

Who Enrolls in Agriculture and Natural Resources Majors: A Case from Michigan State University

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Abstract

Colleges of agriculture in the United States are facing a challenge of unstable student enrollment. The College of Agriculture and Natural Resources (CANR) at Michigan State University recognized the need for a comprehensive profile of its students. To obtain this profile, data were collected from undergraduate students in the CANR via annual online surveys from 2004 to 2008. The study aimed to determine the demographic profile of students and find out how students learned about CANR programs, how they entered (directly from high school or as transfer students from within MSU or other colleges and universities) CANR programs, and identify factors influencing students' decisions to pursue CANR majors. Findings indicated that a majority of the CANR students are Caucasian and female, raised in suburban and urban communities, and former members of their high school National Honor Societies. Findings showed that students utilized family and friends, websites, and printed materials as their major sources of information to learn about CANR programs. About one-third of the students came directly from high school. The majority (nearly two-thirds) of students entered CANR programs as transfer students. Academic programs or curricula, the reputation of the CANR, the availability of internship opportunities, academic advising, and recommendations of family members, friends and alumni were the important factors in students' decision to attend the CANR.

Introduction

Agricultural colleges have been facing a challenge of unstable student enrollment during the past 20 years (Robinson et al., 2007; Dyer et al., 1996). As a result of the farm crisis in the United States in the late 1970s and early 1980s, the enrollment in colleges of agriculture dipped significantly in the late 1980s (Peiter et al., 2004; Dyer et al., 2002; Dyer et al., 1999). Enrollment in agricultural colleges in land-grant universities declined by 24% from 1978 to 1988; enrollment in non-land-grant programs

decreased by 13% over the same period (Manderscheid, 1988). To respond to the national crisis of declining agricultural enrollment, curricula were modernized as suggested by the National Research Council in 1988; as a result, the enrollment at agricultural colleges and high schools rebounded in the early 1990s. According to the U.S. Department of Education, 1992 enrollments in colleges of agriculture were 18.9% above 1981 enrollments nationwide (U.S. Department of Education, 1996).

The number of agronomy or crop science degree recipients fell from 764 in 1984-85 to 523 in 2002-03 (McCallister et al., 2005). According to a recent national survey of all the 1862 land-grant universities, the undergraduate enrollment in all crop and soil science-related majors averaged 90 students per university (Hansen et al., 2007). Similarly, the average undergraduate enrollment in agricultural economics decreased by 17% from academic year 1984-85 to 1995-96 (Blank, 1998).

At Michigan State University, the College of Agriculture and Natural Resources faced a challenge of declining undergraduate enrollment from 1994 to 2004. The trend in fall enrollment for the undergraduate program in the CANR at MSU was negative, with an average percentage change of -0.5% for the decade of fall 1994 to fall 2004. The undergraduate enrollment in the CANR at MSU increased significantly in fall 2005 and has been increasing since then. The increase in enrollment in the CANR at MSU was largely the result of administrative changes. For example, the dietetics major, which used to fall under the College of Human Ecology, was annexed to the CANR. In fall 2005, enrollment in the dietetics major increased by 688.9% over the fall 2004 enrollment (Michigan State University, 2009). Fall enrollment data for several other agricultural majors within the CANR at MSU indicate, however, that the undergraduate enrollment trend is not stable.

Nationwide, the demographic composition of today's college of agriculture students has changed in several respects from that of the 1980s (Peiter et al., 2004; Scofield, 1995). Dyer et al. (1996) reported that 66.4% of freshmen in the College of Agriculture at the

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Who Enrolls

University of Illinois at Urbana-Champaign were from urban backgrounds. Dyer et al. (1999) reported that the majority of students at the Iowa State University College of Agriculture were no longer from rural or farm backgrounds but had been replaced by freshmen from urban backgrounds with no knowledge of or prior experience in agriculture. National statistics on undergraduate enrollment show that the demography has shifted in ethnicity and gender as well, as enrollments of both ethnic minority and female students are increasing (U.S. Department of Education, 2007).

In today's context of an ailing U.S. economy, shrinking federal and state support to higher education, rising costs of college education, and changing student demography, colleges of agriculture are challenged to seek innovative ways to appeal to prospective students. It is more critical than ever before that the colleges of agriculture employ effective recruitment methods to attract the best and brightest students. In this endeavor, reliable information was lacking about students' characteristics, the sources of information they use, and other important factors that influence their decision to enroll in colleges of agriculture. This paper reports the findings of a study aimed at understanding the demographic profile of the undergraduate students in the CANR at MSU, identifying the routes by which they entered the college programs, the sources of information they used to learn about college programs, and the factors that influenced their decision to choose college majors within the CANR at MSU.

