

Urban Cowboys: Demographics Confirm That Agriculture and Natural Resources Recruiting Plans Cannot Be One-Size-Fits-All¹

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Abstract

Modern colleges of agriculture are often a mixture of traditional agricultural, natural resources, and other programs, which may lead to challenges for recruiting. During the past 10 years, the College of Agricultural Sciences and Natural Resources (CASNR) at the University of Nebraska-Lincoln enhanced recruiting in rural areas in response to stakeholders' interests. As a result, CASNR graduates in agricultural programs from the smallest towns in Nebraska of <5,000 people increased markedly, relative to trends of all other types of CASNR students. Almost 60% of graduates during 2005-2015 in agriculture majors were from towns of <5000 people; in contrast, only 27% of graduates from natural resources and 22% of graduates from other programs were from small towns; instead, 51% of natural resources students and 45% of students in other CASNR programs came from the largest Nebraska cities with <45,000 people. Male graduates were the majority of all types of academic programs in CASNR (agriculture: 64%, natural resources: 61%, other programs: 61%), and 94% of CASNR graduates were white. Demographic data analysis is critical to confirmation of successful, targeted recruiting plans aimed at the unique sets of students in a college of agriculture.

Keywords: recruiting, home town, retention, rural

Introduction

Many colleges of agriculture are a diverse set of academic programs including natural resources (e.g., environmental sciences, forestry, fisheries and wildlife) and other programs (e.g. horticulture, biochemistry, food sciences). The diversification of academic programs within colleges of agriculture is exemplified by the adoption of names such as College of Agricultural Sciences and Natural Resources (e.g., University of Nebraska-Lincoln), College of Agriculture and Natural Resources

(e.g., University of Wyoming, Michigan State University), College of Agriculture and Life Sciences (e.g., University of Arizona, Texas A&M University), College of Agriculture, Food and Environment (e.g., University of Kentucky), and College of Food, Agricultural, and Environmental Sciences (e.g., The Ohio State University).

Recruiting can be difficult for colleges of agriculture, especially when specific degree programs may not be revealed by the name of the college (Fritz et al., 2007). Time and energy for recruiters are fixed resources, and market-based recruiting plans enable efficient use of personnel to reach goals for number of majors in programs (Schuster and Costantino, 1986). Recruiting strategies and messages should vary for high school students and students in community colleges, because they may use different information to select an academic program (Rocca and Washburn, 2005). And, messages may need to be tailored to students investigating the diverse programs in colleges of agriculture. For example, students matriculating into traditional agricultural programs may respond with more passion to information about immediate job opportunities, while students entering fisheries, wildlife, and forestry programs within the same college may be more responsive to opportunities to learn about how they can establish a career that contributes to their community and the environment (Schuster and Costantino, 1986; Wolter et al., 2011).

In similar fashion, cultural characteristics of students may affect the manner in which they recruit to a college of agriculture. Traditional rural, white students who matriculate to agriculture programs respond to friendly staff in the college and typically have prior experience with agriculture (Wildman and Torres, 2001). And, traditional students give high value to information from community leaders, such as teachers, and Extension agents or specialists (Dyer et al., 1999; Slocombe, 1986;

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Urban Cowboys: Demographics

Tarpley and Miller, 2004). However, parents and friends were the most influential contributors to the selection of a program in colleges of agriculture for African American students (Burns, 2006), Hispanic students (Valdez, 1995), and urban students in general (Esters, 2007) rather than teachers or Extension youth specialists.

Demographic changes in pools of potential students must be addressed by colleges of agriculture to maintain student numbers in academic programs. During the 1970's, 1980's and 1990's, more than half of the students in colleges of agriculture came from farms, ranches, or small towns (Slocombe, 1986; Taylor and Johnson, 1993). However, rural and small town populations are declining in most states (Brown et al., 2005), and Wildman and Torres (2001) reported that 55% of students in a college of agriculture came from towns or cities with populations greater than 5,000 people. The population shift to urban areas has created the numerical need to recruit urban students who may be less familiar with potential careers in agriculture and natural resources (Fraze et al., 2011).

