DETERMINING EDUCATIONAL NEEDS AND BEST METHODS OF DELIVERY FOR
CONFINED ANIMAL FEEDING OPERATIONS

A Thesis in
Youth and Family Education

by
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Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Education

August 2008
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ABSTRACT

Agriculture is one of the most complex and hazardous industries within the United States, annually ranking within the top two for fatal injuries among workers (NIOSH, 2007). Confined Animal Feeding Operations, commonly known as CAFO’s, are complex and hazardous as well. Insurance companies are interested in finding the best way to educate their CAFO clients to take preventative steps in lowering loss on farms. This study worked with a single insurance company in Pennsylvania. The goal of the study was to examine six problematic areas among their CAFO clients. These topics included Manure and Odor Management, Bio-Security, the Pennsylvania Right to Farm Law, Animal Rights Activism, Construction Issues, and Worker Safety. The first objective was to examine which of the six common problem areas CAFO’s required the most attention and increased awareness. The second objective was to identify which of the six common problem areas clients wanted further information and assistance. The third objective was to identify the most preferred methods of delivery for information.

Both qualitative and quantitative methods of research were used to examine the three objectives listed above. A quantitative knowledge assessment survey was sent out to 116 CAFO owners and operators. Thirty-three surveys were completed and returned. Of those 33 respondents, 15 were successfully contacted and interviewed about their experiences owning and operating a CAFO, any loss or problems within the six common areas they experienced on their farm, and the preventative measures that they had taken to prevent a reoccurrence.

Analyses have shown that Worker Safety and Construction Issues were the two topics most in need of education by the participants. Participants in the study scored the lowest on those sections during the knowledge assessment survey. Manure and Odor Management and Animal
Rights Activism were the two topics participants were most interested in receiving information on. Manure and Odor Management and Animal Rights Activism were also the two topics that participants had the highest score on during the knowledge assessment. Finally, an overwhelming majority of interviewee’s stated that they preferred a less intrusive form of informational delivery such as the mail, as opposed to a personal visit from educators.
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ACKNOWLEDGEMENTS

This project would not have been made possible without the help and support of many people.

To Dr. Nicole Webster- Thank you for understanding my goals, both in and outside of graduate school, and helping me to accomplish them. I will carry your words of wisdom and advice with me for years to come.

To Dr. Dennis Murphy- Thank you for taking a chance on me four years ago and granting me the opportunity to develop my interests in agricultural safety and health. I can never thank you enough for your help and guidance along the way. Thank you for helping me to reach goals I never thought possible.

To Dr. Radhakrishna and Dr. Kephart- Thank you for taking time out of your hectic schedules to give me your input, advice, and expertise that allowed me to grow both professionally and personally. I appreciate your support during this effort.

Finally, to my friends and family I would like to express my deepest gratitude. Thank you for your thoughts and prayers over the last two years, which made this dream possible. I am truly blessed to have the support system that I do, who taught me at a young age, “For nothing will be impossible with God” Luke 1:37.
Chapter 1

INTRODUCTION

Agriculture is one of the most hazardous and complex industries in the United States. According to the Traumatic Injury Surveillance of Farmers (TISF) survey, it annually ranks within the top two most frequent fatal industries among workers (NIOSH, 2007). Farming is a unique occupation in that the workplace and home are often one and the same, creating great risks to the family members who frequent the work area. In addition to the general hazards in agricultural operations, Confined Animal Feeding Operations (CAFO’s) have added complexity due to further regulations placed upon them due to their great size. CAFO refers to a farm where large quantities of livestock or poultry are housed inside buildings or in confined feedlots. CAFOs in Pennsylvania are defined as animal feeding operations that:

- have more than 1,000 animal equivalent units (AEUs). An AEU is equivalent to 1,000 pounds of live animal weight;
- are a concentrated animal operation (CAO) with 301 to 1,000 AEUs; or
- exceed, for a certain animal group, a threshold number established by the Environmental Protection Agency (examples include 700 dairy cows; 2,500 swine weighing over 55 lbs. each; 500 horses; or 82,000 egg-laying chickens). (DEP, 2006).

The size of the farm creates an increased urgency and importance in running a lawful and up-to-date operation. The more advice and education given by professionals, the more successful an operation can be (Ford & Babb, 2006).

Insurance companies that specialize in production agriculture coverage can serve as a great outlet for information and resources for their clients. They, too, are in favor of preventive
services and actions that help foster a productive operation with less loss. Insurance companies work with risk management every day. Agriculture is constantly dealing with many sources of change, creating a variety of risks to the industry. These changes include globalization of markets, rapid technological change, global population growth, expansion of regulations, and environmental pressures (USDA Risk Management Agency, 2006). Key risks in agriculture can generally be grouped into six categories:

- **Price Risk**: Agricultural prices are mainly determined in global markets, and unanticipated changes in global demand or supply of a commodity can lead to unexpected changes in prices received by farmers for their products.

- **Production Risk**: This is usually associated with the inability to plant or harvest acreage or changes in crop yields or animal production due to environmental variables such as weather, pests, and diseases.

- **Income Risk**: Can be caused by unexpected changes in production or prices received by producers as well as by swings in prices producers pay for inputs such as fuel, fertilizer, or electricity.

- **Financial Risk**: Farm financial cash flows and net worth can be seriously affected by changes in interest rates and wages.

- **Institutional Risk**: Changing of laws or regulations that producers count on, such as environmental and tax laws (USDA Risk Management Agency, 2006).

- **Injury Risk**: This is associated with medical costs regarding injured workers as well as production loss due to time injured workers take off in order to heal.

Agriculture is a very diverse industry which makes it difficult to create one risk management plan that would cover the many facets within the industry. However, with insurance
companies carrying the overarching goal of better risk management for all clients, they are in a position to become an excellent resource outlet for their agricultural clientele. Together, agricultural producers and their insurance companies can work toward a common goal of keeping a safe and hazard-free environment on the farm.

Statement of the problem

The joining of efforts between a producer and their insurance company, uniting under the single cause of better risk management for a particular operation, can be very beneficial when implemented well. Insurance companies are interested in knowing the best ways to educate their clients, especially CAFO owners and operators, on laws and common areas of concern. The insurance company that funded this research outlined the six topics they deal with the most regarding their CAFO clients. These topics included Animal Rights Activism, Bio-Security, Construction Issues, Manure and Odor Management, the Right to Farm Law, and Worker Safety.

Significance of the study

*Living in a Contaminated World: Community Structures, Environmental Risks and Decision Frameworks*, is a book written by Ellen Omohundro. Omohundro observed mining communities across the United States and observed how local residents, environmental regulators, and stakeholders can work together to assess the dangers and risks that are present to the lives of community members living near mining operations (Omohundro, 2004). Omohundro argues that better understanding of the risks to society and community involvement promotes better risk management and protects the population. This book encourages the idea of
unity and involvement from a range of community resources in order to promote risk
management in more hazardous living areas.

A study on increasing educational efforts in Latino construction workers has initially
shown decreased fatality rates (Vazquez & Stalnaker, 2004). Latino immigrants have the highest
percentage of work-related fatalities and construction is the second highest industry accounting
for these deaths, following mining (Vazquez & Stalnaker, 2004). Construction is also the highest
ranked industry for non-fatal injuries of Latino workers. After attention was brought to these
trends, the Occupational Safety and Health Administration (OSHA) began increasing educational
efforts to overcome language and cultural barriers to safety education. Data from 2002 shows a
decreased rate of Latino work-related fatalities (Vazquez & Stalnaker, 2004). This study’s author
argues in support of increased education to help reduce work-related injuries.

Unity and increased educational involvement has been shown to decrease problems in the
construction and mining industries. Insurance companies can supply educational resources and
services to aid CAFO owners and operators in becoming better managers of risk. CAFO owners
could become more educated on important topics leading to a more compliant and preventive
operation. Confined Animal Feeding Operations that follow regulations established by the
Environmental Protection Agency and the Occupational Safety and Health Administration have a
better chance for a loss-free operation.

