

Lesson 1: The Importance of Animals

Animals have always played an important role to humans. Early man used animals for food, clothing, tools, and transportation. Modern society continues to use animals for food, clothing, medicines, services, and many other valuable products.

The Importance of Animals

Animals are an important part of American agriculture. They provide food, clothing, services, and a variety of products. Early man hunted animals to provide food and clothing essential to survival. Over time, animals were domesticated. Domestication is taking animals from nature and raising them in a controlled environment. Some animals were tamed and raised to adapt to human control.

The domestication of animals allowed humans to make improvements that have led to an advanced civilization. Planned production of animals increased the production of food and other products contributing to the growth of world economy.

Types of Animals in Agriculture

Primary animals in production agriculture include livestock and fish. They supply a variety of goods, services, and products. Major categories of livestock include beef cattle, dairy cattle, sheep, swine, poultry, and horses. Some producers raise companion animals. Companion animals, also called pets, provide humans with fun, friendship, and sometimes provide services. Dogs, for example, are often used to round up sheep and cattle on farms and ranches. Other alternative markets include beekeeping, ostriches, bison, fish bait production, and laboratory animal production.

Beef Cattle

Beef cattle are valued for their ability to convert grasses and hay into a high-quality source of protein for human consumption. They require minimum management. Mature female beef animals that have given birth are called cows. Young females that have not yet given birth are called heifers. Male beef animals are called bulls. Males that have been castrated, which means

having their testicles removed, are called steers. Castration is done at a young age and makes steers fast growers and efficient producers of meat. A group of cattle is referred to as a herd.

Dairy Cattle

Dairy cattle are valued for their ability to produce milk. This milk provides people with drinking milk, cheeses, and other milk products such as cream. Dairy cattle must be managed carefully to maintain a healthy status while producing large volumes of milk. Their nutrition, reproduction, and milking schedules are kept under careful supervision. The terms for dairy animals are the same as for beef cattle.

Sheep

Sheep is another animal that is valued for its ability to convert low-quality grasses into a product that becomes a source of meat and wool for humans. The meat produced by sheep is referred to as lamb or mutton. A sheep's coat, or wool, can be considered as fine, medium, or coarse. Different types of wool have different uses in industry. A mature female sheep is referred to as a ewe. A mature male sheep that is used for breeding is referred to as a ram. A male sheep that has been castrated and used for meat purposes is referred to as a wether. Male or female sheep that are less than 1 year old are called lambs. A group of sheep is referred to as a flock.

Swine

Swine are also commonly referred to as hogs or pigs and are valued as a source of pork and pork products. A mature male swine used for breeding is called a boar. A mature female swine is called a sow. Male swine that have been castrated for meat purposes are referred to as barrows. Young female swine that have not yet produced a litter of pigs are called gilts.

Poultry

Poultry are a group of birds raised for use as food and other products. The most common types of poultry used for food are chickens and turkeys. On average, each American citizen consumes 78 pounds of poultry per year. Both chickens and turkeys are valued for their low cost of production

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and their ability to convert feed into a high-quality, low-fat protein source. Chickens are also important for egg production. Sexually mature female chickens that have started to lay eggs are called hens. Pullets are young females that are not of breeding age. The mature male chicken is called a rooster. Male chickens that are less than 1 year old are called cockerels. A group of chickens is called a flock. A mature male turkey is called a tom. Young male turkeys are called tom poults. As with chickens, a mature female turkey is called a hen, and a young female turkey is called a hen poult. A group of turkeys is referred to as a flock.

Horses

Horses, although not a food source, are important to American agriculture. Horses are important companion and recreation animals. They provide recreation such as horseback riding, trail riding, and rodeo and racing events, which are important hobbies for Americans. The mature female horse is called a mare, and the immature female is a filly. The mature male horse used for breeding is a stallion. A castrated male horse is a gelding. Horses associate in groups called herds.