Literature on students' college enrollment decisions and selection of college majors indicates that students are influenced by a myriad of diverse factors. This study adapted the Chapman's model of student college choice as the theoretical basis. Chapman suggested that college choice decision is influenced by a combination of two broad factors: students' characteristics and external factors which include the influence of significant persons, college characteristics, and college efforts to communicate with prospective students (Chapman, 1981). Chapman concluded that the choice of which college to attend is first influenced by the background characteristics of the student and the student's family. Second, a series of other external influences, such as the cost of attending the college, the availability of financial aid, the availability of the student's choice of academic major, the geographical location of an institution, and the communication efforts of an institution play a vital role in the student's college choice process. Chapman suggests that these multiple influencing factors be considered by college administrators while charting student recruitment strategies.

A review of literature was conducted to understand the latest trends in sources of information and important factors influencing prospective students' choice of a college of agriculture. The literature shows three major factors influencing student decisions:

i) Influential sources of information (individuals and media)

Studies have shown that prospective students utilize a wide range of sources of information when making the decision to choose a college of agriculture. The most influential individuals as information sources for students were parents and family members, other relatives, friends, alumni, high school agriculture teachers, and college faculty members (Williams et al., 2008; Robinson et al., 2007; Rocca and Washburn, 2007; Bobbitt, 2006; Rocca and Washburn, 2005; Peiter et al., 2004; Segler-Conrad et al., 2004; Washburn et al., 2002; Lynch, 2001; Sivapirunthep, 2000).

Mixed results have been found related to high school agriculture teachers as a source of information and their influence on prospective students making the decision to study agriculture. Segler-Conrad et al. (2004) and Washburn et al. (2002) found that high school agricultural education teachers were the most influential people for freshmen selecting the agricultural education major. Williams et al. (2008) and Peiter et al. (2004) reported that high school agricultural teachers were the fourth most influential individuals for students deciding to attend a college of agriculture. Similarly, Robinson et al. (2007) found that first-time enrollees ranked high school agriculture teachers as the fifth most influential individuals in the college choice process. Rocca and Washburn (2005) reported that high school agriculture teachers had the least influence on high school matriculants' and transfer matriculants' selection of an agricultural college. However, Rocca and Washburn (2007) found that high school agriculture teachers were the most influential people for college students who were former members of Future Farmers of America (FFA).

With increasing access to the Internet, websites are one of the most important sources of information about educational institutions. Rocca and Washburn (2005) found that websites were the most used and the most useful source of information for both high school matriculants and transfer matriculants of the University of Florida. However, Robinson et al. (2007) and Peiter et al. (2004) found university websites to be the fourth most helpful source of information for university freshmen. Washburn et al. (2002) studied factors influencing the college choice of first-time enrollees in the College of Agriculture, Food and Natural Resources at the University of Missouri and found that, although the university and college websites were used by less than 50% of the respondents, the respondents perceived them as useful sources of information.

Printed materials, such as university and college brochures, were also useful sources of information for prospective students (Robinson et al., 2007; Rocca and Washburn, 2005; Peiter et al., 2004; Washburn et al., 2002; Cole and Thompson, 1999). Cole and Thompson (1999) found that nearly 70% of the respondents at Oregon State University used

pamphlets or literature to learn about the college of agriculture. Robinson et al. (2007) found that first-time enrollees ranked printed university publications as the second most used source of information when choosing a college of agriculture. Washburn et al. (2002) reported that university publications were used by seven and eight out of 10 matriculants and non-matriculants, respectively, in the College of Agriculture, Food and Natural Resources at the University of Missouri. Peiter et al. (2004) found that brochures were the third most used source of information by freshmen majoring in agriculture at the University of Kentucky. Rocca and Washburn (2005) found that more than 50% of high school matriculants and transfer matriculants used printed university publications in the College of Agriculture and Life Sciences at the University of Florida.

Campus visits were the most important source of information for first-time enrollees in colleges of agriculture (Robinson et al., 2007; Peiter et al., 2004). Robinson et al. (2007) and Washburn et al. (2002) reported that nearly 75% of the first-time enrollees in the College of Agriculture, Food and Natural Resources at the University of Missouri used campus visits as the most important source of information when deciding to attend the agriculture college. Peiter et al. (2004) found that university freshmen ranked campus visits as the most helpful source of information influencing their decision to attend colleges of agriculture in one land-grant and three non-land-grant universities in Kentucky. Rocca and Washburn (2005) and Cole and Thompson (1999) reported that more than 50% of the respondents used campus visits as a source of information and found them useful in making the decision to attend colleges of agriculture.

ii) Institutional characteristics

The major institutional characteristics influencing prospective students' decisions to choose a college of agriculture were the reputation of the university or college, preparation for employment, opportunities after graduation, faculty quality and reputation, and quality of the facilities (Robinson et al., 2007; Rocca and Washburn, 2005; Washburn et al., 2002). Rocca and Washburn (2007) reported that opportunities after graduation and preparation for employment were the two most influential institutional characteristics for respondents who were former FFA members. Availability of scholarships ranked below the middle in a long list of 17 institutional characteristics (Rocca and Washburn, 2007). Class size was the least influential institutional characteristic in all three studies mentioned above.

iii) Academic program characteristics

Studies have revealed that career opportunities available for graduates were the most influential academic program characteristic for students choosing an agricultural college (Robinson et al.,

2007; Rocca and Washburn, 2007; Peiter et al., 2004; Washburn et al., 2002). Quality and reputation of courses was ranked the second most influential academic program characteristic in studies by Robinson et al. (2007) and Rocca and Washburn (2005). In their studies, Rocca and Washburn (2007) and Peiter et al. (2004) found that respondents ranked the reputation of faculty members as the second most influential factor. The least influential academic program characteristic was the number of students in a major.