In 2002 and 2003, the University of Nebraska-Lincoln experienced dramatic budget reductions. University Extension personnel throughout the state experienced numerical cuts simultaneous with personnel cuts made on campus throughout programs of the University. The budget reductions occurred as enrollments were declining in the College of Agricultural Sciences and Natural Resources (CASNR). Throughout Nebraska, rural residents perceived the local personnel cuts to indicate that the University was losing touch with rural Nebraska (Owens, 2003a). At the College level, it was clear that enrollment trends must be reversed (Fritz et al., 2007), and administrators made the strategic decision to use the resources of University Extension in the state to assist with recruiting efforts. Enrollment in CASNR programs was touted as a tide that "raises all boats"—if enrollment increased, tuition dollars would increase, and research and extension and teaching would all benefit (Owens, 2003b). A strong recruiting effort in rural areas of Nebraska was accomplished using CASNR-level recruiters who would visit field days, local high schools, or other events at the request of Extension personnel. Throughout CASNR, recruiting became a priority for faculty and staff in all positions. As an example, in 2004 the School of Natural Resources re-branded the Fisheries and Wildlife major with 10 career-related options to train students in marketable fields, but also to enable a new audience of potential students to find programs such as Zoo Animal Care, Conservation Biology, Law Enforcement, or Habitat Management through on-line searches. Other innovative programs, such as Forensic Science, Turfgrass and Landscape Management, and Professional Golf Management, were introduced during this period in response to perceived market needs with a goal to attract a new suite of students to the college.

The goal of this research is to evaluate the success of recruiting efforts during the period 2005-2015 in the context of demographics. My objectives were to (1)

compare trends in graduates of traditional agriculture, natural resources, and other programs in CASNR, (2) evaluate trends in hometown origin of graduates from types of academic programs in CASNR, and (3) assess trends in gender and racial diversity. Based on anecdotal observations, I predicted that traditional agricultural students had responded effectively to the targeted rural recruiting by CASNR. I predicted that natural resource programs had experienced a large increase in the proportion of urban students. I also predicted that students in traditional agricultural programs were predominantly derived from rural areas, while natural resources and other CASNR programs were derived from urban areas. My analyses and research questions were derived in the context of my interests as a faculty member in a natural resources program with an eye to future plans for recruiting.

Methods

Graduation data was obtained from the College of Agricultural Sciences and Natural Resources at the University of Nebraska-Lincoln from fall semester 2005 to spring semester 2015. The data included hometown and state of permanent residence, year of graduation, and degree programs for each student. Students who graduated with dual or triple degree programs appeared as two or three lines of data, respectively. Then the US Census data from 2010 for the state of Nebraska was merged with the graduation data to obtain the population sizes of each Nebraska student's hometown. Next, graduates were divided into four categories with regard to hometown: (1) smallest towns in Nebraska with <5,000 people (after Wildman and Torres, 2001), (2) mid-sized towns of 5,000-45,000, (3) largest Nebraska cities of >45,000 (three cities: Grand Island, Lincoln, and Omaha), and (4) out-of-state. When the total number of graduates in a calendar year was evaluated, the data was limited to 2006-2014 because only partial calendar years were available for 2005 and 2015.

Linear regression analyses was used to characterize the growth rate of the number of CASNR graduates in total, by type and size of hometown, and by type of academic program. CASNR graduates were stratified by type of academic program (traditional agriculture, natural resources, and other programs; Table 1), and compared to temporal trends among the categories of home towns for types of CASNR programs. Linear regression analyses was also used to characterize changes in the proportion of females in CASNR, and to compare the proportion of female graduates among groups of program type. SAS version 9.4 (SAS Institute, Cary, NC) was used for the analyses.