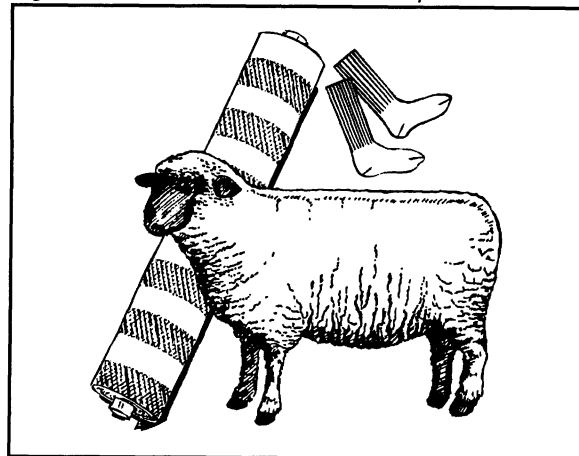
Fish

Aquaculture, the science of raising fish, has become a growing business in animal agriculture. Fish farms raise a variety of fish, such as trout, tilapia, and catfish.

Services and Products

Animals provide a major source of food for both humans and other animals. For example, people eat beef from cattle, mutton from sheep, pork from swine, milk and cheeses from dairy, and eggs from poultry. Animal coats and hides, such as leather in cattle and wool in sheep, are sources of clothing (see Figure 1.1). The by-products from processing animals for food are used in other consumer products. For example, inedible fats from animals are used in the production of cosmetics, waxes, and soaps. Bones, horns, and hooves are used in the production of glue, piano keys, buttons, and wallpaper. Hair from animal hides is used to make brushes, rugs, and insulation.

Figure 1.1 - Wool Products from Sheep



Animals are also important in scientific research. Many medicines used in human health can be traced to animal sources. Insulin, for example, is produced from cattle and swine.

Animals provide companionship to people. Dogs, cats, fish, horses, and a variety of exotic and native pets are valuable to Americans and to the economy.

Animals provide specialized services as well. Dogs provide assistance to persons with disabilities, serving as seeing-eye dogs for the visually impaired. Law enforcement uses dogs to find drugs, weapons, and missing people.

Summary

Animals provide many vital products and services for humans. Farm livestock are a major industry in the United States, providing food, clothing, medicine, and services. Pets provide humans with companionship and specialized services.

Lesson 2: Responsibilities of Animal Ownership

Owning and caring for animals are rewarding experiences. However, the care of living things brings about some great financial and physical responsibilities. Owners should be concerned with the welfare of their animals and abide by animal control regulations to ensure the health and safety of their animals, themselves, and other animals as well.

Responsibilities

The first responsibility of owning an animal is to ensure that it is fed and watered properly. Each animal is different in the type and amount of food that it requires.

Animal owners need to provide the proper health care. A veterinarian can inform the owner of all aspects of animal care. The veterinarian can also provide vital information on the yearly costs associated with checkups and vaccinations.

Animals must be provided proper shelter to house them from the environment and weather conditions. Each animal differs in the type of shelter necessary for its survival. It is important to consider the space requirements for each animal. Overcrowding animals can cause disease and distress for the animals.

The costs associated with food, health maintenance, and general welfare of the animal should be considered before purchasing any animal. Owners who do not properly research the purchase costs and ongoing maintenance costs associated with animal ownership often end up with animals they cannot afford.

Animal Welfare

The term animal welfare has different meanings to different groups of people. The definition most accepted is providing care for the well-being of an animal.

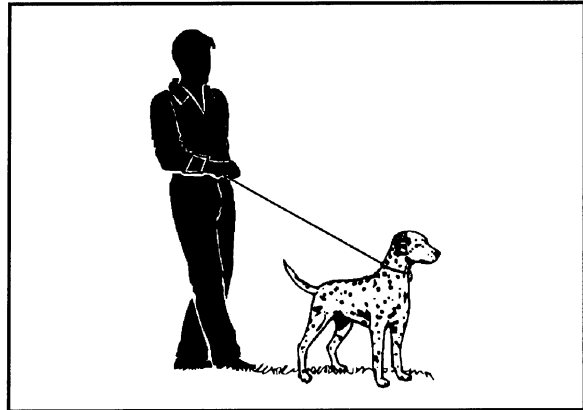
To producers of food, it means providing humane care for animals. Animal ownership brings with it the responsibility to provide appropriate care to ensure the well-being of the animal. Mismanagement or improper care and treatment would mean endangering the animal or the entire production operation because of disease or loss of income. Producers and ranchers spend many hours providing for the needs of their animals to prevent sickness, injury, or disease.

Animal rights supporters believe animals should not be used as resources by humans, whatever the benefits of their use. This would mean the elimination of all methods of animal production for food or research.