Purpose and Objectives

The specific objectives of this paper are to:

1. Document a demographic profile of undergraduate students currently enrolled in the CANR at MSU;
2. Identify how students decided to enter the CANR;
3. Identify sources of information used by the CANR students to learn about college majors; and
4. Identify and rank the factors influencing students' decisions to enroll in the CANR majors.

Methods

The population for this five-year study was the undergraduate students enrolled in the CANR at MSU from spring 2004 through spring 2008. The study utilized an online survey for simplicity and cost effectiveness. The survey instrument was developed on the basis of an extensive review of literature relevant to students' assessments of undergraduate programs. The draft instrument was shared with the CANR assessment committee members, undergraduate advisors, and coordinators to ensure the face and content validity. The final survey instrument incorporated the comments and suggestions received from the CANR assessment committee members, undergraduate advisors, and coordinators.

The instrument was designed as an online survey to solicit students' academic information: academic status, primary majors, dual majors, second degrees, entrance to the CANR, sources of information used to learn about college majors in the CANR, and important factors in making the decision to enter their current CANR majors. The electronic mail addresses of the current undergraduate students were obtained from the Office of the Dean in the CANR. The online surveys were sent to all current undergraduate students through university e-mail in a personalized cover letter, along with a hyperlink to the survey. Students were asked to click on the hyperlink in the e-mail text to access the web-based survey. Once the student completed the survey and clicked the "submit" button, data were automatically collected in the web-based database. The survey was administered in the spring semester from mid-March to April of each year from 2004 to 2008. It should be noted that all students except the graduating seniors were invited to participate in the online survey and some students could have completed the survey in consecutive years.

Who Enrolls

To increase the survey response, a free two-scoop ice cream coupon was provided as a token incentive to each participant who completed the survey. Additionally, survey reminders were sent after one week and again a week before the ice cream event to enhance the survey response rate. The response rates were 30.8%, 9.5%, 25.4%, 22.2%, and 34.4% in 2004, 2005, 2006, 2007, and 2008, respectively. The overall survey response rate for the five-year survey was 24.5%. It is noted that survey response rate was lowest (9.5%) in 2005. Authors believe that the most likely reason for a lower response rate could be the lack of incentive to survey participants and fewer follow ups in 2005. Unlike other survey years, the survey participants were not provided ice-cream coupons as an incentive in 2005, and the number of follow-ups was less than other survey years, which could be the most probable cause for the lowest response rate.

Non-response error, inherent in any survey research, is a potential threat to the external validity of the study. In order to overcome the problem of non-response error in survey research, social scientists have recommended three statistically sound and professionally acceptable methods, namely: compare early to late respondents, compare respondents to population on characteristics known *a priori*, and compare respondents to non-respondents (Miller and Smith, 1983; Lindner et al., 2001; Dooley and Lindner, 2003). This study adopted two methods: comparison of respondents with population and comparison of early respondents with late respondents in handling the non-response error. Comparison of respondents with population for certain demographic characteristics such as gender, ethnicity, residential background (rural or urban), residency status (in-state, out-of-state, and international), and participation in 4-H/FFA revealed no differences between the two groups. Similarly, early respondents were compared with late respondents for two variables: sources of information used and factors influencing their decisions to enroll in the CANR major. The results indicated no differences between the early and late respondents. Therefore, the test results for nonresponse error in this study suggest that the findings can be generalized to other similar population.

The data were analyzed by using the computer software Statistical Package for Social Science (SPSS 15) for Windows. The data were summarized by using descriptive statistics: frequency, mean, and standard error of mean. The factors in deciding to enter the CANR program were identified by calculating the mean and standard error of mean for each factor and then ranked in descending order on the basis of mean. The reliability of each factor was determined by Cronbach's alpha procedure. The overall reliability for factors in deciding to enter the CANR program was 0.867.

Results and Discussion

This section presents the results and discussion of the five-year study. Results are summarized in descriptive statistics for demographic characteristics of survey respondents, their responses to enter the CANR, use of sources of information to learn about the CANR majors, and important factors in making their decisions to enter their current majors. A total of 2,798 undergraduate students within the CANR at MSU participated in the five-year study.

