculture have a college education.	A	B	C	D	E
90.	Most people who work in agriculture go to work on a farm or ranch.	A	B	C	D	E
91.	Jobs in agriculture are interesting and exciting.	A	B	C	D	E
92.	Many ethnic groups and races of people are employed in agricultural industry.	A	B	C	D	E
93.	Someday I would like to be the owner of an agricultural business, farm, or ranch.	A	B	C	D	E
94.	Lots of intelligent people choose agriculture as a career.	A	B	C	D	E
95.	All high school students should know something about agriculture.	A	B	C	D	E
96.	At least one semester of agriculture should be required for all high school students.	A	B	C	D	E

PLEASE GO ON TO THE NEXT PAGE ▶▶▶▶▶▶▶▶▶▶

STOP!

BEFORE YOU TURN IN YOUR ANSWER SHEET AND BOOKLET TO YOUR TEACHER, PLEASE CHECK TO MAKE SURE:

1> YOU HAVE ANSWERED ALL OF THE QUESTIONS

2> YOU HAVE PROPERLY MARKED YOUR RESPONSES ON THE SCANTRON SHEET

3> YOU HAVE ERASED ALL STRAY MARKS ON THE SCANTRON SHEET

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY!

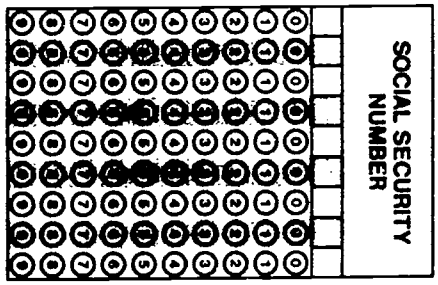
YOU MAY NOW TURN IN YOUR BOOKLET AND COMPLETED SCANTRON SHEET TO YOUR TEACHER.

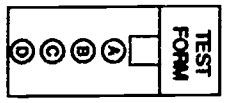
TEXAS A & M UNIVERSITY

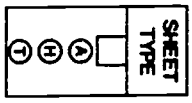
MEASUREMENT AND RESEARCH SERVICES

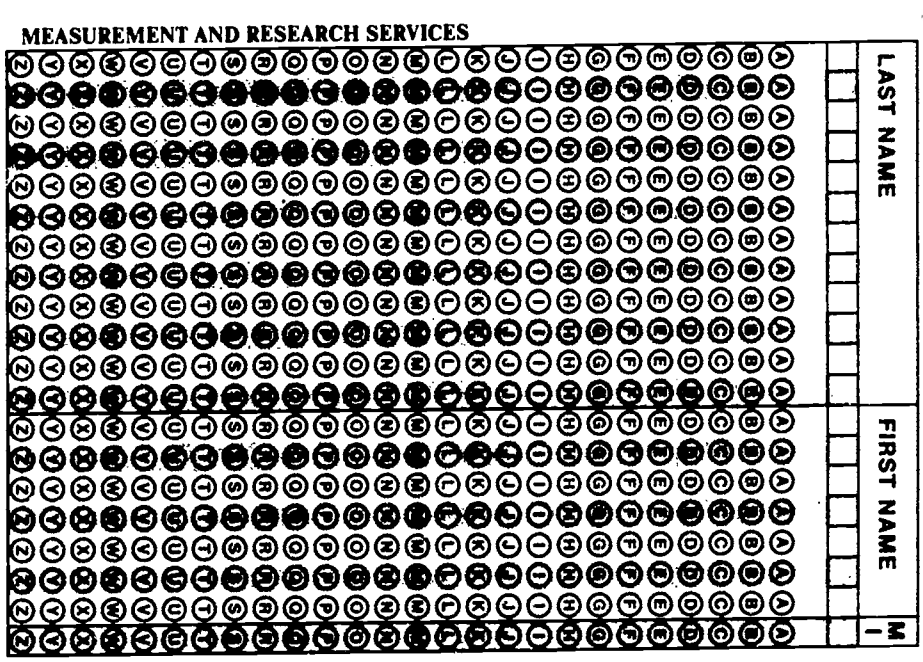
IMPORTANT DIRECTIONS FOR MARKING RESPONSES

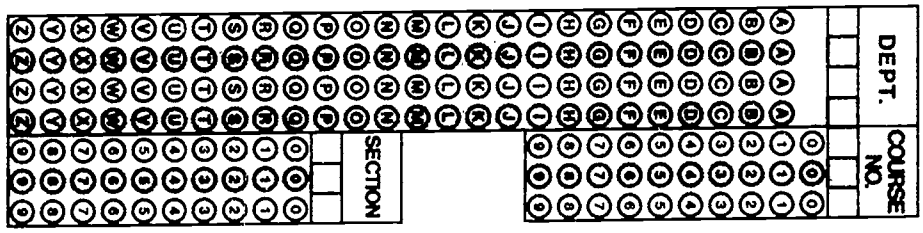
1. Use No. 2 soft lead pencil only (not ink).
2. Make heavy black marks that fill ovals completely.
3. Erase completely.
4. Make no stray marks.











INSTRUCTOR _____

SIGNATURE _____

DATE _____ EXAM _____

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