

Careers and Career Preparation in the Animal Sciences

Key Terms

Agribusiness
Careers

Husbandry
Scientific literacy

INTRODUCTION

Agriculture in general, and animal science specifically, offer a wide variety of challenging and rewarding career choices. The demand for college graduates with agriculturally related college educations has been strong and is expected to stay that way for the foreseeable future. One of the reasons for the opportunities is that many jobs in great demand in agriculture would not have been recognized as agricultural in the recent past. The diversification of agriculture and its changing structure have brought many more opportunities. As in any industry, the demand for specific occupations waxes and wanes. For instance, fewer production specialists are needed than are marketing, merchandising, and sales representatives. However, production specialists will still be needed, as will qualified people in many other areas. This is good news for students with a focus on agriculture, food, and natural resources. Agriculture was hard-pressed to find enough good people to fill its positions during most of the 1990s and 2000s, and the same trend is anticipated through the second decade of the new century and beyond. For job seekers, this has meant and continues to mean more and better opportunities. The agricultural industries need the requisite human resources to grow, advance, and flourish. Many see the lack of college graduates as the most limiting factor in agriculture's growth. A government report summed it up this way: "The strategic importance of our food, agricultural, and natural resource system will grow . . . and require even stronger leaders, more creative scientists, greater international business understanding, and increased sensitivity for consumers and the environment. So, it's largely human resources which will chart the course of the U.S. food, agricultural, and natural resources" (Coulter et al., 1990). These words are just as true today as when written.

The average yearly employment opportunities for agricultural and foods graduates has consistently exceeded the number of graduates since

Learning Objectives

After you have studied this chapter, you should be able to:

- Describe the general job market in agriculture and animal science.
- Identify the general areas of curriculum in animal science and the careers associated with each area.
- Develop a strategy for directing your education toward a satisfying career.

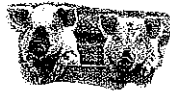


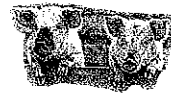
Table 26-1
EMPLOYMENT OPPORTUNITIES FOR COLLEGE GRADUATES IN THE U.S. FOOD,
AGRICULTURAL, AND NATURAL RESOURCES SYSTEM, 2010-2015

Major Occupation Clusters in Food, Agriculture, and Natural Resources	Percentage of Total Employment Opportunities for Graduates	Annual Employment Opportunities	Agricultural and Natural Resources Graduates	Allied Fields Graduates
Management and business	47%	25,700	12,100	11,700
Scientific and engineering	27%	14,500	6,200	7,900

the early 1990s. Table 26-1 also shows the projected employment opportunities for college graduates. It is easy to see that significant opportunities exist in all the employment clusters. Table 26-2 gives past and projected employment opportunities for representative occupations. The projections are overwhelmingly positive. Significant employment opportunities are available in agriculture.

ANIMAL SCIENCE STUDIES AND CAREERS

Students vary in their approach to animal science and in what they want out of their education as it prepares them for a career. Some students, perhaps even the majority, are primarily interested in a specific animal species. For example, they may



Total Annual Qualified Graduates	Total Qualified Graduates Shortage/ Surplus	Types of Opportunities	Strong Employment Opportunities Expected
23,080	10.2% shortage	Accountant, account executive, advertising manager, appraiser, auditor, banker, business manager, commodity broker, consumer information manager, consultant, contract manager, credit analyst, customer service manager, economist, export sales manager, financial analyst, financial manager, food broker, food service manager, forest products merchandiser, golf course superintendent, grain merchandiser, government program manager, grants manager, human resources manager, insurance agency manager, insurance agent, insurance risk manager, landscape contractor, landscape manager, market analyst, marketing manager, policy analyst, purchasing manager, real estate broker, research and development manager, retail manager, risk manager, sales representative, technical service representative, wholesale manager	Technical sales representatives, food brokers, accountants and financial managers, forest products salespersons, market analysts, fruit and vegetable marketing representatives, sales managers, landscape managers, small animal health care product distributors, and international business specialists.
14,500	2.8% shortage	Agricultural engineer, animal physiologist, animal scientist, biochemist, cell biologist, entomologist, environmental scientist, fisheries scientist, food engineer, food scientist, forest scientist, geneticist, landscape architect, microbiologist, molecular biologist, nanotechnologist, natural resources scientist, nutritionist, plant breeder, quality assurance specialist, rangeland scientist, research technician, resource economist, soil scientist, statistician, toxicologist, veterinarian, waste management specialist, water quality specialist, weed scientist	Precision agriculture, functional genomics and bioinformatics, forest science, plant and animal breeding, biomaterials engineering, food quality assurance, nanotechnology, animal health and well-being, nutraceuticals development, and environmental science.