Demographic characteristics of respondents

Of 2,798 respondents who completed the online survey from 2004-2008, 384 (13.7%) were freshmen; 689 (24.6%) were sophomores; 1,117 (39.9%) were juniors; and 608 (21.7%) were seniors. Of the total respondents, 184 (6.6%) indicated that they had second majors. Over three out of five (63.8%) were female. The age of respondents ranged from 18 to 58 years with a median age of 20 years.

In all survey years, more than four out of five survey participants were Caucasian (87.1%). Participation of Hispanic (3.9%) and Asian-American students (2.5%) was slightly higher than the participation of African-American students (2.1%). Less than 1% (0.6%) of students was Native American.

In all survey years, less than one-fifth (19.3%) of respondents were from rural areas and had farm experience. A little more than a quarter (26.1%) of the respondents were from rural areas but had no farm experience. The majority of respondents (43.8%) were from suburban communities, and 10.8% of the respondents were from urban communities. A residency status question was added to the survey in 2005 and findings showed that nine out of ten (91.7%) respondents were in-state students. Participation of out-of-state students and international students was 5.7% and 2.6%, respectively. Nearly one quarter (24.4%) of respondents had participated in youth development programs such as 4-H and FFA. More than half (55.3%) of the respondents indicated membership in the National Honor Society while they were in high school.

Sources of students in the CANR

The CANR at MSU receives students from various sources. Table 1 presents the sources of students in the CANR program at MSU. Of the 2,782 respondents, 1,008 (36.2%) indicated that they entered the CANR directly from high school. In each of the five years of the study, more than 30% of the respondents indicated that they entered the CANR program directly from high school. Thirteen percent (13.3%) of the respondents were transfer students from community colleges. Less than 10% (8.2%) of the respondents were transfer students from other colleges or universities. About 1% (1.3%) of respondents was transfer students from MSU's Agricultural Technology program. Forty-one percent of the

respondents were transfer students from other MSU programs.

According to the National Center for Higher Education Management System (NCHEMS, 2009), the three year (2004, 2006, and 2008) average college-going rate of high school graduates (directly from high school) is 61.3% in Michigan. This finding suggests that it may be possible for the CANR at MSU to increase its enrollment of students directly from high schools by improving its recruiting strategies.

Community colleges have provided 13% of the total students in the CANR, which is less than half of the current transfer rate of 28.9% from community colleges to four-year programs nationally (Eddy et al., 2006). According to a national study conducted for the National Center for Educational Statistics, 68% of beginning community college students enrolled in an academic program, and 71% indicated that they anticipated earning a bachelor's degree or higher (Bradburn et al., 2001). A study of Michigan community college students indicated that 61% intended to transfer to other institutions, and 79% of those indicated that they intended to transfer to public four-year schools in Michigan (Monroe and Richtig, 2002). These statistics indicate that community colleges are the potential source of students for four year public colleges including CANR at MSU.

Transfer students from other MSU programs made up the largest proportion of the CANR students. However, the percentage of transfer students decreased by 1% per year during the last three years of the study (2006-2008). Overall, nearly two-thirds of the survey respondents were transfer students either from other colleges/universities or from other MSU programs.

Sources of information used by the respondents

Prospective students use various sources of information when selecting a college. Table 2 presents the frequency count and percentage for sources of information used by respondents to learn about CANR majors at MSU. Respondents were asked to indicate various sources of information they had used.

The results indicated that family and friends (31.8%), university and college website (27.1%), and printed materials (12.2%) were the top three primary sources of information used by the respondents to learn about CANR majors. Five percent of the respondents received information about the CANR from high school counselors, teachers, and CANR faculty members. The least utilized source of information was high school career days and

recruitment meetings. Other sources of information included professional meetings organized by 4-H, FFA, and the Career Center and events such as Ag Expo and ANR Week, organized by the CANR.

Prospective students used many sources of information, including parents, guardians, and friends, in the process of making the decision to choose a particular college or major. This study shows that family and friends were the principal source of information to learn about CANR majors; this is consistent with the findings of Cole and Thompson (1999) and Peiter et al. (2004).

University and college websites are important sources of information for today's technologically savvy students. Respondents in this study indicated that the MSU and CANR websites were their second most important source of information. These findings are consistent with Hoyt and Brown (2003); Butler et al. (2004); and Rocca and Washburn (2005), who found that high school and transfer matriculants used websites to learn about degree programs.

Printed materials, such as college brochures and university publications, are useful sources of information for prospective college students. The findings of this study revealed that printed materials were the third most useful source of information in selecting CANR programs at MSU. This result is in agreement with the findings of other studies (Rocca and Washburn, 2005; Peiter et al., 2004; Hoyt and Brown, 2003), in which printed materials were ranked as the third most important source of information used by students while selecting a college of agriculture. However, Cole and Thompson (1999) and Segler-Conrad et al. (2004) found that university pamphlets and brochures rated as highest in importance, and Robinson et al. (2007) found that they were the second most important source of information used by the respondents when selecting a college of agriculture.