The purpose of the Occupational Safety and Health Administration (OSHA) is to help
ensure that every worker has a safe and healthful place to work (Baker, 1993). Under the
William-Steiger Occupational Safety and Health Act of 1970, a farmer with one or more
employees has the legal responsibility to assure safe and healthful working conditions for his
employees. Operations with ten or more employees are subject to OSHA inspections and
possible fines for violations (US Department of Labor, 2008). There are several common areas of agriculture that OSHA pays particular attention to despite a farm's geographic location or farming specialty:

- The slow moving vehicle (SMV) emblem,
- Roll over protective structure (ROPS), and
- Agricultural machinery guarding

As an employer, the farmer has three general responsibilities regarding the safety of their employee's. They are:

- To comply with the agricultural safety standards;
- To comply with record keeping and other reporting responsibilities, such as reporting accidents, posting of a citation, etc.; and
- To comply with the general duty clause

There are four levels of violation that can result in a citation. The highest level of violation is called a “willful” violation and exists when evidence shows either an intentional violation or indifference to the law. A “serious” violation results when a hazard or hazardous exposure has the high probability of an accident resulting in death or serious injury. A “non-serious” violation is a situation in which there is injury potential, but the injuries should not result in death or total disability. Finally, a “de minimis” violation does not have a direct or immediate relationship to safety or health (Baker, 1993). An example of this would be the use of a nuisance dust respirator against a non-toxic dust without a respiratory protection program (Byrum, 2001). Citations can result in fines causing economic loss to a farm. More serious citations resulting from a willful violation can even result in serving time in jail and court expenses. By educating agricultural
operators on the OSHA regulations, they can stay in better compliance and therefore save time, money and stress.

Another organization involved with the prevention of agricultural hazards is the Environmental Protection Agency (EPA). Farming involves the management of large quantities of nutrients like fertilizer and animal wastes, especially on large-scale operations such as CAFO’s. Scientists with the EPA have realized within the last 25 years that agriculture could potentially be a contributor to nutrient pollution. In most cases, problems are clearly unintentional and result from common practices. Because of these issues, the EPA, along with the United States Department of Agriculture (USDA), has encouraged all CAFO operators to implement a Nutrient Management Plan. Nutrient management can reduce impacts on water quality by reducing the amounts of phosphorus and nitrogen available for runoff or erosion. To support these efforts the USDA has begun offering incentive rewards for those territories in which such programs are implemented.

**Purpose of the Study**

Since agriculture is one of the more dangerous and complex occupations in the United States, it is important to use all means necessary and available to educate workers about common issues and topics that promote risk management (NIOSH, 2007). Insurance companies can serve as an effective vehicle to promote awareness. The overall purpose of this study is to find the most effective means to promote awareness of several common agricultural issues amongst CAFO owners and operators.
The three questions that guided the study are as follows:

1. Which of the six educational topics are the most in need of promotion and awareness?
2. On which of the six educational topics do CAFO owners and operators want to receive further educational information?
3. Which method of delivery is most preferred by CAFO owners and operators to receive educational information?

Limitations

First, this study represents the opinions of a sample of Pennsylvania CAFO owners and operators of a single insurance company and therefore cannot be generalized to other CAFO operators within the state. It was a convenience sample of one insurance company’s clients, and may not be representative of the CAFO owners and operators within Pennsylvania.

Secondly, the poor return rate of surveys may have effects on the results. The 28% return rate on the surveys was much lower than originally anticipated. This also limits the ability to generalize findings of the data beyond the sample population.

Operational Definitions

Agriculture, Communities, and Rural Environment (ACRE) Law- The objective of ACRE is to balance the legitimate business interests of agriculture with the environmental and community concerns of local citizens and elected leaders. ACRE will help resolve some of the interface issues that occur when the non-farm community meets production agriculture.
Confined Animal Feeding Operation (CAFO)- CAFO refers to a farm where large quantities of livestock or poultry are housed inside buildings or in confined feedlots. CAFOs in Pennsylvania are defined as animal feeding operations that:

- have more than 1,000 animal equivalent units (AEUs). An AEU is equivalent to 1,000 pounds of live animal weight;
- are a concentrated animal operation (CAO) with 301 to 1,000 AEUs; or
- exceed, for a certain animal group, a threshold number established by the Environmental Protection Agency (examples include 700 dairy cows; 2,500 swine weighing over 55 lbs. each; 500 horses; or 82,000 egg-laying chickens). (DEP, 2006).

Occupational Safety and Health Administration (OSHA)- the division of the Department of Labor that sets and enforces occupational health and safety rules.
Chapter 2

REVIEW OF LITERATURE

Agriculture continues to be one of the most complex and dangerous industries in the United States (NIOSH, 2007). There have been growing concerns about the lack of efficiency in educational delivery to production agriculturalists. The field of extension education has worked for years to find the best ways to disseminate appropriate information to appropriate audiences. Confined Animal Feeding Operations (CAFO’s) are one population that is in need of an efficient means of educational delivery. Due to their size, these operations have increased regulations placed upon them, compared to the average production farm. These regulations are constantly under review and changing in an effort to better protect the environment while still supporting the producer.

This review of literature examines the background of CAFO’s, as well as six topic areas commonly dealt with by those operating CAFO’s. The population for this study is composed of CAFO owners. In order to work with those participants, it is important to have a basic understanding of what they are, how they operate, as well as how the six outlined themes affect them. Types of delivery methods commonly used to present educational information will also be examined. It is important to have an understanding of how delivery methods have usually been used in the past in order to find the best method(s) for this study. Finally, the involvement of insurance agencies in educational formats will be discussed in this literature review. Insurance plays an important role in this study, for it will be the main resource of information for the CAFO operator. Knowledge of how insurance agencies typically work in regards to educating
clients is important to help them develop feasible future actions relating to the topics of this study.

Although the literature in this field is limited due to the emerging trend of CAFO’S, the researcher investigated the construction and mining industries, as well as traditional agriculture formats in order to find relevant material. Construction and mining are also very hazardous industries that often rank high for fatal and non-fatal work-related injuries (NIOSH, 2007). The literature review used highly reputable organizations such as the United States Department of Agriculture and the Department of Environmental Protections to review these topics.

**Confined Animal Feeding Operations**

The image of farming has been drastically changing over recent years. Due to global competition, increased regulations, and profit reductions, the traditional family farm is becoming extinct. Advanced, large-scale farms are more efficient and becoming a more common style of farming. Confined Animal Feeding Operations (CAFO’s) are slowly taking over production agriculture (USDA Risk Management Agency, 2006).

What exactly is a Confined Animal Feeding Operation? A CAFO, as it is commonly referred to, describes a farm where large quantities of livestock or poultry are housed inside buildings or in confined feedlots (McGinty, 2006). This new image of agriculture brings with it new challenges for the production agriculture industry. The increased size of an operation in a confined space leads to the need for more attentive managers in regards to many facets of production agriculture. These facets include Animal Rights Activism, Bio-Security, Worker Safety, the Pennsylvania Right to Farm Law, Manure and Odor Management, and Construction Issues. The following sections will briefly discuss these six in regards to CAFO’s.
Animal Rights Activism

There are many animal rights groups existing throughout the United States. The most popular of these groups is the People for the Ethical Treatments of Animals, commonly known as PETA. PETA is an activist group that promotes ethical animal treatment in large-scale farms, laboratories, clothing industries, and entertainment industries (PETA, 2007). The Animal Liberation Front (ALF) is another animal activist group that is growing in popularity. Both groups work against actions that disrupt the normal practice of farms. For example, Gemperle Farms, a large chicken supplier in Illinois, was accused of abusing hens by an animal rights activist group, leading to animal cruelty allegations. Trader Joe’s, the company that was supplied eggs by Gemperle Farms, ceased doing business with the farm due to the allegations, therefore putting great economic strain on the farm (Salerno, 2008). It is important for large-scale farms to use safe and healthy practices with their animals, and to protect themselves against risky allegations.

The National Council of Chain Restaurants (NCCR) and the Food Marketing Institute (FMI) have joined together to create the Animal Welfare Audit Program (AWAP). Combined, these two groups represent about 80 percent of the food market industry in the United States (Hess, 2008). For a producer or slaughter house to be a part of the NCCR or FMI, they must complete an audit of their operation by a trained AWAP professional (Hess, 2008). Audit tools and regulations were composed from recommendations of various livestock organizations across the United States including the National Pork Board, National Chicken Council, and many others (Hess, 2008). Being approved by the AWAP allows those producers or slaughter houses to be deemed as practicing safe animal protocol and opens their services to the 80 percent of the food
market industry. By following recommended animal welfare protocol, CAFO operators can join these organizations and grow their supply market.

Bio-Security

In 2001, the United Kingdom had a Foot and Mouth outbreak that cost the country 6 million animals and $3.6-11.6 billion. The United Kingdom land size would fit within the state of Oregon (Narlesky, 2005). United States farms need to be ready to protect themselves from such an epidemic. The greatest risk to the health of livestock on a farm is from other animals and their manure (UVM, 2003). Bringing new animals onto the farm is the most common vehicle for transmission of disease. Farms should have an established purchase and quarantine plan established before buying new animals (UVM, 2003). By confining animals into smaller spaces, owners must take even greater caution to prevent disease from entering the herd. A small space with more animals increases the chance of disease transmission.