Results and Discussion

CASNR produced 3,885 graduates of degree programs between fall semester 2005 and spring semester 2015 (traditional agriculture: 56% of CASNR graduates, natural resources: 17%, other programs:

Table 1. Complete list of academic programs with degrees offered during 2005-2015 in the College of Agricultural Sciences and Natural Resources at the University of Nebraska-Lincoln. Programs are categorized as traditional agriculture, natural resources, or other.

Type of Program	Academic Program	
Traditional Agriculture	Agribusiness	
	Agricultural and Environmental Sciences Communication	
	Agricultural Economics	
	Agricultural Education	
	Agricultural Journalism	
	Agronomy	
	Animal Science	
	Diversified Agricultural Studies	
	Grazing Livestock Systems	
	Mechanized Systems Management	
	Pre-Veterinary Medicine	
	Veterinary Science	
	Veterinary Technologist	
	Veterinary Technology	
	Natural Resources	Environmental Restoration Science
		Environmental Studies
		Fisheries and Wildlife
		Grassland Ecology and Management
		Natural Resource and Environmental Economics
		Rangeland Ecosystems
Water Science		
Other	Applied Science	
	Biochemistry	
	Food Science and Technology	
	Food Technology for Companion Animals	
	Forensic Science	
	Horticulture	
	Hospitality, Restaurant and Tourism Management	
	Insect Science	
	Microbiology	
	PGA Golf Management	
	Plant Biology	
	Plant Protection Sciences	
	Professional Golf Management	
	Turfgrass and Landscape Management	

27%). The number of CASNR graduates in a calendar year increased 69% from 301 in 2006 to 508 in 2014 (slope=29.8 graduates/year, SE=3.0, $F_{1,7} = 96.3$, $P < 0.001$; Figure 1). The recruiting strategies were considered robustly successful by CASNR stakeholders and the University regarding overall enrollment. CASNR's strategy to use Extension personnel throughout the state to start conversations with potential students is considered a model within the University.

Program Type

The eight largest academic programs in CASNR with over 200 graduates during 2005-2015 were: Animal Science (563 graduates), Fisheries and Wildlife (386), Agricultural Economics (347), Agribusiness (310), Agronomy (289), Biochemistry (255), Mechanized Systems Management (220), and Horticulture (219). The number of graduates from traditional agricultural majors increased by 43% from 196/year in 2006 to 280/year in 2014. Natural resources graduates increased by 152% from 34/year in 2006 to 86/year in 2014; Fisheries and Wildlife is the largest natural resources undergraduate program, and the development of programmatic options was successful from a recruiting perspective. Many

majors within the college have followed the example to create career-related options to make programs come alive for potential students. Other CASNR majors increased by 100% from 71/year in 2006 to 142/year in 2014 (Figure 1). CASNR introduced three successful new programs that contributed to this dramatic increase: Professional Golf Management, Turfgrass and Landscape Management, and Forensic Science.

Size of Hometown

The number of CASNR graduates from small towns of <5,000 people increased at substantially higher rates (slope=16.1 graduates/year, SE=1.6, $P < 0.001$) than all other categories of hometown (mid-sized: slope=2.6, SE=1.0, $P = 0.04$; large cities: slope=6.5, SE=1.8, $P = 0.01$; out-of-state: slope=4.6, SE=0.8, $P < 0.01$; Figure 2). CASNR recruiting efforts in rural Nebraska were clearly effective, which is even more impressive considering demographic shifts in population trends of declining rural populations and the inherent inefficiencies of recruiting efforts directed at small audiences in rural high schools and events. CASNR recruiters describe their strategy as largely an effort of "going and smiling" to make relationships with small town students who may be uncomfortable at the thought of leaving their small town to enter a large university. In addition to friendly recruiters who remember names of students who eventually come to visit campus, CASNR has developed first-year activities and a student services office to reach out to students to make the university seem smaller for rural students. At present, large cities and out-of-state students represent potential growth areas for CASNR, and new approaches are under development. Mid-sized towns may continue to be problematic for recruiting, as many Nebraska towns in this size category have small, private colleges or colleges in the State College system in Nebraska that compete for students.