High school counselors, teachers, and college professors were collectively ranked as the fifth most important source of information. In other research studies, however, personal contact or conversations with professors have been found to be a more important and more frequently used source of information (Peiter et al., 2004; Segler-Conard et al., 2004; Washburn et al., 2002). More than a quarter of students consulted high school teachers when

Table 1. Sources of students in the CANR

Entrance	2004	2005	2006	2007	2008	Total
	Freq. (%)					
From high school	250 (33.2)	72 (32.0)	189 (37.9)	186 (35.8)	311 (39.6)	1,008 (36.2)
Transferred from community college	101 (13.4)	23 (10.2)	73 (14.6)	74 (14.2)	98 (12.5)	369 (13.3)
Transferred from other college/university	62 (8.2)	20 (8.9)	27 (5.4)	47 (9.1)	72 (9.2)	228 (8.2)
Transferred from MSU's AgTech	9 (1.2)	6 (2.7)	7 (1.4)	9 (1.7)	6 (0.7)	37 (1.3)
Transferred from another MSU program	331 (44.0)	104 (46.2)	203 (40.7)	204 (39.2)	298 (38.0)	1,140 (41.0)
Total	753 (100)	225 (100)	499 (100)	520 (100)	785 (100)	2,782 (100)

Who Enrolls

choosing the College of Agricultural Sciences at Oregon State University (Cole and Thompson, 1999). A recent study by Williams et al. (2008) revealed that high school agriscience teachers and high school counselors were ranked as the fourth and 12th most influential persons by first-time agriculture students at Texas Tech University.

University representatives have been found to be a very important source of information for prospective students choosing college majors. Nine percent (8.9%) of the respondents utilized the personnel from University Undergraduate Division (UUD) at MSU as their source of information to learn about CANR majors. However, this response item was added in the survey from 2006. Similar results were found by Robinson et al. (2007) in their study of influential factors used by first-year, first-time enrollees at the University of Kentucky, who found conversations with college admissions representatives as one of the most important sources of information.

The importance of campus visits as a source of information for prospective students was asked only in the 2008 survey. Campus visits were equally utilized as the printed materials by respondents in 2008. Research indicates that campus visits have been found to be a widely used and very useful source of information for college students choosing a college of agriculture (Robinson et al., 2007; Rocca and Washburn, 2005; Peiter et al., 2004; Hoyt and Brown, 2003; Washburn et al., 2002; Cole and Fanno, 1999).

In summary, family and friends, university and college websites, and printed materials are the most used sources of information by prospective students to learn about CANR majors at MSU.

Factors in selecting CANR majors

The final objective of this study was to identify the important factors in deciding to enter CANR and to rank them for the various groups of respondents in order of importance, from high to low. To accomplish this objective, the survey asked respondents the question "How important was each of the following factors to your decision to enter your current CANR major?" The question contained 16 response items to be rated on a scale of 1, indicating "not important," to 4, "extremely important."

Table 3 presents the important factors on the basis of the mean for each of the factors, and their rankings in descending order for overall respondents and for each group of

respondents. The description, comparisons, and discussions follow for each factor by type of respondents.

Academic program or curriculum in the CANR was found to be a very important factor, and it ranked first across the various groups of respondents. It was highest for transfer students from within MSU, with the highest mean score (mean=3.36) among the four groups. Respondents who entered the CANR directly from high school and transfers from other colleges/university perceived the CANR's academic program or curriculum to be equally important.

The reputation of the CANR at MSU was ranked the second most important factor by respondents in three groups: students entering directly from high school, transfer students from community colleges, and transfer students from other colleges/universities. Overall, the reputation of the CANR ranked as the second most important factor for respondents entering the CANR.

These results show that the academic program characteristics and the institutional reputation of the CANR at MSU are the two most important factors in prospective students' decision to choose a CANR major. These findings are consistent with the findings of other studies (Robinson et al., 2007; Rocca and Washburn, 2005; Hoyt and Brown, 2003; Hodges and Barbuto, Jr., 2002; Pratt and Evans, 2002; Washburn et al., 2002; Chapman, 1981) that investigated the factors influencing college choice decisions.