Animal Control Regulations

Animal control regulations are designed to protect people from animals. Animals do not possess the reasoning ability required to keep themselves, other animals, or humans from danger. Fencing, caging, and leash regulations protect people and other animals from harm or property damage (see Figure 2.1). For instance, animals that are allowed to roam freely can be hit on the road, harm other animals, or endanger people.

Figure 2.1 - Leash Laws



Health regulations protect against the spread of diseases that can kill other animals or humans. For example, rabies is a disease that is highly infectious to humans and other animals. A person or animal that contracts rabies risks death and poses a threat to society. Some states have laws to prevent diseased animals from entering their area. Animals crossing state lines must have the proper papers signifying they are healthy, disease free, and up-to-date with vaccinations and health checks.

Local laws also require animals to be tagged with proper identification. This provides proof of animal ownership. Animal breed associations require specific registration papers and proof of ownership. Such guidelines provide documentation of the animal's history.

Many areas have animal abuse ordinances to prevent cruel treatment of animals. Owners who have been proven to abuse animals can be fined or serve jail time.

Some communities possess laws that control the type, number, and caging requirements for animals. For example, livestock cannot be raised

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within city limits. Local laws also serve to reduce noise and disruption created by animals in populated areas.

States outline regulations to control the fishing and hunting of wildlife species. Hunting helps to reduce overpopulated species that could be a nuisance and a danger to humans. Hunting and fishing regulations control the type and amount of animals hunted to prevent overkilling certain species.

Summary

Animal ownership is a responsibility to be taken very seriously. Owners of animals should provide proper food, shelter, and medical care to ensure the welfare of animals under their care. Animal control laws and regulations should be followed to protect humans and animals.

Lesson 3: Selecting an Animal

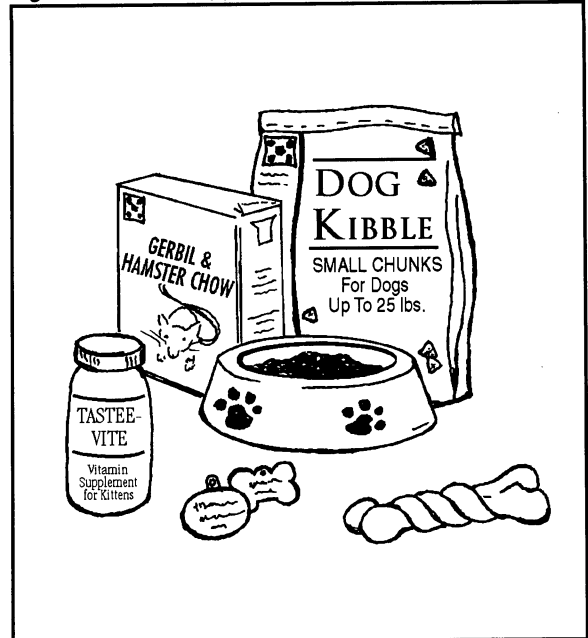
Determining whether to own livestock, fish, or companion animals is an important decision that involves a great deal of responsibility. Potential animal owners should carefully evaluate the resources and costs involved with each type of animal and select the animal that best fits their needs or lifestyle.

Facilities and Resources

Animals must be provided with some key resources to ensure their well-being. Food and a water supply must be made available. This could be in the form of pasture for grazing, a farm pond for drinking, self-feeding and watering systems, or manual feeding. Animals must have appropriate shelter to protect them from the weather. Farm livestock need barns, sheds, or shelter of some type to protect them from extreme weather conditions. Fish require water, a pond, and proper nutrition. Pets may be kept indoors or out and some may require cages. All facilities need to be cleaned to some degree to reduce chances of disease and to reduce odors. Companion animals may need bathing and grooming supplies and exercise equipment such as a leash or an exercise wheel for a pet kept in a cage. Medical equipment and supplies are also a necessary resource for raising animals. All of these items require costs that must be considered when

determining needed resources. Costs are involved to purchase the animal, equipment, and supplies to effectively maintain a healthy animal.