Almost 60% of students in traditional agriculture majors were from towns in Nebraska with a population

Figure 1. Temporal trends in the number of graduates (total) from academic programs in the College of Agricultural Sciences and Natural Resources (CASNR) at the University of Nebraska-Lincoln during 2006-2014. Trends are also shown for categories of academic programs: traditional agriculture, natural resources, and all other programs (see Table 1 for descriptions).

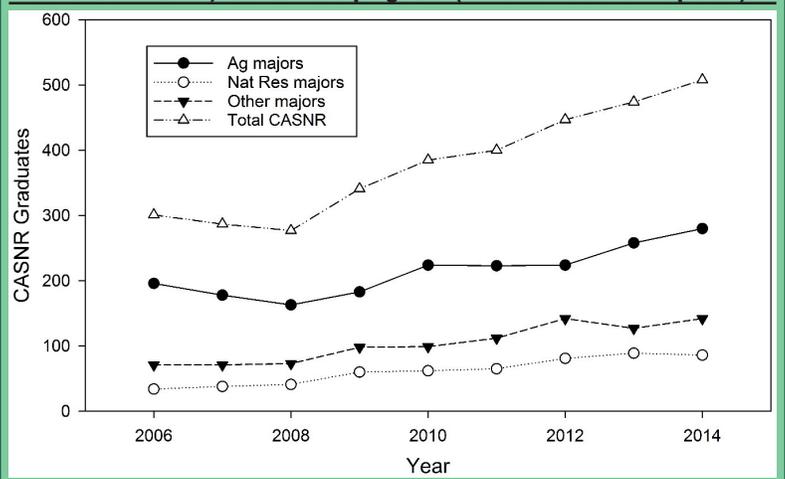


Figure 2. Temporal trends in the number of graduates from academic programs in the College of Agricultural Sciences and Natural Resources (CASNR) at the University of Nebraska-Lincoln during 2006-2014 stratified by four hometown categories: small Nebraska towns of <5,000, mid-sized Nebraska towns of 5,000-45,000, large cities of >45,000, and out-of-state.

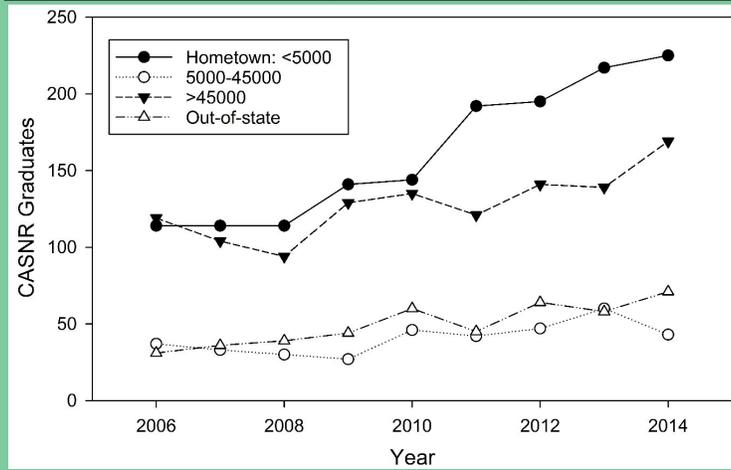
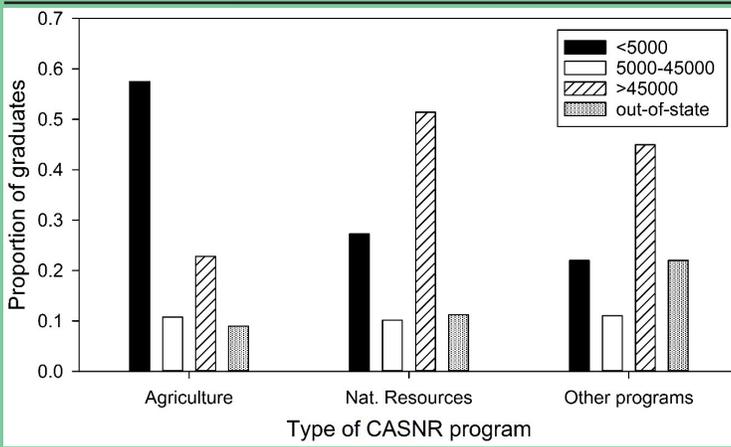