Opportunity for internships was ranked the third most important factor by the respondents who came directly from high school and transfer students from other colleges/universities. It is important to note that transfer students from other programs within MSU ranked internship opportunities in the CANR as the second most important factor. The reason for this ranking could be that the transfer students within MSU had already been on campus for some

Table 2. Sources of information used by respondents to learn about CANR majors

Sources	2004 (N=761)		2006 (N=500)		2007 (N=525)		2008 (N=786)		Total (N=2,572)	
	Freq.	(%)	Freq.	(%)	Freq.	(%)	Freq.	(%)	Freq.	(%)
Family/Friends	404	(37.0)	230	(29.9)	221	(29.0)	387	(30.3)	1,242	(31.8)
University/College website	231	(21.1)	237	(30.9)	234	(30.7)	356	(27.9)	1,058	(27.1)
Printed materials (college brochures)	190	(17.4)	99	(12.9)	83	(10.9)	103	(8.1)	475	(12.2)
High school counselor/teacher	68	(6.2)	42	(5.5)	37	(4.9)	57	(4.5)	204	(5.2)
Professor (Advisor)	90	(8.2)	26	(3.4)	32	(4.2)	55	(4.3)	203	(5.2)
High school career day/ recruitment meetings	33	(3.0)	10	(1.3)	11	(1.4)	17	(1.3)	71	(1.8)
Others (FFA, 4-H, Career Center, Ag Expo, etc.)	77	(7.0)	45	(5.9)	34	(4.5)	38	(3.0)	194	(5.0)
University Undergraduate Division	*		79	(10.3)	110	(14.4)	159	(12.4)	348	(8.9)
Campus visit			**				106	(8.3)	106	(2.7)
Total	1,093	(100)	768	(100)	762	(100)	1,278	(100)	3,901	(100)

Note:

i. This was a multiple-response question, so the total frequency counts exceed the total N in each survey year.

ii. This question was not asked in the 2005 survey.

* This item was added in the 2006 survey.

** This item was added in the 2008 survey.

time and may have gotten a chance to compare the internship opportunities available in their former major department with those available in the CANR. Thus, availability of more internship opportunities for students in the CANR might have influenced the students from other MSU programs. Studies show that career opportunities after graduation are one of the most important criteria for selection of college major for students (Robinson et al., 2007; Rocca and Washburn, 2005; Hoyt and Brown, 2003; Pope and Fermin, 2003; Hodges and Barbuto, Jr., 2002; Washburn et al., 2002). Internships are associated with job placements after graduation. It is believed that internship opportunities may lead to full-time job offers. A recent study of Michigan State University indicates that graduates who stack up as many internships as possible have a high chance of getting jobs (Gardner, 2008).

Academic advising was ranked the sixth most important factor by respondents from community colleges and transfer students from other colleges/universities. It was ranked seventh by the respondents who entered the CANR directly from high school but fourth by respondents who transferred from other MSU programs. Overall, academic advising was ranked the fourth most important factor for respondents' decision to enter the CANR programs. Findings of a study on undergraduate students' satisfaction with academic advising at Michigan State University indicated that respondents were very satisfied with academic advising

services in the CANR (Shrestha, 2009). In the same study, the participants who were transfer students were more satisfied with academic services in the CANR than with those in their former academic departments.

Recommendations of friends, alumni, and family members appeared as the fifth most important factor. Respondents who transferred from other colleges/universities and other MSU programs rated recommendations of friends, alumni, and family members equally as the fifth most important factor influencing their decision to enter the CANR. Respondents who entered the CANR program directly from high school, however, ranked them as the fourth most important factor, which suggests that first-time applicants were much more influenced by their parents, peers, and alumni than were respondents who were not first-time enrollees. The results for the respondents who entered directly from high school are similar to the findings of Robinson et al. (2007). In their study, parent or guardian and friend in college were ranked the third and fourth most influential people in the college choice decision for first-time enrollees. Similar results were obtained by Esters and Bowen (2005) and Reis and Kahler (1997) about factors influencing agricultural education students in making their career decisions.

Opportunity for study abroad was perceived very differently by the various groups of respondents. Respondents directly from high school ranked it as the fifth most important factor; respondents from