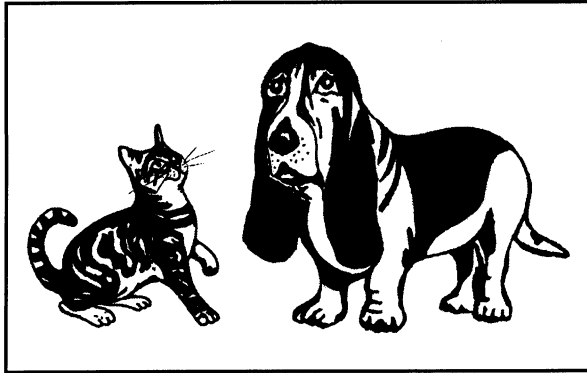
Figure 3.1 - Pet Supplies



Selecting a Pet

When selecting a pet, potential owners must consider the purpose of the pet. Some owners prefer purebreds that may be used for breeding or show purposes. Some people enjoy affectionate pets that interact well with humans. The cost of the pet is another consideration. Some purebred or exotic animals are very expensive whereas other animals can be purchased at a minimal cost or obtained for free. Some pets may require more maintenance or upkeep costs, such as food, equipment, and facilities than other pets. Fish, for example, require lower maintenance and food costs than a large dog. The amount of space a pet requires is also a consideration. Some pets require minimum space whereas others may need special cages where lighting and temperature are strictly controlled. Persons living in a small apartment may not want a very large dog as a pet, or the apartment may restrict them from having pets. Finally, the amount of time required to take care of the pet is a consideration. Some pets may require exercise or their cage may need routine cleaning.

Figure 3.2 - Popular Pets



Sources of Pets

One important source of pets is the local animal shelter or animal welfare institution. Their original owners have abandoned these animals or the owners have found they can no longer care for the animal. The cost of obtaining an animal from a shelter will vary.

Owners looking for a specific breed of pet or a purebred animal may have to contact animal seedstock producers. Animal seedstock producers normally advertise in magazines, newspapers, or on the Internet. Owners will usually pay more for a purebred animal but may feel more confident they are purchasing a higher-quality animal. Purebred pets are registered and their breed history is recorded.

Newspaper advertising is also a source of available pets. If a potential owner relies on newspaper advertising to locate a particular pet, availability may vary and the individual may have to search to find the right pet.

Pet stores provide a valuable source for a wide variety of pets. A pet store is a fast, convenient place to find exotic, purebred, or mixed breed pets. They can provide information on the care and maintenance of the pet. The pet food, equipment, and supplies can all be purchased at a pet store.

Selecting Livestock or Fish

The selection of a livestock species or fish will reflect the owner's goals, available money to purchase and maintain the animal, available resources required to house and raise the animal, and time commitment. Market prices can affect

the ability of the producer to make a profit and thus affect the decision to own the animals.

Another selection factor is the intended purpose of the animal. The animal's purpose can be for producing food, for breeding purposes, or for showing at livestock exhibitions. Purebred livestock may require more costs and care than other livestock.

Livestock require a large amount of money for the initial start-up costs and for ongoing maintenance. Space requirements for each species will vary. Cattle and horses require more space and larger equipment than sheep. Equipment needs are similar to space considerations when choosing a species of livestock. Smaller species often require less equipment than larger species.

And finally, the time commitment to care for the animals must be a consideration. Some species, such as dairy cattle, will require daily attention, whereas beef cattle require relatively less attention.

Sources of Livestock or Fish

Livestock can be purchased in a variety of settings. Seedstock producers advertise in magazines, newspapers, or on the Internet. A seedstock producer specializes in the specific breed or a number of breeds that they raise and can normally ensure high-quality animals to the potential buyer. Animals from individual breeders may be usually costlier than from other sources such as sale barns. Fish can be obtained as fingerlings from fish hatcheries.

Livestock sale barns are places where livestock owners of any type bring animals to be sold. The advantage to this type of situation is that the animals are sold at auction. Thus, the buyer can usually find animals at cheaper prices. However, when unknown sources are involved, often the age, health, breed, and general quality of the animal are hard to predict.

Important sources of livestock are independent livestock producers. They may advertise in newspapers, on the Internet, or in livestock magazines. Independent producers can be smaller operations that serve as important sources of livestock in their own communities.

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Additional sources of livestock include hatcheries, coops, and alliances.

Summary

Individuals who are selecting pets or livestock for ownership should carefully evaluate their personal goals for the animal. They should select an animal that meets their financial needs and personal resources. They must be able to provide for the welfare of the pet or livestock species. Important factors such as time, money, space, and equipment should all be considered when selecting a species of livestock or pet to raise.

Lesson 4: Current and Emerging Technologies

Animal agriculture is an evolving science that has expanded and advanced with the use of technology. Technological advances in alternative reproduction and self-management systems have allowed for the expansion and improvement of present-day animal agriculture.