Many other diseases are threatening livestock operations across the United States. In cattle, Johne’s disease is a chronic, incurable bacterial illness affecting ruminant animals. It affects primarily the gastrointestinal tract and ultimately results in persistent diarrhea and weight loss in infected animals (Hovingh, 2007). The best way to prevent this disease from entering a herd is to minimize contact with other potentially infected herds that could be carrying Mycobacterium avium paratuberculosis, the infective agent of this disease. Good practices are vital in keeping unwanted diseases off of farm operations.

Antibiotic use on the farm has long been an important tool in dealing with infectious diseases. However, research is finding that prolonged use or improper use over time will increase the number of resistant bacteria (Wolfgang, 2008). Good management of disease should always be the first step in disease prevention, not antibiotic use (Wolfgang, 2008). Farms should work
closely with their veterinarian to design a herd health plan that will ensure appropriate use of antibiotics and lessen chances of developing antibiotic-resistant bacteria.

There are many factors that serve as barriers to CAFO owners and operators taking the full bio-security cautions that are needed. In-person interviews with 20 dairy farmers as well as four focus groups with 22 farmers in South Carolina were conducted to determine their knowledge and attitude towards antibiotic use in livestock. Analysis found that significant barriers to following proper protocol for antibiotic use were finances and lack of time (Freidman et al, 2007). It is important to enforce the preventive aspect of antibiotic use and encourage CAFO owners to take the time and spend the finances on proper bio-security and disease prevention efforts.

*Construction Issues*

When building large facilities such as those used for a CAFO, which will receive heavy use due to high numbers of animals, there are many precautions to take into consideration. Fire protection and ventilation are important features to implement in a CAFO barn.

Almost 6,000 barns are lost due to fire each year in America (Gerberich, 2004). Older barns often consist of deteriorated electrical wiring that can start fires. When building new barns, it is important for farmers to consider added features such as a firewall between bedding/hay storage and animals, flame resistant materials, and smoke detectors. All buildings should also be equipped with fire extinguishers that are annually inspected by a professional (NASD, 2007).

Ventilation systems in a barn serve an important function for maintaining animal comfort, reducing odors, removing moisture, replenishing the oxygen supply, and removing gases. Ammonia, hydrogen sulfide, and methane are all common gases found in poorly ventilated barns (NASD, 2007). Gas levels become higher when animal operations have more
aerial concentration of gases and dust. These gases and dust particles can be damaging to the health of both the livestock and workers. A proper ventilation system should achieve sufficient airflow, adjust according to outside weather conditions, and account for seasonal variability (NASD, 2007).

*Manure and Odor Management*

Pennsylvania Act 38 of 2005, House Bill 1646, commonly known as the ACRE (Agriculture, Communities, and Rural Environment) law was first announced to the public at the 2004 Penn State Ag Progress Days by Pennsylvania Governor Ed Rendell (Becker, 2005). Building off of the Nutrient Management Act of 1993 (Act 6 of 1993), the ACRE law harmonizes local government ordinances with common agricultural practices. In October of 2006, the ACRE law was officially put into effect (Beegle, 2007). The main purpose of this act was to:

a. Ensure that local governments enact ordinances regulating normal agricultural operations that are consistent with authority given to them by the laws of the Commonwealth to protect citizens health, safety, and welfare;

b. Provide timely reviews of potentially unauthorized local ordinances;

c. Replace the Nutrient Management Act by retaining most of the current law and regulations and adding manure setback and buffer requirements; and

d. Require certain farms to develop odor management plans. (Becker, 2005)

Act 38 also requires that all Concentrated Animal Operations (CAOs) develop and maintain nutrient management plans. A CAO is defined as an agricultural operation where the
animal density of all the livestock on the farm exceeds two Animal Equivalent Units (AEUs) per acre of land suitable for manure application and owned or managed by a farmer (Beegle, 2007). An AEU is equivalent to 1,000 pounds of live animal weight (McGinty, 2006). The goal of nutrient management, which is a vital section of the revised ACRE law, is to apply the proper amount of nutrients at the proper time to achieve optimum yields and minimize the entry of nutrients into surface and groundwater supplies (NRCS, 2007). Nutrient management plans are designed to help the farmer responsible manage three main nutrients, phosphorus, nitrogen, and potassium.

Act 38 has also added required odor management plans. An odor management plan is a written, site-specific plan identifying the practices, technologies, standards, and strategies to be implemented to manage the impact of odors generated from animal housing or manure storage facilities (Becker, 2005). Odor management plans will be required for existing CAOs and CAFOs when building or expanding upon a new animal housing or manure storage facility.

The Pennsylvania Right to Farm Law

The Pennsylvania Right to Farm Law was originally designed to protect agricultural operations that meet specific requirements from nuisance suits that may be brought against them (Feirick, 2007). This law was developed in the 1970’s but has just as much influence today with urban sprawl on the rise and neighborhoods being built next to a large-scale farming operations. It is important for CAFO owners to operate lawfully and meet all specified regulations so the government can have full coverage of them in the event of a nuisance lawsuit.

Worker Safety

Agriculture continues to be one of the most hazardous industries in the United States (NIOSH, 2007). Confined animal operations expose workers to risks associated with high animal
density conditions. Two of the most documented sources of farm-related injury are machinery and animals (Mitloehne & Calvo, 2008). Large-scale farms have increased mechanization and animal units which results in possible increased exposure to greater risk for people that work on those farms (Mitloehne & Calvo, 2008). In 1995, 196,000 work injuries occurred on farms resulting in lost work time (McCurdy & Carroll, 2000). The leading causes of these injuries were from machinery (21.3%) and livestock injuries (20%) (McCurdy & Carroll, 2000).

Beyond animals and machinery, air pollutants also have severe effects on farm workers, especially those who work in confinement operations where pollutants can be found in higher concentrations. Approximately 150 potentially toxic gases have been documented in confined animal operations which arise from feed, manure, and animals (Von Essen & Auvermann, 2005). There are approximately 238,000 animal feeding operations in the United States that produce 575 million tons of manure each year (Federal Register, 2003). Exposures to these toxic substances over time can cause respiratory diseases (Omland, 2002).

Confined Animal Feeding Operations with 10 or more employees are required by OSHA standards to comply with Worker Protections Standards and create an Agricultural Safety and Health Plan (OSHA, 2007). A farmer who employs just one or more persons has the legal responsibility to assure safe and healthful working conditions under the Wiliam-Steiger Occupational Safety and Health Act of 1970 (Baker, 1993). Complying with these rules will aide in successful operations where everyone is working at optimum levels.

The above pages have given a background of the six themes of this research project, each one having their own unique impact on how CAFO’s are operated. Educating CAFO owners on how to deal with issues arising under these themes is an important part of running a successful
operation. Proper delivery methods will ensure the most efficient and productive means of education.

**Delivery Methods**

Educational delivery methods were studied to help choose the most appropriate delivery method to present educational information to an audience. Literature similar to the nature of this study was reviewed to further understand how delivery methods are chosen and carried out.

According to the North Carolina Cooperative Extension Service, the choice of delivery method of educational information should be based on the needs and preferences of the targeted audience and the specific educational purpose. Newsletters and personal visits are common methods used. Newsletters are a printed instrument developed for a targeted audience that is intended to provide timely information of current potential interest to the readers (Richardson et al., 2008). A personal visit is defined as a face-to-face exchange of information between two or more people, usually at the location of the person or persons receiving the information (Richardson et al., 2008).

Conducting a thorough and accurate situational analysis and needs assessment are essential steps in defining learning needs of audiences. When developing the educational delivery method, learning objectives should always be taken into consideration in order to keep the delivery focused (Boldt, 1987).

Traditional extension audiences are becoming less common as production agriculture moves more toward a confined style of operation. Family farms are slowly decreasing in numbers and larger more efficient operations are producing more output each year. The traditional family farm audience for extension programming had a more direct connection to researchers in order to obtain educational information (Hildreth & Armbruster, 1981).
A study conducted in North Carolina that sought to assess clientele’s preferences for receiving extension information found that clientele preferences do exist, and may be quite different depending upon the audience being served (Richardson, 1995). This provides even more cause to establish audience needs and desires prior to delivering educational information.

There are many factors which influence farmers’ attitudes toward specific informational sources. A study done by Cornell University found that crop/livestock magazines and general farm magazines are the most useful information sources for farmers (Gloy, Akridge, & Whipker, 2000). It also found that the number of different commodities that the farm produced, as well as the amount of time spent on the internet, were common predictors of various attitudes toward information sources (Gloy, Akridge, & Whipker, 2000). Over 2,000 questionnaires sent to east coast farmers in a study conducted by the University of Florida found that sources of information did not vary widely among various types of farmers (Ford and Babb, 1989).