(continued)

be in the horse industry and are willing to consider many different career paths as long as the careers involve horses. Others are more interested in a career track and less interested in a specific species. They may wish to be a production specialist but would be just as content running a swine unit, a beef feedlot, or a dairy. Others are more interested in a specific biologic function and want to be involved in the industry as a nutritionist or reproductive specialist or a management consultant, for example. There is plenty of room for all of these orientations. To accommodate the necessary learning that must take place to prepare students for their chosen path, colleges and universities design study options and curricula with all of the career choices in mind. As you might expect, there are several approaches to curricula design. However, if you look at them objectively, you will generally see that most college and university curricula in the animal sciences are designed around



Table 26-1
EMPLOYMENT OPPORTUNITIES FOR COLLEGE GRADUATES IN THE U.S. FOOD,
AGRICULTURAL, AND NATURAL RESOURCES SYSTEM, 2010-2015 (continued)

Major Occupation Clusters in Food, Agriculture, and Natural Resources	Percentage of Total Employment Opportunities for Graduates	Annual Employment Opportunities	Agricultural and Natural Resources Graduates	Allied Fields Graduates
Education, communication, and government services	11%	6,200	3,900	3,600
Agricultural and forestry production	15%	7,900	7,100	950
Total/overall	100%	54,400	29,300	24,200

Source: Goecker et al, 2010.



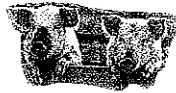
Total Annual Qualified Graduates	Total Qualified Graduates Shortage/Surplus	Types of Opportunities	Strong Employment Opportunities Expected
7,500	21.0% surplus	Agricultural science and business teacher, agricultural science reporter, animal inspector, college teacher, computer software designer, computer systems analyst, conference manager, conservation officer, cooperative extension educator, dietician, editor, educational specialist, environmental impact analyst, farm and ranch advisor, farm service agency manager, food inspector, forest service administrator, high school teacher, illustrator, information specialist, information systems analyst, journalist, land-use planner, naturalist, outdoor recreation specialist, nutrition counselor, park manager, peace corps representative, personnel development specialist, plant inspector, public relations specialist, radio/television broadcaster, regulatory agent, training manager, youth program director	Plant and animal inspection, public health administration, biotechnology impact assessment, foods and nutrition services, outdoor recreation, food system security, consumer information technologies, environmental management, high school agricultural science and business teaching, and land-use planning occupations.
8,050	1.9% surplus	Animal breeder, aquaculturist, equine operator, farm manager, farmer, feedlot manager, forest resources manager, fruit and vegetable grower, greenhouse manager, nursery operator, nursery products grower, rancher, seed producer, tree farmer, turf producer, viticulturist, wildlife manager	Producers of fruits and vegetables, growers of specialty crops that provide raw materials for medical and energy products, managers of specialized livestock operations, forest managers, growers of landscape plants and trees, managers of aquaculture operations, turf producers, equine operators, organic farmers, and providers of outdoor recreation.
53,500	1.65% shortage		

Table 26-2
NUMBERS IN THOUSANDS

2008 National Employment Matrix title and code	Employment			Change, 2008-18			Total job openings due to growth and replacement needs
	Number		Percent distribution	Number	Percent	Number	
	2008	2018					
Total, all occupations	150,931.7	166,205.6	100.00	100.00	15,273.9	10.12	50,928.5
Farm, ranch, and other agricultural managers	248.1	262.7	0.16	0.15	14.6	5.88	64.9
Farmers and ranchers	985.9	906.7	0.65	0.54	-79.2	-8.03	60.3
Food service managers	338.7	356.7	0.22	0.21	18.0	5.31	83.7
Natural sciences managers	44.6	51.5	0.02	0.03	6.9	15.45	20.1
Agricultural engineers	2.7	3.0	0.00	0.00	0.3	12.13	0.9
Biomedical engineers	16.0	27.6	0.01	0.01	11.6	72.02	14.9
Environmental engineers	54.3	70.9	0.03	0.04	16.6	30.62	27.9
Environmental engineering technicians	21.2	27.5	0.01	0.01	6.4	30.10	10.4
Animal scientists	3.7	4.2	0.00	0.00	0.5	13.15	1.8
Food scientists and technologists	13.4	15.6	0.00	0.00	2.2	16.32	6.9
Soil and plant scientists	13.9	16.1	0.00	0.00	2.2	15.48	7.0
Microbiologists	16.9	18.9	0.01	0.01	2.1	12.18	7.5
Zoologists and wildlife biologists	19.5	22.0	0.01	0.01	2.5	12.81	8.8
Conservation scientists	18.3	20.5	0.01	0.01	2.2	11.92	4.1
Foresters	11.5	12.9	0.00	0.00	1.4	12.13	2.6
Agricultural and food science technicians	21.9	23.8	0.01	0.01	1.9	8.77	9.6
Forest and conservation technicians	34.0	36.9	0.02	0.02	2.9	8.63	17.5
Vocational education teachers, secondary school	99.4	109.0	0.06	0.06	9.6	9.63	38.5
Farm and home management advisors	13.1	13.2	0.00	0.00	0.2	1.16	3.0
Veterinarians	59.7	79.4	0.03	0.04	19.7	32.95	30.2
Veterinary technologists and technicians	79.6	108.1	0.05	0.06	28.5	35.77	48.5
Veterinary assistants and laboratory animal caretakers	75.2	92.4	0.04	0.05	17.1	22.77	25.5