Natural Mating

Advanced reproduction techniques have improved the genetics of many livestock species. However, natural mating procedures remain a viable choice for many livestock producers. Natural mating involves allowing a male and female to breed by copulation. The female undergoes a monthly cycle in her natural reproductive phase, called estrus, or heat. During estrus, the female will allow herself to be bred by the male. Thus, the only time a female may become impregnated is during estrus, and this is the time that natural mating can occur.

Natural mating is a low-management, often cost-effective alternative for many producers. In most cases, animals do not have to be monitored closely because it is a natural process. In addition, natural mating situations do not require special facilities, equipment, or trained technicians.

Alternative Reproductive Practices

Alternative reproductive practices allow producers to select and breed for superior traits and to make

faster progress toward improvement. These practices are also making advancements that are improving the quality of life for animals and humans.

Artificial insemination (AI) refers to the process of placing sperm in the reproductive tract of females by using means other than natural mating. Artificial insemination has the advantage of allowing the producer to select superior males with which to breed the females. This procedure can be planned according to gestation so that the young can be born at opportune times of the season. Synchronization is essential for optimum breeding.

Cloning involves reproducing a fertilized egg to create an organism with the exact genetic makeup as the original organism. Researchers have experimented with cloning to make exact reproductions of superior genes. In addition, clones may be produced to provide organ replacements or to produce valuable medicines for other species.

Embryo transfer is the process of flushing the embryos from the reproductive tracts of superior, donor females and implanting them in other females of lower quality. Embryo transfer creates a greater number of superior offspring in a much shorter period of time. A female that could normally produce one offspring per year would be capable of producing several that were transplanted to many different females.

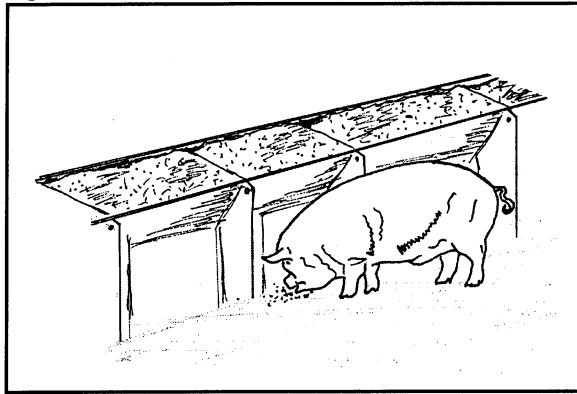
Genetic engineering is the alteration of animals by human intervention. It involves finding and selecting desirable genes in an animal and producing an organism with those genes. For example, scientists can select the size, sex, and desirable genetic characteristics of an animal by selecting or altering certain genes. Scientists have also experimented with genes that produce valuable medicines and vaccines for animals and people. Disease-resistant animals can be created by genetic engineering. Genetic engineering, along with cloning, has faced many moral, ethical, and environmental challenges.

Systems Management Technology

Technology has made raising animals a precise science where animal needs can be monitored by computers and where management decisions can

be made by computer readings. Automated systems of feeding, watering, waste disposal, milking, and even gate release have reduced the amount of manual labor involved in animal care. Technological advances have paved the way for large production units where a smaller number of people are capable of managing several thousand head of animals. As a result, smaller, one-family operations are being replaced by large corporations.

Figure 4.1 - Automated Feeding System



Modern technology has advanced many animal facilities by having a totally controlled environment. Self-feeders and waterers set on timing devices have been developed to reduce

the hours spent feeding and watering animals. These machines also cut down on wasted food because it can be precisely measured and provided at precise intervals. Present-day facilities have been designed to be self-cleaning. Such facilities include pits for waste removal or specially designed flooring that drops at intervals to remove animal waste. Technology has allowed animal management systems to greatly reduce the manual labor involved in raising animals.

Summary

Technological advances in animal production and breeding have allowed agriculture to evolve into a precision business focused on creating superior products for the consumer. Advancements will continue to decrease manual labor as well as produce genetically superior animals resistant to disease with maximum production capabilities.

Credits

Baker, M. and R. Mikesell, *Animal Science: Biology and Technology*. Danville, IL: Interstate Publishers, Inc., 1996.

Herren, R. *The Science of Animal Agriculture*, Albany, NY: Delmar Publishers, 1994.