A study conducted by Colorado State University on farm families and what they felt were useful forms of education on agricultural health and safety. Interviews with eight families in Weld County, Colorado found that farmers trusted selected agencies such as Cooperative Extension and Growers Associations with delivering the most reliable information. They also found that farmers favored monetary incentives from insurance companies through the reduction of insurance rates for attendance at safety seminars (Seiz & Downey, 2001). People trust organizations for which they have had long withstanding relationships.

Age can also be a determining factor when it comes to choosing an appropriate delivery method. A study conducted at North Carolina State University examined the effect of environmental structure, farm operator’s environmental attitudes, farm operator’s age, and education on their environmental practices. Over 22 states and 1,111 farmers were included in
the study that was part of the federal Rural Clean Water Program. Analysis of the data collected supports the idea that pro-environmental attitudes are related to farmers’ behaviors and the younger and better educated the farmer is, the more likely they are to use environmentally friendly practices (Richardson et al, 2008). In regards to this study, it is projected that younger CAFO owners and operators would be more likely to adopt changes and be open to new knowledge.

From this section of the literature review, many important points were raised. First, it was determined that completing a needs assessment of the audience is a vital step in developing program objectives and goals (Boldt, 1987). Farmers do have preferences and desires when it comes to the type of education that they receive; which is important to consider when developing materials and programs (Richardson, 1995). It is also important to note that the traditional style of direct face-to-face contact between extension personnel and producers is becoming less efficient and less common (Hildreth & Armbruster, 1981). All of this information will help to develop an appropriate educational delivery method for the population at hand.

Insurance

One of the most important assets a farmer has to help with risk management is the information provided to them. Insurance agencies promote risk prevention and can be a vehicle for information distribution. As stated earlier, agriculture is constantly dealing with many sources of change, creating a variety of risks to the industry. These changes include globalization of markets, rapid technological change, global population growth, expansion of regulations, and environmental pressures (USDA Risk Management Agency, 2006). Among the most common risks that farmers face are weather, crop and livestock diseases, pests, adoption of new technologies, governmental policies, and worker safety. With the constant changes in production
agriculture, it is important to keep farmers informed of all risks. Key risks in agriculture can generally be grouped into six categories;

- **Price Risk**: Agricultural prices are mainly determined in global markets, and unanticipated changes in global demand or supply of a commodity can lead to unexpected changes in prices received by farmers for their products.

- **Production Risk**: This is usually associated with the inability to plant or harvest acreage or changes in crop yields or animal production due to environmental variables such as weather, pests, and disease.

- **Income Risk**: Can be caused by unexpected changes in production or prices received by producers as well as by swings in prices producers pay for inputs such as fuel, fertilizer, or electricity.

- **Financial Risk**: Farm financial cash flows and net worth can be seriously affected by changes in interest rates.

- **Institutional Risk**: Changing of laws or regulations that producers count on, such as environmental and tax laws (USDA Risk Management Agency, 2006).

- **Injury Risk**: This is associated with medical costs regarding injured workers as well as production loss due to time injured workers take off in order to heal.

How the population, including farmers, deal with risk management can be understood by using the Utility Theory. Utility Theory monitors how people perceive possible risk and measures the subjective values of risk against taking an action (Myerson, 1979). In other words, people make decisions based on their subjective perception of probability.

Insurance is involved with risk management and how it relates to their clients. CAFO owners deal with risk on a daily basis. It is important that CAFO owners and their insurance companies
work together to create the most hazard free environment. Changes in the global market of agriculture are creating new risks in which the agricultural population is learning to adjust (USDA Risk Management Agency, 2006). The insurance industry is also adjusting to these changes and finding new ways to aid their production agriculture clients.

This literature review has discussed CAFO’s and the six common areas of concern for which producers commonly deal with. It also discussed educational delivery methods and how to choose an appropriate method for a certain audience of production agriculture. And finally, it discussed how insurance plays a role in risk management of CAFO’s. All of this information will be combined and used to assess the population involved in this study, and find the best and most efficient way to educate CAFO owners on appropriate topics.
Chapter 3

METHODOLOGY

The focus of this study was to describe the best ways to educate Confined Animal Feeding Operations (CAFO) owners on six common problem areas. The primary purpose of the study was to develop effective delivery techniques for insurance companies to use with their CAFO clientele.

The following research questions guided the study:

1. Which of the six educational topics are the most in need of promotion and awareness?
2. On which of the six educational topics do CAFO owners and operators want to receive further educational information?
3. Which method of delivery is most preferred by CAFO owners and operators to receive educational information?

Population and Sample

The target population included CAFO owners and operators insured by the particular insurance company that aided in developing the research study. The frame included 116 CAFO owners drawn from the target population and provided to the researcher by the insurance company. All 116 CAFO owners were sent the original survey along with a letter from their insurance company (See Appendix A) encouraging their participation and a consent statement (See Appendix B) stating that a returned survey is considered indication of their consent to participate. Thirty-three surveys were returned from this group of respondents who comprised the sample population. All participants that returned a survey were then contacted via phone for a
follow-up interview to gain more in depth information about topics first mentioned in the survey. Fifteen successful interviews were conducted.

Three weeks were scheduled for the researcher to complete the phone interviews. For those who did not answer a call, messages were left making those participants aware of who was calling, the purpose of the call, and how they could contact the researcher. Contacts were made by either participants calling the researcher back or the researcher calling the participants multiple times. If the researcher had not heard from a participant three days after a previous message left, the researcher would call again. Once four messages were left, the researcher stopped calling a participant. Calls differed regarding time of day and day of the week the researcher called. However, calls were not made on Sundays.

**Instrumentation**

Prior to developing the survey the researcher successfully completed Penn State's Social Science and Biomedical Institutional Review Boards (IRB) training. Once the survey was developed and planned, the proposed research project was sent to the IRB board for review, and was approved as IRB # 24942.

A multiple-section questionnaire (See Appendix C) was developed to measure the baseline knowledge of the 116 CAFO owners. The questionnaire consisted of six parts of multiple choice questions regarding the six topics of interest: Construction Issues, Manure and Odor Management, Worker Safety, Animal Rights Activism, Bio-Security, and the Pennsylvania Right to Farm Law. Following the multiple choice section, the questionnaire sought out information on whether or not the operation had specific plans established for five risk management aspects of a CAFO, including: proper building ventilation, a waste management plan, quarantining of incoming animals, worker safety training, and fire extinguisher
maintenance. The final section, measured on a Likert scale, required participants to indicate how likely they would be to implement as well as accept help from their insurance company regarding those five aspects.

Originally, the methodological format for this study included separating those participants that responded to the survey into three equal treatment groups. The first group would get information on the six themes via education materials (See Appendix D-I) sent through the mail. The second group would receive the same information through the researcher, who would visit those participants at their farm and presenting it to them. Finally, a control group would receive no information. The same survey would then be sent out after treatments were applied to see which group improved the most on their knowledge assessment and became more compliant. However, with only 33 usable surveys being returned, an interview protocol was developed in order to ask open-ended questions that would gain more in-depth information from participants and allow the researcher to meet the three main objectives of the study. A structured interview through the phone was the best assessment tool to be used in order to obtain the information needed.

For the interview phase of the study, an interview protocol (See Appendix J) was established to ensure common questioning for each participant contacted. Questions were developed by taking general themes from the knowledge assessment survey and asking interviewees for more in-depth information regarding those themes. The first part of the interview protocol established the purpose of the study and a statement of confidentiality. The following section asked open-ended questions in order to gain an in-depth description of specific practices the operation carries out. And finally, questions led the researcher to inquire about how the participants would most like to receive educational information from their insurance
company. The researcher took detailed notes during the interviews in order to analyze data at a later date.

Interviews were conducted over the phone due to time constraints on the research project. Practice sessions were completed with three undergraduate students who lived or worked on a CAFO within the last year. Minor changes were made to the order or questioning after the practice sessions to make the interview run smoothly. It is common practice in qualitative research to keep a journal while collecting data in order to keep personal thoughts and opinions from impacting results. The researcher for this study kept a journal and wrote in it after every two interviews. The researcher documented both problems and successes with the interview in order to keep researcher bias in check.