2008 National Employment Matrix title and code	Employment				Change, 2008-18			Total job openings due to growth and replacement needs
	Number		Percent distribution		Number	Percent		
	2008	2018	2008	2018				
Fish and game wardens	8.3	9.0	0.00	0.00	0.7	8.28	2.7	
Animal control workers	16.1	17.5	0.01	0.01	1.5	9.05	5.8	
Supervisors, food preparation and serving workers	941.6	997.0	0.62	0.59	55.4	5.88	145.2	
Chefs and head cooks	108.3	108.5	0.07	0.06	0.2	0.19	10.8	
First-line supervisors/managers of food preparation and serving workers	833.3	888.5	0.55	0.53	55.1	6.62	134.4	
Cooks and food preparation workers	2,958.1	3,149.6	1.95	1.89	191.5	6.47	1,039.5	
Landscaping and groundskeeping workers	1,205.8	1,422.9	0.79	0.85	217.1	18.00	362.2	
Animal trainers	47.1	56.7	0.03	0.03	9.6	20.42	19.0	
Nonfarm animal caretakers	173.3	209.1	0.11	0.12	35.9	20.71	73.6	
Supervisors, farming, fishing, and forestry workers	48.6	52.4	0.03	0.03	3.8	7.81	16.3	
Agricultural inspectors	16.6	18.7	0.01	0.01	2.1	12.80	5.5	
Animal breeders	14.7	15.5	0.00	0.00	0.8	5.77	4.8	
Graders and sorters, agricultural products	33.4	33.5	0.02	0.02	0.1	0.17	6.9	
Miscellaneous agricultural workers	807.0	788.8	0.53	0.47	-18.2	-2.26	221.6	
Fishing and hunting workers	36.0	33.3	0.02	0.02	-2.7	-7.56	9.3	
Forest, conservation, and logging workers	79.0	84.0	0.05	0.05	5.0	6.29	26.5	

Source: Employment Projections Program, U.S. Department of Labor, U.S. Bureau of Labor Statistics.



similar categories. These curriculum categories usually include a set of core animal science courses combined with all of the other course opportunities that institutions of higher learning provide to create a meaningful college learning opportunity. Brief descriptions of career options follow.

Production

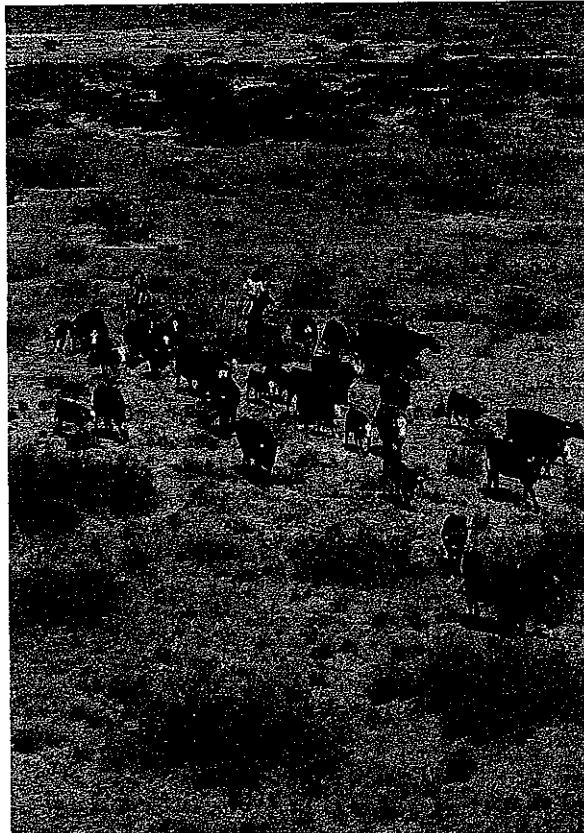
The primary goals of those in production are to improve the quality of agricultural products and the efficiency of farms. We generally think of these occupations as those most directly involved with the raising of animals or those who work in a service position closely tied to production. People in this occupational cluster direct the activities of the world's largest and most productive agricultural sector. They produce the food and fiber for the consumers of this country and enough surplus to generate large and positive trade balance in agricultural products and goods to the other countries of the world (Figure 26-1).