Table 3. Factors in selecting CANR majors

Factors	High school (N=1,005)		Community college (N=368)		Other college/university (N=227)		MSU's other programs (N=1,170)		Overall Rank	
	Rank	Mean*(± s.e.)	Rank	Mean*(± s.e.)	Rank	Mean*(± s.e.)	Rank	Mean*(± s.e.)	Rank	Mean*(± s.e.)
	Academic program/curriculum suited to your interests	1	3.31 (±0.02)	1	3.19 (±0.04)	1	3.31 (±0.05)	1	3.36 (±0.02)	1
Reputation of CANR at MSU	2	2.85 (±0.03)	2	2.78 (±0.05)	2	2.87 (±0.06)	3	2.56 (±0.03)	2	2.72 (±0.02)
Opportunity for internships	3	2.62 (±0.03)	4	2.50 (±0.06)	3	2.67 (±0.07)	2	2.61 (±0.03)	3	2.60 (±0.02)
Academic advising	7	2.35 (±0.03)	6	2.28 (±0.05)	6	2.38 (±0.07)	4	2.47 (±0.03)	4	2.39 (±0.02)
Recommendation of friend/alumni/family member	4	2.49 (±0.03)	6	2.28 (±0.05)	5	2.41 (±0.06)	5	2.30 (±0.03)	5	2.38 (±0.02)
Opportunity for study abroad	5	2.43 (±0.03)	11	2.04 (±0.06)	10	2.23 (±0.07)	7	2.17 (±0.03)	6	2.25 (±0.02)
Scholarship/financial aid	6	2.42 (±0.04)	5	2.36 (±0.07)	7	2.36 (±0.09)	14	2.04 (±0.04)	6	2.25 (±0.03)
Clubs and extracurricular options	8	2.31 (±0.03)	11	2.04 (±0.05)	13	2.14 (±0.06)	8	2.16 (±0.03)	7	2.20 (±0.02)
Personal/family reasons	9	2.27 (±0.03)	8	2.18 (±0.05)	9	2.26 (±0.07)	10	2.11 (±0.03)	8	2.19 (±0.02)
Opportunity for research	10	2.26 (±0.03)	7	2.19 (±0.06)	8	2.27 (±0.07)	9	2.12 (±0.03)	8	2.19 (±0.02)
Credit evaluation and transfer	14	1.89 (±0.03)	3	2.61 (±0.06)	4	2.60 (±0.07)	6	2.19 (±0.03)	9	2.17 (±0.02)
Class size	11	2.13 (±0.03)	10	2.09 (±0.06)	11	2.21 (±0.07)	12	2.09 (±0.04)	10	2.12 (±0.02)
Opportunity for service learning	11	2.13 (±0.03)	9	2.12 (±0.05)	12	2.19 (±0.06)	11	2.10 (±0.03)	10	2.12 (±0.02)
Faculty member contact	12	2.06 (±0.03)	12	1.96 (±0.06)	14	2.00 (±0.07)	13	2.07 (±0.03)	11	2.04 (±0.02)
4-H/FFA background	13	1.97 (±0.04)	13	1.57 (±0.05)	15	1.64 (±0.06)	16	1.42 (±0.02)	12	1.66 (±0.02)
Ineligible for preferred major at MSU	15	1.40 (±0.02)	14	1.40 (±0.04)	16	1.44 (±0.05)	15	1.60 (±0.03)	13	1.49 (±0.02)

* Mean is computed based on 1= not important, 2=somewhat important, 3=very important, and 4=extremely important

Who Enrolls

other colleges/universities and community colleges ranked it as the 10th and 11th most important factor, respectively, in their decision to enter a CANR program. Respondents from other MSU programs ranked it as the seventh most important factor. According to the Open Door report (2008/09), MSU ranked No. 1 for study abroad participation among public universities for the sixth year in a row (MSU News, November 15, 2010). Despite MSU's reputation as a top public university in study abroad program, respondents from other colleges and universities perceive this factor as "somewhat important," this could be due to the "credit crunch" experienced by them on a shorter timeline. Overall, opportunity for study abroad was ranked as the sixth most important factor in respondents' decision to enter a CANR program.

Scholarship/financial aid was also ranked the sixth most important factor overall. Respondents directly from high schools and community colleges perceived scholarship/financial aid to be a more important factor than did respondents from other colleges/universities and transfer students from within MSU. For transfer students from other programs at MSU, scholarship/financial aid was one of the least important factors in their decision to join a CANR program. A similar result was found by Rocca and Washburn (2005): in their decision to enter the agricultural college at the University of Florida, high school matriculants were more influenced by scholarships awarded than were transfer matriculants. A study of factors affecting transfer decisions of community college students in Michigan revealed that, of the students who were planning to transfer, 38% were expecting financial aid from four-year colleges (Monroe and Richtig, 2002). However, Hodges and Barbuto, Jr., (2002) found that financial aid was one of the most influential factors for recruiting rural and urban high school students.

Clubs and extracurricular options were ranked the eighth most important factor by the respondents who entered directly from high schools and transfer students from within MSU. This was perceived to be a more important factor by respondents who transferred from community colleges than by the respondents who transferred from other colleges/universities. Overall, clubs and extracurricular activities ranked seventh of the 16 factors. The focus group study of graduating seniors in the CANR at MSU (Shrestha, 2009) found that extracurricular activities conducted by the student clubs -- such as Forestry Club, Park and Recreation Club, Fisheries and Wildlife Club, and Horticulture Club -- were very important to CANR students at MSU for hands-on learning and developing skills for employment.

Personal/family reasons and the opportunity to get involved in research activities were equally ranked as the eighth most important factor overall. Undergraduate research is a powerful pedagogical approach for fostering competencies in creativity and

innovation, problem solving, systems thinking, and civic, social and personal responsibility. Undergraduate research opportunities allow students to become more actively engaged in their education through intellectual and practical learning. Students develop research, analytical, writing, and speaking skills, which ultimately help them better prepare for their future careers in either graduate study or meaningful employment. Given the increasing call for undergraduate research experiences and the availability of research grants from National Science Foundation, United States Department of Agriculture, and National Health Institute, opportunities for getting involved in research activities have become one of the important factors for making the decision to enter the CANR.