Steps were taken to establish validity within the study. All instruments used for data collection were reviewed by a panel of six experts consisting of faculty members of the Departments of Agricultural and Extension Education, Agricultural and Biological Engineering, Animal Sciences, and Rural Sociology for content and face validity. The panel of experts were selected by recommendations from the researcher’s masters committee as well as their content knowledge of the six topics of interest; Animal Rights Activism, Bio-Security, Construction Issues, Manure and Odor Management, PA Right to Farm Law, and Worker Safety.

A pilot survey was conducted with Pennsylvania CAFO owners that were not included in the research population, in order to establish survey reliability. The Lancaster County Conservation District provided names of CAFO owners that could be contacted and given the survey. Twelve surveys were sent out and four pilot surveys were returned. Data from the pilot test were checked for consistency of entry, and entered and analyzed using the Statistical Package for Social Sciences (SPSS 16.0).
Data Collection

Data for part one was collected using a mail survey. The design for the survey followed recommendations of Dillman (2000) and Diem (2002). The questionnaires, along with cover letters and return address envelopes, were mailed to 116 research participants in June 2007. To ensure confidentiality, all respondents were assigned a code so that no names appeared on questionnaires that were returned to the researcher. Reminder/Thank You cards (See Appendix K) were mailed to all 116 participants two weeks later. Follow-up contacts were made four weeks later to all those who had yet to respond by sending reminder letters and replacement questionnaires. In week six, another batch of Reminder/Thank You cards were sent to those who had still not responded.

After the initial mailing of questionnaires, the researcher received four incomplete questionnaires from respondents indicating they were unqualified for the study because they no longer had a Confined Animal Feeding Operation, were too ill to participate, or that the individual the questionnaire was mailed to had passed away. Thirty-three complete surveys were returned to the researcher during the eight week period after the initial survey was sent out. Table 3.1 shows the response rate for the data collection process:

Table 3.1 Number and Percentage of Questionnaire Survey Reports

<table>
<thead>
<tr>
<th>Time and Date of Mailing</th>
<th>n</th>
<th>Percent Return</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Mailing</strong> (Questionnaire, Cover Letter, Consent Form)</td>
<td>13</td>
<td>39</td>
</tr>
<tr>
<td>June 27th, 2007 - July 11th, 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second Mailing</strong> (Reminder/Thank You card)</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>July 12th, 2007 - July 26th, 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Third Mailing</strong> (Reminder Letter, Questionnaire)</td>
<td>11</td>
<td>33</td>
</tr>
<tr>
<td><strong>Forth Mailing</strong> (Reminder/Thank You card)</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>August 11th, 2007 - August 31st, 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>33</td>
<td>28.4</td>
</tr>
</tbody>
</table>

*Note: 28.4% = 33/116
The problem of non-response bias was addressed by comparing early respondents to late respondents (Miller, 2005) on all survey responses. Early respondents were classified as those responding before July 12\textsuperscript{th}, 2007 and late respondents were those responding after July 12\textsuperscript{th}, 2007. There were no significant differences on the valid total percentage scores on the knowledge base assessment.

**Data Analysis**

Data was coded and analyzed using SPSS version 16.0. Statistics were compared on a frequency measure. Valid total percentages of correct versus incorrect were established for each of the knowledge assessment questions. Frequency distributions were also done for the opinion sections of the survey.

Results from interviews were coded for emerging themes. Themes were entered into Excel 2007 and summarized into charts. A chart of emerging themes was created for each of the seven questions asked during the interview protocol.

Measures were taken from both the survey and interview portions to answer the three research questions.
Chapter 4

FINDINGS

This study focused on describing the most needed and most desired educational information for Confined Animal Feeding Operation (CAFO) owners. The primary purpose was to identify what educational information was most needed and desired by CAFO owners, and then find the most effective means of communicating the information to CAFO operators.

The findings of this study are reported according to the two methods used to address the three guiding questions.

1. Which of the six educational topics are the most in need of promotion and awareness?

2. On which of the six educational topics do CAFO owners and operators want to receive further educational information?

3. Which method of delivery is most preferred by CAFO owners and operators to receive educational information?

The first data listed are the results from the quantitative knowledge assessment. These results are separated into three tables; 1) answers to the multiple choice questions, 2) answers to the binary questions, and 3) answers to the opinion section, which are measured using a Likert scale.

A total of 33 CAFO owners responded to and returned usable questionnaires. The question that the knowledge assessment survey answered was as follows:
Research Question #1

Which of the six educational topics are the most in need of promotion and awareness?

Table 4.1 depicts the level of correctness CAFO owners had regarding the multiple choice knowledge assessment. Questions were divided into the six topics of concern: Construction Issues, Manure and Odor Management, Worker Safety, Animals Rights, Bio-Security, and the Pennsylvania Right to Farm Law. In the first column, Table 4.1 shows the question which was asked on the survey. The second column lists how many participants answered each question correctly. The third column shows the percentage of participants of the entire sample population that answered each question correctly. The fourth column, titled Total %, takes into account those participants that did not answer the question at all. And finally, the fifth column takes an average of total percentages for each question, and creates an overall total average for each section. According to the total percentage correct for each theme, CAFO owners in this study answered the most questions correct regarding Manure and Odor Management, with an average score of 86.1%. Remaining scores for the other topics were as follows: Animal Rights Activism- 73.4% correct, Pennsylvania Right to Farm Law- 69.0% correct, Bio-Security- 68.2% correct, Construction Issues- 63.7% correct, and Worker Safety 59.9% correct. To answer the first research question, the topics most in need of promotion are Worker Safety and Construction Issues, because CAFO owners scored the lowest on those sections.
Table 4.1 Knowledge Assessment of CAFO Operators Responding to a Multiple Choice Survey Instrument

<table>
<thead>
<tr>
<th>Question #</th>
<th>Correct #</th>
<th>Correct %</th>
<th>Total %</th>
<th>Total Theme Average %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Issues</strong></td>
<td></td>
<td></td>
<td></td>
<td>63.7%</td>
</tr>
<tr>
<td>Distance between buildings and fuel storage.</td>
<td>12</td>
<td>44.4</td>
<td>81.8</td>
<td></td>
</tr>
<tr>
<td>Common gas in buildings.</td>
<td>28</td>
<td>100</td>
<td>84.8%</td>
<td></td>
</tr>
<tr>
<td>Barns lost each year to fire.</td>
<td>5</td>
<td>26.3</td>
<td>57.6%</td>
<td></td>
</tr>
<tr>
<td>Reason for proper ventilation.</td>
<td>21</td>
<td>84</td>
<td>75.8%</td>
<td></td>
</tr>
<tr>
<td><strong>Manure and Odor Management</strong></td>
<td></td>
<td></td>
<td></td>
<td>86.1%</td>
</tr>
<tr>
<td>Water pollution law.</td>
<td>24</td>
<td>96</td>
<td>75.8%</td>
<td></td>
</tr>
<tr>
<td>Main objective of ACRE.</td>
<td>13</td>
<td>65</td>
<td>60.6%</td>
<td></td>
</tr>
<tr>
<td>Manure application distance from water source.</td>
<td>21</td>
<td>87.5</td>
<td>72.3%</td>
<td></td>
</tr>
<tr>
<td>NRCS.</td>
<td>23</td>
<td>95.8</td>
<td>72.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Worker Safety</strong></td>
<td></td>
<td></td>
<td></td>
<td>59.9%</td>
</tr>
<tr>
<td>Occupational fatality ranking.</td>
<td>19</td>
<td>82.6</td>
<td>69.7%</td>
<td></td>
</tr>
<tr>
<td>Production agriculture accounts for how many fatalities.</td>
<td>8</td>
<td>34.8</td>
<td>69.7%</td>
<td></td>
</tr>
<tr>
<td>Safety policy.</td>
<td>23</td>
<td>92</td>
<td>75.8%</td>
<td></td>
</tr>
<tr>
<td>Worker Protection Standard.</td>
<td>7</td>
<td>30</td>
<td>69.7%</td>
<td></td>
</tr>
<tr>
<td><strong>Animal Rights</strong></td>
<td></td>
<td></td>
<td></td>
<td>73.4%</td>
</tr>
<tr>
<td>PETA.</td>
<td>25</td>
<td>100</td>
<td>75.8%</td>
<td></td>
</tr>
<tr>
<td>Radical activist group.</td>
<td>7</td>
<td>46.7</td>
<td>45.5%</td>
<td></td>
</tr>
<tr>
<td><strong>Bio-Security</strong></td>
<td></td>
<td></td>
<td></td>
<td>68.2%</td>
</tr>
<tr>
<td>Infectious disease.</td>
<td>16</td>
<td>84.2</td>
<td>57.6%</td>
<td></td>
</tr>
<tr>
<td>Foot and Mouth.</td>
<td>22</td>
<td>88</td>
<td>75.8%</td>
<td></td>
</tr>
<tr>
<td>Disease spread through urine.</td>
<td>12</td>
<td>63.2</td>
<td>57.6%</td>
<td></td>
</tr>
<tr>
<td>Appropriate days of quarantine.</td>
<td>9</td>
<td>37.5</td>
<td>72.3%</td>
<td></td>
</tr>
</tbody>
</table>
Pa. Right to Farm Law