College curricula designed to prepare students for careers in production generally stress more **husbandry** practices than do the other approaches, but they also include supporting course work to help a student prepare for specific production positions. For instance, a future ranch manager most certainly needs to know good agronomic practice as it relates to producing good forage. A future poultry producer would find value in a course on environmental stress. All students need basic knowledge in business and accounting. Areas of employment for the production specialists include aquaculturist, farmer, rancher, farm or ranch manager, feedlot manager, animal unit managers in intensive production systems, and careers in marketing, feed manufacturing, international opportunities, and many more. Related areas include bree

Husbandry The combined animal care and management practices.

Figure 26-1

For many students, the goal of their education is to own or manage a farm or ranch. (Photographer Scott Bauer, Courtesy USDA-Agricultural Research Service.)





association personnel, animal breeders, animal scientists, dairy scientists, poultry scientists, county agricultural agents, state extension specialists, feed and farm management advisors, and stud managers. A large number of good opportunities exist and will continue to exist in production positions and on farms and ranches throughout the country. However, the general trend to larger and fewer production units is causing a decrease in the number of available positions. This will increase competition for these positions. Another avenue for the production-minded student who also wishes to work with people is to combine an animal science production degree with a double major in education. Students who choose this path can teach in public schools, in technical programs, in the extension service, or in one of the many trade and technical schools found all over the United States. Advanced degrees can further enhance a career in these areas.

Science and Medicine

Agriculture is scientifically based and scientifically dependent. Virtually all who work in agriculture are well served by having minimal **scientific literacy**. However, some specialties require advanced scientific competency and training. Science curricula are designed for those who wish to pursue further education after the BS degree in graduate and professional schools and for those who may wish to fill the need for technicians and industry science representatives (Figure 26-2). Perhaps because of the rigor of science-based curricula, perhaps because so many other opportunities exist, or perhaps because additional years in school are usually needed, this general area of agriculture and animal science is barely producing enough graduates. This translates into good opportunities for students who choose this area. The foods areas offer an especially large number of opportunities for those with advanced degrees owing to the changing eating habits of our population and the pressing needs of making the food supply safer. Good demand is also seen for other animal science specialties including molecular geneticists, veterinarians, toxicologists, pathologists, physiologists, nutritionists, microbiologists, animal behaviorists, and waste management specialists to become professors, industry and university scientists, technical consultants, research technicians, and so on (Figure 26-3). All of these biotechnology areas are in need of quality people.

Scientific literacy The minimum knowledge necessary to stay abreast of further scientific development and innovation.

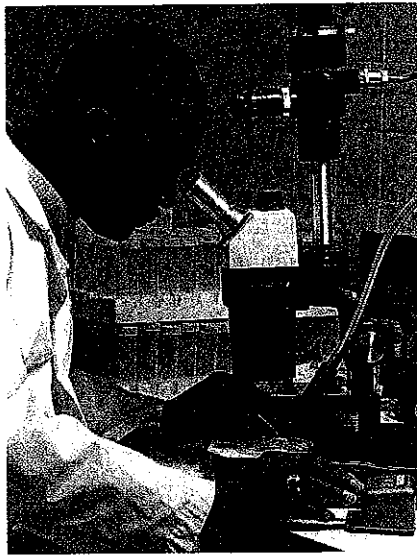


Figure 26-2

Science curricula are for those who wish to pursue advanced degrees and pursue research with universities and industry and for those who wish to be technicians and industry science representatives. Pictured here, animal scientists examine a cross-sectional magnetic resonance image (MRI) from the abdominal area of a pig. MRI technology is one of many tools used in modern animal research. (Photographer Scott Bauer, Courtesy USDA-Agricultural Research Service.)

**Figure 26-3**

The area of biomedical research needs qualified researchers and technicians. (Photographer Scott Bauer, Courtesy USDA-Agricultural Research Service.)



The work of animal and food scientists helps to improve agricultural productivity and efficiency by increasing quantity and quality of products, reducing labor, controlling diseases and parasites, protecting natural resources, and converting raw products into safe, convenient, appealing, and healthy food products for consumers. Those in the science area use biology, chemistry, physics, mathematics, and other sciences to meet challenges in animal science, with foods, and in the companion animal market. Obviously, curricula designed to prepare students in these areas are laden with chemistry, physics, biology, microbiology, biochemistry, and more. Animal and food scientists work in basic or applied research and development, administer research and development programs, manage marketing or production operations in companies, and serve as consultants to businesses, producers, and government agencies. Opportunities exist in each of the species groups (dairy, beef, companion animal, and so on), and in discipline groups (nutrition, reproduction, food microbiology, production, and so on), and in the full array of opportunities from conception to consumption.