Figure 3. Proportion of graduates from academic programs in the College of Agricultural Sciences and Natural Resources (CASNR) at the University of Nebraska-Lincoln during 2006-2014 stratified by three types of academic programs (traditional agriculture, natural resources, and all other programs; see Table 1 for descriptions) and four hometown categories: small Nebraska towns of <5,000, mid-sized Nebraska towns of 5,000-45,000, large Nebraska cities of >45,000, and out-of-state.



size of <5000 people (Figure 3), which is like other colleges of agriculture (Wildman and Torres, 2001). In contrast, only about one-quarter of graduates from natural resources and other programs in CASNR were from small towns; these types of programs were dominated by graduates from the three largest cities in Nebraska (>45,000 people: 51% natural resources, 45% other programs). Only about one-fifth (22%) of agriculture students came from large cities. Although only about one in 10 graduates from agriculture and natural resources programs were from outside Nebraska, programs such as Professional Golf Management, Food Science and Biotechnology, Forensic Science, and Biochemistry produced 22% of their graduates from outside of Nebraska. CASNR students are not homogeneous across types of academic programs, and these data are critical to the establishment of recruiting strategies for sets of academic programs within CASNR. Certainly, each set of students brings their own interests to campus, which affects retention efforts, club participation within the

College, and participation in study abroad trips. For example, CASNR has recently seen growth in student clubs with environmental themes, as well as study abroad trips with environmental themes. Development of retention programs in CASNR programs that may attract urban and minority students who find themselves isolated in culture and theme of their program within the college is a critical step for the future.

The growth experienced in graduates from agricultural majors only occurred among students from Nebraska's smallest towns (slope=11.3, SE=1.4, P<0.001; Figure 4). The number of agriculture graduates from mid-sized towns, large cities, and out-of-state did not grow (P>0.05). In contrast, the number of graduates in natural resources majors grew during 2006-2014 in three of four categories of hometowns (small: slope=1.8, SE=0.4, P<0.01; large: slope=3.9, SE=0.4, P<0.001; out-of-state: slope=1.2, SE=0.4, P=0.01); graduates from natural resources programs from mid-sized towns did not increase (P>0.05). Similarly, the number of graduates in other CASNR majors grew in three of the four categories of hometowns during 2006-2014 (small: slope=3.1, SE=0.6, P<0.001; large: slope=2.9, SE=0.9, P=0.01; out-of-state: slope=3.4, SE=0.6, P<0.001); graduates in other majors from mid-sized towns did not increase (P>0.05). CASNR recruiting in rural areas benefited all programs, but especially traditional agriculture programs. No CASNR programs showed growth in the number of graduates from mid-sized towns, perhaps because of competition from other colleges in these towns. And, natural resources and other CASNR majors were the only programs to show an increase in graduates from Nebraska's three largest cities of >45,000 people as well as out-of-state residents. The latter indicates a potential growth area for CASNR in the future, as growth has been small relative to potential pools of students in these target areas.

Gender and Diversity

Male graduates were the majority of all types of academic programs in CASNR (agriculture: 64%, natural resources: 61%, other programs: 61%); for comparison, males comprise only 53% of University of Nebraska-Lincoln students as a whole. The percent of female graduates in both agricultural and natural resources programs was variable (agriculture range: 30-42%; natural resources: 23-46%; other programs: 23-65%) but none of the types of academic programs showed any changes in male: female ratio during 2005-2015.