<table>
<thead>
<tr>
<th></th>
<th>Have Plan (N=96)</th>
<th>No Plan (N=24)</th>
<th>Total (N=120)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag. Nuisance lawsuit.</td>
<td>24</td>
<td>96</td>
<td>69.0%</td>
</tr>
<tr>
<td>Common complaints.</td>
<td>21</td>
<td>84</td>
<td>75.8%</td>
</tr>
<tr>
<td>Time without complaint to fall under protection.</td>
<td>2</td>
<td>9.1</td>
<td>66.7%</td>
</tr>
<tr>
<td>Nutrient Management Plans.</td>
<td>20</td>
<td>87</td>
<td>69.7%</td>
</tr>
</tbody>
</table>

Table 4.2 summarizes the information gathered on the survey in the binary questions section. The question asked whether or not operators had specific plans or practices established for five common risk management strategies on CAFO’s; proper building ventilation, a waste management plan, quarantining of incoming animals, worker safety training, and fire extinguisher maintenance. The first column relates back to the question on the survey. The second and third columns represent the number and percentage of people that stated they did have a current plan established for that specific risk management strategy. The fourth and fifth columns show the number and percentage of participants that said they did not have that particular risk management strategy established. And finally, the sixth column shows the total number of participants that answered the question. For example, only 23 out of the 33 participants that returned a survey answered question #23. The majority of participants had a specific plan established on their operation for proper building ventilation (91.3%) and manure management (100%). The topic for which the fewest participants had a plan established was worker safety (41.2%). Quarantining of animals (65%) and fire extinguisher inspections (61.9%) were reported for slightly over one half of participants.
Table 4.2 Frequency of Adoption of Various Risk Management Plans for CAFO Operators Responding to a Survey Instrument

<table>
<thead>
<tr>
<th>Question #</th>
<th>Yes #</th>
<th>Yes %</th>
<th>No #</th>
<th>No %</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Building Ventilation</td>
<td>21</td>
<td>91.3</td>
<td>2</td>
<td>8.7</td>
<td>23</td>
</tr>
<tr>
<td>Waste Management Plan</td>
<td>23</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Quarantining of Incoming Animals</td>
<td>13</td>
<td>65</td>
<td>7</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>Worker Safety Training</td>
<td>7</td>
<td>41.2</td>
<td>10</td>
<td>58.8</td>
<td>17</td>
</tr>
<tr>
<td>Fire Extinguisher Maintenance</td>
<td>13</td>
<td>61.9</td>
<td>8</td>
<td>38.1</td>
<td>21</td>
</tr>
</tbody>
</table>

Table 4.3 summarizes the information gathered in the final part of the survey using a Likert scale to measure participant’s intentions. These questions asked participants first to rank on a scale of one to five, how likely they would be to implement each of the five risk management strategies. One is equivalent to definitely yes, and five being definitely not. Although not strongly positive, Worker Safety plans were the most likely item to be implemented on an operation with an average score of 2.71 on a scale of one to five. The second set of questions asked participants how likely they would be to accept help from their insurance company in implementing the five risk management strategies. One is equivalent to definitely yes to accepting help and five is equivalent to definitely not accept. Overall the participant’s ratings were very similar for each strategy stating that they were unlikely to accept help from their insurance company to implement risk management practice.
Table 4.3 Likelihood of Adopting Various Risk Management Plans for CAFO Operators Responding to a Survey Instrument

<table>
<thead>
<tr>
<th>Question</th>
<th>Definitely Yes</th>
<th>Probably Yes</th>
<th>Not Sure</th>
<th>Probably Not</th>
<th>Definitely Not</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Building Ventilation</td>
<td>2</td>
<td>11.8%</td>
<td>0</td>
<td>0%</td>
<td>3</td>
<td>17.6%</td>
<td>3</td>
</tr>
<tr>
<td>Waste Management Plan</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>2</td>
<td>15.4%</td>
<td>1</td>
</tr>
<tr>
<td>Quarantining of Incoming Animals</td>
<td>1</td>
<td>8.3%</td>
<td>1</td>
<td>8.3%</td>
<td>4</td>
<td>33.3%</td>
<td>2</td>
</tr>
<tr>
<td>Worker Safety Training</td>
<td>5</td>
<td>35.7%</td>
<td>2</td>
<td>14.3%</td>
<td>1</td>
<td>7.1%</td>
<td>4</td>
</tr>
<tr>
<td>Fire Extinguisher Maintenance</td>
<td>1</td>
<td>6.3%</td>
<td>1</td>
<td>6.3%</td>
<td>1</td>
<td>6.3%</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Definitely Yes</th>
<th>Probably Yes</th>
<th>Not Sure</th>
<th>Probably Not</th>
<th>Definitely Not</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Building Ventilation</td>
<td>1</td>
<td>5.6%</td>
<td>2</td>
<td>11.1%</td>
<td>7</td>
<td>38.9%</td>
<td>6</td>
</tr>
<tr>
<td>Waste Management Plan</td>
<td>1</td>
<td>5.9%</td>
<td>2</td>
<td>11.8%</td>
<td>6</td>
<td>35.3%</td>
<td>5</td>
</tr>
<tr>
<td>Quarantining of Incoming Animals</td>
<td>1</td>
<td>5.9%</td>
<td>5</td>
<td>29.4%</td>
<td>4</td>
<td>23.5%</td>
<td>5</td>
</tr>
<tr>
<td>Worker Safety Training</td>
<td>3</td>
<td>17.6</td>
<td>1</td>
<td>5.9</td>
<td>5</td>
<td>29.4</td>
<td>6</td>
</tr>
<tr>
<td>------------------------</td>
<td>---</td>
<td>------</td>
<td>---</td>
<td>-----</td>
<td>---</td>
<td>------</td>
<td>---</td>
</tr>
<tr>
<td>Fire Extinguisher Maintenance</td>
<td>1</td>
<td>5.3</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>26.3</td>
<td>7</td>
</tr>
</tbody>
</table>
The next section shows the results from the interview phase that gained a more in-depth view of the survey data and answered the final two research questions.

Interviews were conducted with 15 of the 33 survey respondents. Again, these interviews were arranged due to the lack of response gained in the survey portion of the study. Open-ended questions were used to answer the final two guiding questions of the study.

Figures 4.4 - 4.10 summarize the answers received from CAFO owners during the interview, and the emerging themes that arose. Figure 4.4 shows the most common precautions taken in order to keep barns and buildings on the farms up-to-date regarding building codes. Regular maintenance was by far the most stated response (86%), followed by including fire extinguishers in buildings (33%).

*Figure 4.4 Results to Interview Question #1*
Figure 4.5 shows actions CAFO owners took to ensure they followed manure and odor management regulations established by the ACRE law. The most common actions were spreading manure on fields at appropriate times (47%) and keeping pits under barns (47%). Increased use of these practices may be attributed to the implementation of the ACRE law. Hauling manure in appropriate weather and having an approved Nutrient Management Plan were also two emerging themes with 33% of interviewee’s mentioning them.

*Figure 4.5 Results to Interview Questions #2*
Figure 4.6 shows the types of actions CAFO owners take to ensure the safety of workers on the farms. However, the most common answer received was that there were no workers beyond family on the farm and safety was not a high concern. For those CAFO owners that did take safety into consideration, making sure shields and guards on equipment were in place was the most common action taken. Another common theme was to simply use common sense.

Figure 4.6 Results to Interview Questions #3

Can you tell me what types of actions or activities your operation does to ensure worker safety?

- No workers on farm
- No official plan in place
- Use Common Sense
- Be safe around
- Learn by doing
- Technical/Mechanical... Shields in place at all times
- Non-slip adhesive on... Fans running for...
- No debris laying around
- Remove aggressive... Equipment in good...
- PPE supplied
- Relational Preventive...
- Talk to workers and...
- Training workers and...
- Safety meetings

Number of Responses
Figure 4.7 shows the various tactics CAFO owners took to protect themselves from animal rights activism. This seemed to be a less important issue, for very few participants had taken any precautions, and 20% admitted to doing nothing to prevent animal rights activism. For those that had thought about it, their main efforts were put forth toward maintaining a clean and responsible image by taking actions such as disposing of dead animals quickly (27%) and not letting unauthorized people in barns (20%)

*Figure 4.7 Results to Interview Question #4*

**Can you tell me what types of actions or activities your operation does to protect yourself from animal rights activists?**

![Graph showing responses to interview question](image-url)
Figure 4.8 illustrates actions taken in terms of bio-security and preventing disease from entering farms. The most common way of preventing disease from entering the herd is keeping visitors off the farm (33%). If visitors do enter the farm, they are usually asked to use disinfectants, and wear clean, disposable boots before entering a barn (20%).