One very popular career opportunity that animal science can lead to is that of a veterinarian. The majority of veterinarians are in private practices where they pursue the clinical work necessary for the prevention, diagnosis, and treatment of disease disorders, and injuries in animals. About half of these veterinarians are predominant or exclusively small-animal practitioners. Most of the remaining veterinarians are in mixed-animal practices or exclusive large-animal practices. Other veterinarians care for zoo or aquarium animals, or for laboratory animals. Additional careers for veterinarians include clinical researchers on human and animal diseases, drug therapy, antibiotics, or new surgical techniques. The U.S. government employs veterinarians as livestock inspectors, and as meat, poultry, or egg product inspectors. In addition to the inspection service, U.S. government positions include disease-control workers, epidemiologists, and commissioned officers in the U.S. Public Health Service, U.S. Army, or U.S. Air Force (Figure 26-4). Some veterinarians choose to specialize beyond the DVM degree and may do so by completing internships, residencies, and sitting for board certification examinations. Specialties include a focus on specific types of animals; specialization in a clinical area, such as pathology, surgery, radiology, laboratory animal medicine; and board certification in internal medicine, oncology, radiology, surgery, dermatology, anesthesiology, neurology, cardiology, ophthalmology, or exotic small-animal medicine.

**Figure 26-4**

A USDA-ARS veterinarian prepares to inject a cow with an experimental vaccine. (Photographer Keith Weller, Courtesy USDA-Agricultural Research Service.)

Foods

The food industry represents one of the most significant areas of current and potential employment in animal science and all of agriculture. Food scientists and technologists have a variety of career opportunities in the food-processing industry, with universities, and in state and federal government (Figure 26-5). For those trained in the science and/or the business of food production, career track options are available in all areas, including food safety, new product development, market testing, nutrition, processing, packaging, distribution, quality assurance, plant management, technical service, sales, and regulation compliance, and as agricultural commodity graders, consumer safety inspectors and officers, environmental health inspectors, food inspectors, and consumer educators. Career tracks are plentiful for those with BS degrees as well as advanced degrees (Figure 26-6). Concerns over food safety and changing demographics relating to how we eat will keep demand high for this area. The high starting salaries for food science graduates have begun to pull more and more students into the area, but a shortage of graduates is still projected.

Universities and colleges vary somewhat in the departments in which foods curricula are found. In some institutions, they are housed in animal science departments. In others, they may be found in separate food departments or as cross-disciplinary

**Figure 26-5**

The food industry represents one of the most significant areas of current and potential employment in all of agriculture. (Photo courtesy of U.S. Department of Agriculture.)

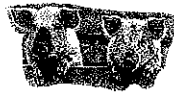
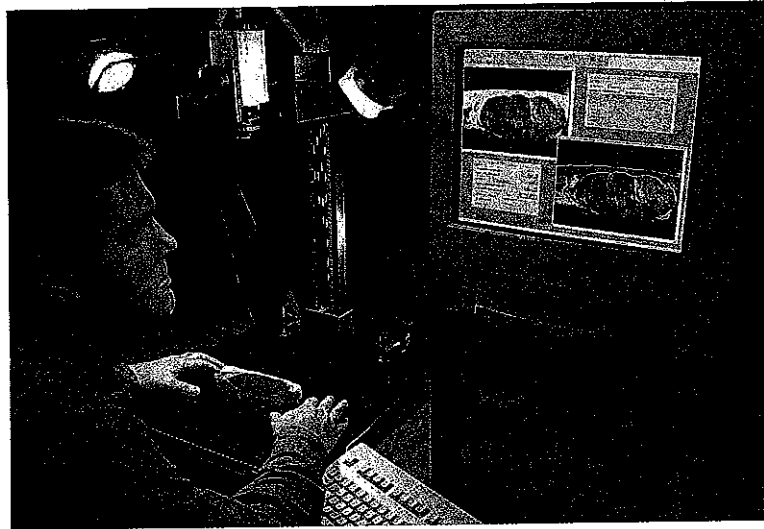


Figure 26-6

Because of the science and engineering know-how needed to produce a safe, convenient, and economical food supply, career tracks for those with advanced degrees are plentiful in the foods industry. In this photo, a food technologist is using computer images of steak samples to predict beef carcass composition.