Male and female graduates from agricultural programs in CASNR were predominantly from small towns, while over 40% of graduates from natural resources and other majors were from the three largest cities in Nebraska (Figure 5). Male graduates were more likely to come from small towns for agriculture and natural resources programs than females in the same program

Figure 4. Temporal trends in the number of graduates from academic programs in the College of Agricultural Sciences and Natural Resources (CASNR) at the University of Nebraska-Lincoln during 2006-2014 stratified by four hometown categories: small Nebraska towns of <5,000, mid-sized Nebraska towns of 5,000-45,000, large Nebraska cities of >45,000, and out-of-state. Trends are shown for three types of academic programs: (A) traditional agriculture, (B) natural resources, and (C) all other programs (see Table 1 for descriptions).

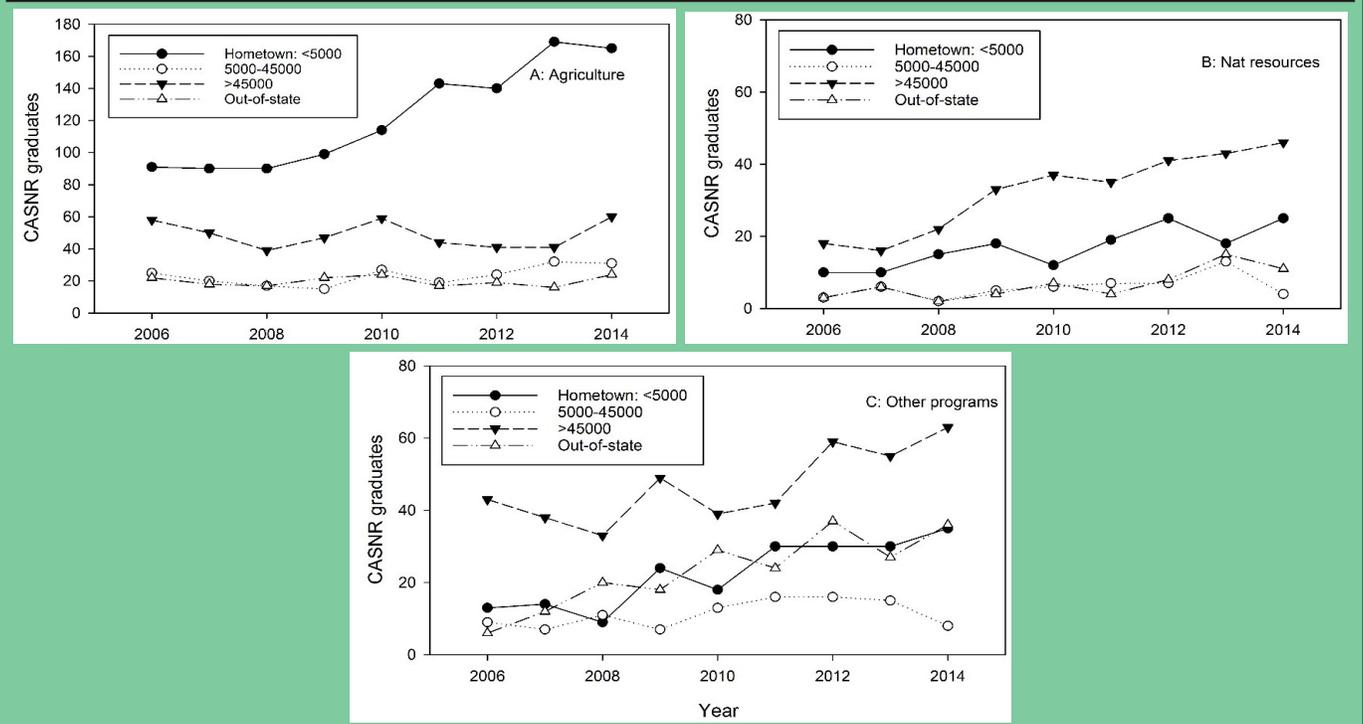
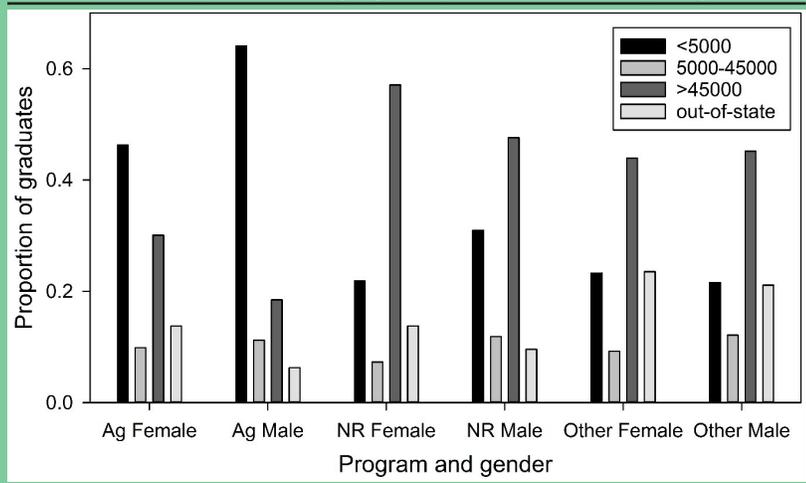