Figure 4.8 Results to Interview Question #5

Can you tell me what types of actions or activities your operation does to ensure bio-security and prevent disease epidemics?
Figure 4.9 summarizes the history of those CAFO owners interviewed and asks about any complaints regarding their farming practices. Sixty percent of those interviewed said that they had never received a complaint and many attribute this to living in a rural area surround by neighbors who also farm. The other 40% who had received a complaint, said odor was the most common criticism.

Figure 4.9 Results to Interview Question #6

<table>
<thead>
<tr>
<th>Have you ever dealt with a complaint by a neighbor regarding your farming practices?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>Number of Responses</td>
</tr>
</tbody>
</table>

Number of Responses
Research Question #2

On which of the six educational topics do CAFO owners and operators want to receive information on?

Figure 4.10 summarizes CAFO owner’s answers as to what types of information they would like to receive regarding the six topics of interest. It shows that Manure and Odor Management (47%) and Animal Rights Activism (47%) were the two most commonly sought after topics for educational materials. Worker Safety (40%), the Pennsylvania Right to Farm Law (40%), and Construction Issues (40%) followed closely. Bio-Security and Disease Prevention (33%) was the least requested topic with only a third of interviewees wanting further information.

Figure 4.10 Preferred Topics of Interest
Research Question 3

Which method of delivery is most preferred by CAFO owners and operators to receive educational information?

Figure 4.11 summarizes the participant’s answers to the question of how they preferred educational information to be delivered to them. Overwhelmingly, 73 percent of responses indicated that they would prefer to receive information through the mail as opposed to email, or someone visiting the farm. Email followed at a distant second with only 13 percent deeming it as an acceptable source of delivery. Only one interviewee, seven percent of the total interview population, mentioned that they would prefer a professional coming to their operation or making contact by telephone.

*Figure 4.11 Preferred Methods of Delivery*
Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to explore the best ways to educate Confined Animal Feeding Operation (CAFO) owners on various topics through their insurance company. A situational analysis is often used to initiate understanding of what methods and ideas would best be perceived by a particular audience (Boldt, 1987). This study was designed to find the most effective and desired means to promote awareness of several common agricultural issues amongst CAFO owners and operators through surveys and interviews. In addition, the study found which topics CAFO owners were the most in need of further education. Along with exposing the most needed topics to be informed upon, it also revealed which topics CAFO owners and operators desired more information.

The following research questions and hypotheses guided the study:

1. Which of the six educational topics are the most in need of promotion and awareness?

2. On which of the six educational topics do CAFO owners and operators want to receive further educational information?

3. Which method of delivery is most preferred by CAFO owners and operators to receive educational information?

The research study developed to address these questions employed an approach that used both quantitative and qualitative methods. The quantitative portion was a
knowledge assessment survey developed to measure CAFO owner’s knowledge level on certain topics affecting large-scale production agriculture operations. It consisted of multiple sections which focused on the six topics of interest: Construction Issues, Manure and Odor Management, Worker Safety, Animal Rights Activism, Bio-Security, and the Pennsylvania Right to Farm Law. It can be assumed that the insurance company that outlined these topics pays out the most money to their clients due to those six issues.

Following the multiple choice section, the questionnaire sought out information on whether or not the operation had specific plans established for five important aspects of a CAFO: including proper building ventilation, a waste management plan, quarantining of incoming animals, worker safety training, and fire extinguisher maintenance. The final section, measured on a Likert scale, required participants to inform researchers of how likely participants would be to implement, as well as accept help from their insurance company, regarding those five aspects.

The qualitative portion consisted of a follow-up interview conducted with those participants who responded to the survey. An interview protocol (See Appendix D) was used by the researcher to establish equality and consistency across interviews. After the statement of confidentiality was read, the interview preceded to ask for further descriptions regarding the main themes asked in the survey. Lastly, we asked participants how they would most like to receive educational information in regards to the six focus areas of the research study.

Conclusions

1. Which of the six educational topics are the most in need of promotion and awareness?
Based on the study’s results, Worker Safety is the topic most in need of promotion and awareness, followed closely with Construction Issues, for these topics had the lowest average scores on the knowledge assessment at 59.9% and 63.7%, respectively. CAFO owners in this study answered the most questions correct regarding Manure and Odor Management, with an average score of 86.1%. Therefore, participants in the study are the least in need of information regarding Manure and Odor Management.

2. On which of the six educational topics do CAFO owners and operators want to receive further educational information?

Regarding the second research question, which of the six educational topics do CAFO owners and operators want to receive information on, data displayed in figure 4.10 showed that Manure and Odor Management (47%), as well as Animal Rights Activism (47%) were the most requested. Seven out of 15 interviewees wanted further information on these two topics. Furthermore, Manure and Odor Management and Animal Rights Activism were also the two topics that CAFO owners and operators in this study had the highest scores on during the knowledge assessment survey. Therefore, participants are requesting the information that they already are the most knowledgeable about. Manure and Odor Management is an important topic at the moment because of the new ACRE law in Pennsylvania and its associated regulations that come along with it. This is forcing CAFO owners to be aware of regulatory requirements and make necessary adjustments to their operation in order to stay compliant. Farmers are most likely requesting information in order to find out what they need to do to comply with new regulations.
3. Which method of delivery is most preferred by CAFO owners and operators to receive educational information?

The final research question, which method of delivery is most preferred by CAFO owners and operators to receive educational information, revealed how participants would prefer educational information be delivered to them. An overwhelming majority, 73%, answered that they would prefer receiving information through the mail versus other options such as email or a professional visiting the farm or calling by telephone. Production agriculturalists have a very demanding schedule which makes it difficult to take the time and schedule an appointment with someone to call or visit the farm. It is much more convenient for CAFO owners and operators to receive the information they need via mail and read it at their convenience.

**Recommendations**

**Further Research**

This study has identified the need for further research regarding the effectiveness of suggested types of educational delivery methods. It is suggested that an experimental study be done in which different treatment groups are given similar information through various delivery methods. Participants could be split into three equal groups. The first group could receive information through mail. The second group could receive identical information through personal visits to the operation. And finally, the third group would serve as a control. Pre and post treatment tests could be administered to measure differences among group scores.
This study has also revealed the need for further in-depth studies. Follow-up interviews with participants would reveal if participants have added risk management procedures into their operation due to knowledge they were exposed to during the study.

**Implications**

This study has further implications for insurance companies across the state of Pennsylvania who insure large-scale animal production operations. Based on the findings of this study, it is recommended that educational materials be developed (See Appendix D-I) and be sent to CAFO clients across Pennsylvania through the mail. This style would not only be the most cost effective for an insurance company, but also less intrusive for their clients. Traditional forms of communication include face-to-face contact between educators and farmers. However, new technology and distance between farms has made direct communication difficult (Hildreth & Armbruster, 1981). It was also determined through the literature review, that farming audiences consider magazines and newspapers that they receive through the mail as reliable sources of information (Gloy, Akridge, & Whipker, 2000). It is assumed that CAFO owners would accept information from insurance companies through the mail as reliable information.

It also is recommended that insurance companies focus their efforts on the younger generations of farmers. A study done by North Carolina University found that younger farmers are more likely to adopt new environmentally friendly practices (Richardson et al, 2008). It is assumed that having fewer years for tradition to set in allows these farmers to be flexible in their practices.
Topics that should be focused on vary. Worker Safety and Construction Issues are topics that most participants in the study had the least amount of knowledge about. In order to encourage increased awareness of these topics, more focus should be placed upon them. In addition to Worker Safety having the lowest scores on the knowledge assessment section of the survey, participants ranked it as the risk management strategy most likely to be implemented. This shows a desire among participants to create a worker safety plan, but a lack of knowledge to do so. Additionally, 33% of interviewees stated that common sense alone was their best protection against injury on the farm and they took no additional precautions. It is important for insurance companies to show client’s that common sense will only get someone so far, and is not a guaranteed protection from hazards. Also during interviews, a vast majority of participants stated that only family members were working on the farm, and they felt this was good reason to dismiss worker safety. However, owners of the farm can still be held liable for family member’s injury (Baker, 1993). These issues provide additional support in favor of continued educational focus on Worker Safety.