Credit evaluation and transfer were ranked the third most important factor by the respondents who entered from community colleges and the fourth most important factor by respondents who transferred from other colleges/universities. Transfer students from within MSU ranked credit evaluation and transfer as the sixth most important factor. However, it was one of the least important factors for respondents who entered the CANR programs directly from high school; this is likely the case because not many high school students enter college with transfer credits. Although it was ranked as the ninth most important factor overall, it was among the top four most important factors for transfer students. This indicates that easy credit evaluation and transfer is one of the most important factors for transfer students deciding to enter a CANR major. One of the themes raised by the respondents in Monroe and Richtig's (2002) study of factors affecting the transfer decisions of community college students in Michigan was that four-year colleges should accept credits earned in community colleges and make the credit transfer process easy.

Class size and opportunity for service learning ranked as the 10th most important factor for respondents in their decision to enter a CANR program. Both factors were almost equally ranked by respondents within and across the groups. Other studies also found that class size was one of the least important factors for prospective students choosing an agricultural college major (Robinson et al., 2007; Rocca and Washburn, 2005; Washburn et al., 2002). Rocca and Washburn (2005) found, however, that class size was a more important factor for students entering the University of Florida directly from high school than it was for transfer matriculants.

Faculty member contact, 4-H/FFA background, and ineligibility for their preferred major at MSU were the least important factors in deciding on a CANR major. Results indicate that the 4-H and FFA background of respondents was the least important factor for making the decision to choose an agricultural major. It is important to note, however, that only 24.4% of the respondents had 4-H and/or FFA

backgrounds. Therefore, the mean ranking was skewed. An analysis of the respondents with 4-H and/or FFA backgrounds revealed that having a 4-H and/or FFA background was a very important factor in selecting a CANR major. A study by Williams et al. (2008) found that related clubs or organizations were the fifth highest rated influencing factors for agriculture students choosing an academic major at Texas Tech University.

Overall, three factors -- academic program or curriculum, institutional reputation of the CANR, and opportunity for internships -- were the top three factors for respondents in deciding to enter into a CANR program.

Summary

This study is aimed at understanding the demographic profile of the undergraduate students in the CANR at MSU and identifying the routes by which they entered CANR programs, the sources of information they used to learn about the programs, and factors influencing their decisions to choose majors in the CANR at MSU.

Analysis of the demographic data showed that a high majority of the respondents in this study were Caucasian females from suburban or urban communities, and residents of Michigan. Less than a quarter of the respondents had participated in 4-H and/or FFA activities, so a large majority of respondents did not have backgrounds involving working in agriculture-related clubs and organizations or prior experience in agriculture. Given the demographic characteristics of respondents, the CANR may develop strategies to promote agriscience studies in high schools and recruit more students who have prior experience in agriculture, have taken agriculture courses in high schools, and were members of 4-H and/or FFA.

There are four major sources of students for the CANR: transfer students from within MSU (41%), students entering the CANR directly from high schools (36.2%), students from community colleges (13.3%), and transfer students from other colleges and universities (8.2%). Among these entrants, it is easier to identify and target students from high schools and community colleges than transfer students from other colleges/universities and from within MSU. Therefore, recruitment officers in the CANR should target high school students and community college students by working with high school teachers/counselors and community college transfer counselors.

Family members and friends were the most influential individuals as sources of information for prospective students in the CANR at MSU; other sources were websites and printed materials. Campus visits ranked as the fourth most frequently used source of information. Therefore, it is recommended that recruiters for the CANR at MSU:

- Work with parents and guardians of prospective

students to provide accurate information about college majors.

- Work with the college alumni network to disseminate college information.
- Update college websites regularly and make them more interactive and informative.
- Distribute college brochures to high school and community college students.
- Promote campus visits for prospective students and their parents and guardians.

Academic program/curriculum, the reputation of the CANR at MSU, and opportunities for internships were the top three important factors influencing students' decisions to enter CANR majors at MSU. Other factors influencing respondents' decision to enter CANR majors were academic advising, recommendations of friends, alumni, and family members, opportunity for study abroad, scholarships and financial aid, and clubs and extracurricular activities. Recommendations of friends, alumni, and family members were more influential to respondents who entered the CANR directly from high school than they were for other entrants. Credit evaluation and transfer, and scholarships and financial aid, were more important factors for respondents who transferred from community colleges than they were for other entrants.

On the basis of these findings, the CANR should continue offering the current academic programs, maintain its institutional reputation, and work closely with potential employers to find opportunities for student internships. Linkages should be established with transfer counselors and advising officials at community college transfer centers to inform community college students about the transfer process, requirements, programs, and prospects of higher education in agriculture. Transfer students need help in transferring credits and applying for scholarships and financial aid. The CANR recruitment office should work closely with key persons, such as agriscience teachers, the state supervisor for the agriscience program, local FFA chapters, and 4-H educators and club leaders to facilitate the college application process, especially for 4-H and FFA members.

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