Figure 5. Proportion of graduates from academic programs in the College of Agricultural Sciences and Natural Resources (CASNR) at the University of Nebraska-Lincoln during 2005-2015 from four categories of hometown: small Nebraska towns of <5,000, mid-sized Nebraska towns of 5,000-45,000, large Nebraska cities of >45,000, and out-of-state. Data are stratified by combinations of gender and three types of academic programs: traditional agriculture, natural resources, and all other programs (see Table 1 for descriptions).



type. However, the proportion of male and female graduates from small towns in other CASNR programs was similar. Conversely, the proportion of females from large cities was higher than males in agriculture and natural resource programs, but the proportion of females and males from large cities was similar for graduates in other CASNR programs. Approximately 10% of males and females in all types of programs were from mid-sized cities. The proportion of out-of-state graduates was higher for females than for males in agriculture and natural resources programs, but the proportion of males and female graduates from out of state in other CASNR

programs was similar. Graduates from out of state were more common in other CASNR programs than in agriculture and natural resources programs (Figure 5). Future recruiting efforts for natural resources students will need to focus on larger cities, which also may hold potential for female agriculture students; recruiting of out-of-state students to other CASNR programs appears to be successful, and other programs may learn from these successes.

The University of Nebraska-Lincoln, overall, is comprised of 80% white students. During 2005-2015, 94% of CASNR graduates self-identified as white (agriculture programs: 96%, natural resources: 92%, other programs: 89%). CASNR graduates were self-identified as 0.5% American Indian, 2.0% Asian, 0.6% African American, 0.1% Hawaiian/Pacific Islander, and 1.3% Hispanic. Like many agricultural colleges (Wiley et al., 1997), CASNR lacks racial diversity in its student body, and recruiting minorities to agricultural and natural resources programs and careers is a challenge (Adams and Moreno, 1998; Hodgdon, 1982). Burns (2006) suggests that students of diversity have opportunities for engagement with representatives from colleges of agriculture during their middle school years in a repeated basis, and that high schools with high percentage of minority students be targeted for these efforts, so that student gain confidence in a relationship with the representatives (Esters, 2007; Valdez, 1995).

Summary

An analysis of CASNR graduation data reveals trends in success in recruiting that confirm recruiting programs can be very effective when designed to accomplish a purpose. For the past 10 years, CASNR has dedicated efforts to work throughout rural areas of Nebraska to increase enrollment in agricultural programs. Simultaneously, natural resources and other CASNR programs have made unique programmatic changes to attract urban students. Future recruiting strategies can be designed to accomplish goals specific to these audiences, and these analyses confirm that CASNR programs are not homogeneous with regarding types of hometown and gender of graduates. Given the potential for information to be used to make decisions and strategies, as well as the critical importance of recruiting to the sustenance of modern student bodies in competitive environments with limited budgets, colleges of agriculture should regularly examine demographic graduation data.

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