(Photographer Keith Weller. Courtesy of USDA-Agricultural Research Service.)



studies. Food technology centers have been built at several universities, acknowledging both the importance and the complexity of the foods area. Mechanization, microbiology, product development, personnel management, and many other areas are appropriate areas of study for food science students. In addition to meat and milk products, there is also a wide variety of opportunities in the foods area that deal with plant-based products and careers that deal with both.

Agribusiness

Agribusiness The segment of agriculture that deals in sales and service to production agriculturists and consumers.

Agribusiness careers have proliferated over the last two decades as all of agriculture has taken the structure of the big business it is. As production consolidated, international trade expanded, and the products of the agricultural industries proliferated, the need for managers, financial specialists, marketing specialists, and people with general business knowledge has opened a wide variety of opportunities for animal science students. These careers require a knowledge of the animal industries, but they also require business acumen, skilled communication, and people skills. Animal science curricula have been designed to incorporate a wide variety of business, human and resource management, marketing, computer, communications, accounting, and financial management courses. In many places, an agricultural economics, marketing, or management minor has been incorporated into the animal science major. Graduates of such programs have traditionally taken promotion, livestock marketing, and industry positions. In addition, they are now accepting positions and excelling as brokers, purveyors, pharmaceutical salespeople, market analysts, advertising consultants, technical service representatives, computer software developers, appraisers, bankers, business managers, service managers, sales representatives, and fair/exposition managers. In retail, there are opportunities in advertising and public relations, and with livestock organizations, cooperative marketing and service organizations, and trade journals. This area represents an opportunity for many more graduates because colleges and universities are chronically short of qualified graduates for these positions, with little prospect of catching up anytime soon. These are intensely people-related jobs and, for many people, they offer the best of both worlds for career opportunities.

Communication and Education

A combination of strong communication skills and technical knowledge in animal science, foods, or other agricultural disciplines prepares students for careers as

**Figure 26-7**

The animal industries offer many opportunities, among them the opportunity to work with both animals and young people in vo-ag and 4-H programs. (Photo courtesy of Dr. Rebecca L. Damron. Used with permission.)

communication and education specialists. Opportunities for computer information specialists, advertising representatives, public relations specialists, secondary school agriculture and business teachers, and internal communications specialists are expected to be plentiful. Other opportunities will be available as writers, editors, newscasters, and extension agents. Computer skills, especially those necessary to provide education, goods, and services via the Internet will be in demand.

Many colleges and universities have recognized that traditional programs have not kept up with the needs of people who will fill these roles in life. As a result, a variety of cross-disciplinary and double major programs have been developed to assist people in acquiring the skills necessary to compete in this job market. It is common now to find animal science–agricultural communications double majors and animal science–agricultural education double majors at many universities (Figure 26-7).

Animal Caretakers

Universities, commercial laboratories, pharmaceutical companies, animal hospitals and clinics, kennels, animal shelters, stables, and zoos and aquariums employ animal caretakers (Figure 26-8). Responsibilities, job titles, and long-term opportunities vary tremendously. Many of these jobs require no formal training but rely on on-the-job training. However, advancement can depend on both experience and/or formal

**Figure 26-8**

The opportunity to work with zoo and exotic animals is a goal of many students. This animal caretaker raised the bison pictured from a 1-day old calf for use in research to develop a brucellosis vaccine for bison. (Photographer Keith Weller, Courtesy USDA-Agricultural Research Service.)



training. Research labs and zoos, especially those involved in conservation of endangered species, often require caretakers to have a bachelor's degree. Because competition for higher-level positions in zoos is so keen, the only entry level into this career track is often as a caretaker. Advancement can be painfully slow because positions are limited and few openings occur for the better positions. Those who aspire to curatorial positions would be advised to receive a postbaccalaureate degree. With experience and formal training, caretakers in animal shelters may become shelter directors. Laboratory animal caretakers can become animal research facility managers and research assistants. Many veterinarians employ caretakers to assist in caring for the animal in their charge. Veterinary technician programs can be found at approximately 65 accredited veterinary technology programs around the country. Laboratory animal caretakers work in research facilities with scientists, physicians, veterinarians, and laboratory technicians and assist in conducting vital research work. On the whole, this area is not full of opportunities for the college graduate, but opportunities do exist.

International Opportunities

As the world has become increasingly open and accessible to trade, cultural exchange, and humanitarian intervention, more and more opportunities are created for those who wish to work in the international arena. Federal government programs in the Peace Corps, Vista, and the foreign Agricultural Service of the USDA (USAID) offer both long- and short-term opportunities. The Food and Agricultural Organization, World Health Organization, and World Bank also offer opportunities. Domestic and multinational firms offer the full range of business and trade positions. With the future economic growth of the food and agricultural sector largely dependent on being competitive in the international arena, the individual with language training in addition to basic discipline education will be increasingly able to command premium salaries and have access to the best opportunities. A wealth of international exchanges, study tours, and study abroad opportunities are available at colleges and universities around the United States. These are valuable experiences, whether you wish to make a long-term commitment to international work or not. Even for those who do not wish to live outside the United States, ample and ever-increasing opportunities exist for involvement in the international arena and many offer fast-track advancement opportunities within a company.

TRENDS AFFECTING EMPLOYMENT*

The following major trends are expected to influence employment in food, agricultural, and natural resources.

Consumer demands. Consumers are increasingly demanding more specific products and services. Much of what they demand is associated with particular lifestyle choices. Those choices are in turn being affected by such demographic factors as domestic and world population growth, changing ethnicity of the U.S. population, the graying of America (over 80 million baby boomers started retiring on January 1, 2008), and strong consumer preferences influenced by social beliefs and health concerns. As these factors affect consumption, they will also require specific expertise in production, marketing, and distribution to meet consumer demands.

Changing industry structures. Major factors influencing the direction of change in the business structure include globalization and consolidation. The U.S. food system is big business with well-developed business structures in place to produce, collect, process, and distribute its products. However, the system constantly changes as it works to meet consumer demands, market opportunities/shifts.

*The material in this section was based in part on Goecker et al., 2005, p. 12.



challenges in energy availability and cost, and the needs of food distribution and supply chains that literally extend around the globe. To meet the demands of the changing workplace, graduates must have an excellent base set of skills in business, leadership, and international understanding and be willing to use those skills creatively to bring about innovation and productive structural evolution in the agribusiness sector.

Science and technology. The current rate of advancement in science and technology is having profound effects on employment. Science and its technological applications are joined inexorably to the solutions for biosecurity, population growth, health issues, depleting natural resources, and climate change. New and powerful biotechnologies and nanotechnologies are being developed. This creates the need for both graduates with basic science skills to create the new tools of science and technology and those with the ability to use the creations and innovations in practical and useful ways.

Public policy. We are in an unprecedented era of public policy regarding the food we eat and the system that provides it, especially regarding energy, food safety, diet and health, and environmental protection. Consumers are demanding and governments are providing policy. This is creating increasing demand for graduates to manage/oversee regulatory programs and provide public services to all sectors of the food and natural resources system in education, natural resource management, food assistance, and recreation.

Global changes. The world is a rapidly changing place. Markets are shifting, incomes are rising in much of the world, and food is in greater demand (volume and quality) due to increased populations and increased income levels. A look at the statistics for the increased exports of agricultural products from the United States to points around the globe offers a window into the changing world marketplace. For example, in 2010, the United States exported over 6.7 million MT beef, pork, and poultry, valued at over \$13 billion.

A JOB, A CAREER, A LIFETIME: WHAT ARE YOU DECIDING WHEN YOU CHOOSE A CAREER AND A MAJOR?

Certainly one of the most important and difficult decisions we ever make in life is our choice of a career. There are usually competing motives at work trying to sway our choice, making it a difficult decision. There may be pressures from family or community. We usually have certain expectations for ourselves in terms of the amount of money we want to make or the perceived prestige associated with certain careers. We may have strong preferences about the working conditions we prefer or the part of the country where we want to live. Unless one has been very fortunate and been able to travel and have a variety of life experiences, we often find ourselves making this very important decision from a position of inexperience. It seems that the most important choices in life are left to rank amateurs! All of this can be very confusing and disconcerting, leaving us in a position of indecision.

This is one of those life decisions that calls for a plan. Having said that, the author is stepping out of the third person and offering some advice. Here is how I think this decision should be approached.

First of all, choose an occupation you can enjoy. Ample evidence exists that one must be happy in an occupation to truly excel at it. Doing something just for the money gets old after awhile because money is an external motivator. To continue doing something for a lifetime and not get burned out on it, we have to gain



satisfaction from what we do. That provides internal motivation—the only kind that lasts. Consider that we spend from two thirds to three fourths of the most alert and productive hours of our lives in the workplace. It seems a shame to spend so much of life's quality time on something we're doing just for the money. Today's agriculture offers a wealth of opportunity and choice. Everyone can find challenging, enjoyable, and productive life's work. Even if the area that most interests you seems to have an oversupply of interested and qualified graduates, opportunities are available. The question becomes simply, "How good do I have to be in order to be placeable?" Also, demand varies from region to region. An area that has too many graduates on a national basis may have too few in specific geographic areas. Do your homework! Don't dismiss a potentially rewarding career just because finding employment might be challenging in general terms. You are an individual, not a statistic!

Once you've settled on an area of interest, a specific career, or even a career cluster, there is still work to do to ensure that your decision is a good one. Perhaps the most important part of the process is to adopt the attitude that this is a tentative choice. Even though we probably feel more secure with a firm decision, this is not the time to limit your options. Use all of the resources at your disposal to seek additional information about the career and its opportunities. Explore other options. As a safety net, develop a Plan B that includes other career areas that also interest you. Seek summer, part-time, and/or internship positions in your career area. Reevaluate your choice periodically. Plan your course of study so it supports your career choice and take your courses in the sequence that best supports preparation for the chosen career. Above all, be realistic and keep your perspective. If, for instance, you find that you just don't like physical, biological, and chemical science courses, then perhaps veterinary medicine isn't a good choice after all, and you need to explore some other career and focus of studies. Always be ready to consider a different path.

Don't neglect the areas that transcend a specific focus of study. Employers may be attracted to certain people because of their knowledge in specific areas. However, they never lose sight of the fact that they are hiring a person, not a degree plan. The classes a student takes in college are certainly important, but they are only part of an education. It is equally important to develop the talents of leadership and problem-solving. All walks of life are well served by the ability to communicate and the knowledge of how to work with people. Developing a personal philosophy and a work ethic are also important. Join and participate in clubs and organizations. Participating in extracurricular activities gives us a laboratory to learn how to deal with people. In developing people skills, there is no substitute for practice!

It also helps to be aware that an education is more than job training. Although it is certainly true that an education should provide the basis for securing a position and earning a living, it should also provide a broad enough base to allow a person to grow both professionally and personally. An education should also add quality to life in ways not associated with a career. It should further challenge the student in ways that help to develop basic life skills that transcend any given occupation. An education should also be broad enough in design to allow a given individual to be adaptable and flexible throughout life. This enables us to take advantage of career and life decisions that offer the most of what we want from life. We should also develop an appreciation that one of the most important lessons of a formal education is that an education never ends. A formal education is no more than the basis for continued learning throughout life. The world is changing rapidly. We must be willing to learn and change with it.



And now for a little role clarification. Education works best if students make best use of the resources available to them. Some of your best resources can be found in your professors and advisers. As professionals in the field of education, it is our charge to help facilitate your learning process and your transition into the work world. As advisers and faculty members, we can tell you what is important. However, we can't make you do any of it. We can tell you that good course choice is important, but we cannot make you learn the material in those courses. We can tell you that practical experience is important, but we can't force you to take summer, part-time, or internship positions. We can tell you the value of good communication skills, but we cannot compel you to place yourself in positions where you have to function in front of a group or sharpen your writing skills. We can tell you the value of a good work ethic and good work skills. We can tell you that being on time, being honest, and caring about what you do are important qualities to have in this world, but we cannot make you do or be anything you don't choose. All of these things must come from within. All we can do is hope that you will take advantage of all opportunities to prepare for a productive and enjoyable career in some area that interests you and for which you have an aptitude. Your success depends on you. This is an area of life in which we must all accept responsibility.

SUMMARY AND CONCLUSION

Career opportunities are available in agriculture and its component parts. It is common consensus that a workforce that is too small has been an impediment to agriculture since the 1990s. Projections of future opportunities hold the promise of continued opportunities. In animal sciences, students may choose a production,

science and medicine, or foods or agribusiness orientation. Further education will be required for some careers. Ultimately, a career is a personal choice filled with personal and professional responsibility. All students can prepare for useful, satisfying careers by working closely with professors and advisers at their school.

STUDY QUESTIONS

1. What is the current, overall job outlook for agricultural graduates?
2. What is the projected yearly ratio of graduates to jobs?
3. The projected employment figures provided show a decrease in the numbers of farmers and ranchers that will be needed. However, the number of jobs is still quite high in this category. How do the absolute numbers of farmers and ranchers rank compared to all others careers listed in Table 26-2?
4. In a brief paragraph, present a rationale for having an educational path that leads to a specific career.
5. Even though many production specialists will still be needed in the future, there is a downward trend in the total number that will be needed. Why?
6. Describe the variety of opportunities open to those who have an interest in science and medicine.
7. Food science careers have proliferated in the last few years and are expected to continue doing so. Look around you at the way people eat and think of the food-related news items you've seen in the past few months. Based on these observations, speculate as to why foods careers are so available and variable.
8. Compare the support courses in an agribusiness curriculum with those in a science curriculum.
9. The opportunities for those with BS degrees in the general area of animal caretaking is limited. What might cause those prospects to improve?
10. For those who wish to have an international career, what are the most important skills to learn and experiences to have?
11. In the last section of this chapter, the author presented a personal view of the career decision-making and educational process. However, you should recognize that you have the right to disagree with any or all of it. After all, advice is just that. After reading that section, develop a brief "point-counterpoint" essay in response to the section as a means of comparing your own thoughts to those presented.



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