Manure and Odor Management is a topic that also merits educational. Not only were participants the most knowledgeable of this topic, it was also the most desired. This could be attributed to the new ACRE law that has been established, creating more guidelines for CAFO owners and operators in regards to how they manage the discharge of their manure.

In addition to sending educational information to CAFO owners and operators through the mail, it is recommended that more incentive be given to those that cooperate and act accordingly to compliance regulations. A study in Colorado found that producers
favored incentives given by insurance companies to those clients who attended safety seminars (Seiz & Downey, 2001). If feasible, it is recommended that the insurance company working with this study give financial incentives to those clients who comply with a certain level of regulations determined by the insurance company.
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Appendix A

Letter from Insurance Company
Dear Recipient

The XXXX Agribusiness Division wants to better understand how we might help our clients successfully address important issues related to a confined animal operation (CAO). We asked the Pennsylvania State University’s Department of Agricultural and Biological Engineering to conduct a study that is important to all agricultural producers running a CAO. This study will address common issues such as manure and odor management, worker safety, dealing with animal rights activists, bio-security/disease epidemics, and right to farm issues, as well as how we may be able to provide services for you in these areas. The findings of this research may also lead to more accessible information for confinement operators that can help them become more profitable.

Enclosed is a consent form from Penn State that provides more information about the study. Also enclosed is a survey form. A code number has been assigned to your survey to help us anonymously track responses. Your participation is completely voluntary. Please give serious consideration to participating by completing and returning the survey form. A postage-paid, self-addressed envelope is included for your convenience.

This is an excellent opportunity for us to learn more about how we can help you and help pave the way for more customer-directed services. If you have any questions or concerns about this letter please feel free to telephone me at the number on this letter.

Respectfully,


XXXX XXXXX
Senior Executive Specialty Lines
Appendix B

Letter of Consent
Informed Consent Form for Social Science Research
The Pennsylvania State University

**Title of Project:** Determining Education Needs and Best Methods of Delivery for Confined Animal Feeding Operations

**Principal Investigator:** Dr. Dennis J. Murphy, Extension Safety Specialist  
221 Agricultural Administration Building  
University Park, PA 16802  
(814) 865-7157; djm13@psu.edu

**Project Coordinator:** Keri Connelly  
424 Agricultural Administration Building  
University Park, PA 16802  
(814) 404-5083; kec188@psu.edu

1. **Purpose of the Study:** The purpose of this research study is help Westfield Insurance better understand how they may be able to help clients address important issues related to a confined animal operation.

2. **Procedures to be followed:** A needs assessment survey will be mailed out to all participants consisting of approximately 25 questions. Depending upon those results, specific educational materials will be developed and distributed in a variety of techniques. Some participants may be personally presented with further information regarding CAO operations.

3. **Duration:** It will take about 15 minutes to complete the survey.

4. **Statement of Confidentiality:** Participation in this research is confidential. All survey results will be presented only as grouped data. There is no identifying information on the survey form and individual names and responses will not be used. Code numbers will be randomly assigned to each participant so that no identifying information will be included on the survey. After participants are randomly grouped into categories, a personal letter and number will be assigned to ensure anonymity. For example, the participant’s final code will look like A15, B12, C31, or something of that nature. Surveys will be secured in 221 Ag Engineering Building and then destroyed once the project is completed. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.

5. **Right to Ask Questions:** Please contact Dr. Dennis Murphy at (814) 865-7157 with questions or concerns with the survey questions.

6. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer.
You must be 18 years of age or older to take part in this research study.

Completion and return of the survey is considered your implied consent to participate in the study. Please keep this form for your records.
Appendix C

Questionnaire
Survey Questions

Listed below are questions related to Confined Animal Operations. Please answer the questions by circling the most appropriate answer for each question.

Construction Issues:

1) The recommended distance between buildings that contain fuel storage devices or chemicals is:
   a. 50 feet
   b. 100 feet
   c. 150 feet
   d. 200 feet

2) Which of the following gases is commonly found in a poorly ventilated barn?
   a. Ammonia
   b. Nitrogen
   c. Helium
   d. Formaldehyde

3) On average, how many barns are lost due to fire each year in the United States?
   a. Approximately 1,000
   b. Approximately 2,500
   c. Approximately 6,000
   d. Approximately 10,000

4) Which of the following is a common reason for installing proper ventilation to a barn?
   a. Decreased disease transmission
   b. Keeps bedding dry
   c. Increased lighting
   d. Decreased risk of fire

Would you like to receive more information on Construction Issues regarding Confined Animal Operations? Please circle the answer that applies
   Yes       No

Manure and Odor Management:

5) Growing public awareness and concern for controlling water pollution led to enactment of the Federal Water Pollution Control Act amendments of 1972. As amended in 1977, this law became commonly known as what?
   a. The Great Lakes Act
   b. The Pollution Act
   c. The Clean Water Act
   d. The Environmental Act
6) Which of the following is a main objective of the Agriculture, Communities, and Rural Environment (ACRE) program established by Governor Ed Rendell in 2005?
   a. Rewrite all the existing laws concerning manure and odor management.
   b. Ensure that local governments pass ordinances overseeing normal water regulations.
   c. Replace the Nutrient Management Act by retaining most of the current law and regulations but adding manure management requirements.
   d. Require all farms to develop odor management plans.

7) Under new regulations of the ACRE law, no CAO may mechanically land apply manure within how many feet of a stream, lake, or pond, without some type of regulated buffer?
   a. 1 mile
   b. 500 feet
   c. 100 feet
   d. 10 feet

8) What do the letters NRCS stand for in regard to preserving soil, water, and other natural resources?
   a. National Resource Constraint System
   b. National Ranchers Conservation System
   c. Natural Resources Conservation Service
   d. Natural Resource Control System

Would you like to receive more information on Manure and Odor Management regarding Confined Animal Operations? Please circle the answer that applies
Yes  No

Worker Safety

9) Agriculture continues to flip between what two rankings for most occupational fatalities?
   a. 1st and 2nd
   b. 4th and 5th
   c. 7th and 8th
   d. 10th and 11th

10) Production agriculture accounts for what percent of agricultural fatalities?
    a. 10%
    b. 40%
    c. 60%
    d. 80%

11) Which of the following is not usually included in a safety policy?
a. Employees wages
b. Safety goals
c. Accountability procedures
d. Employee and owners responsibilities to safety.

12) Under the Worker Protection Standard (WPS), agricultural employers are now required to take many safety precautions regarding their employees. Which of the following is a requirement under the WPS?
   a. Have on file specific information about pesticide safety, emergency procedures and recent pesticide applications.
   b. Supply pesticide safety training for their agricultural workers and pesticide handlers.
   c. Transport workers to medical care in case of emergency.
   d. Participate in the pesticide safety training along with newly hired pesticide applicator.

Would you like to receive more information on Worker Safety regarding Confined Animal Operations? Please circle the answer that applies
Yes ❌ No

Animal Rights Activists

13) What do the letters P.E.T.A. stand for in reference to animal rights?
   a. People for the Ethical Treatment of Animals
   b. Pennsylvania Employees Teaching Awareness
   c. Pennsylvania Ethical Treatment Association
   d. Pets and Easily Trainable Animals

14) Which of the following groups is a radical activist group?
   a. PDMP
   b. ALF
   c. EFL
   d. NCBA

Would you like to receive more information on Animal Rights Activists regarding Confined Animal Operations? Please circle the answer that applies
Yes ❌ No

Bio-security/Disease Epidemic

15) Which of the following diseases is an infectious disease?
   a. Porcine Stress Syndrome
   b. Johne’s
   c. Ketosis
   d. Ovarian follicular cysts
16) Which of the following species is most likely to be infected with Foot and Mouth?
   a. Cattle
   b. Chicken
   c. Fish
   d. Horses

17) Which of the following diseases is mainly spread through contact with urine of infected cows?
    a. Contagious Mastitis
    b. Rotavirus
    c. Leptospirosis
    d. Hairy heel warts

18) New animals should be quarantined for how many days upon arrival to a new farm?
    a. 60 days
    b. 30 days
    c. 14 days
    d. 7 days

Would you like to receive more information on Bio-security and Disease Epidemics regarding Confined Animal Operations? *Please circle the answer that applies*
Yes    No

Right to Farm Issues

19) The original goal of the Right to Farm law was to equip agricultural operations to protect them against what?
    a. Agricultural nuisance lawsuits
    b. Animal rights activists
    c. Environmental pollution
    d. Disease epidemics

20) Most agricultural nuisance lawsuits are brought against operations complaining of what type of problem?
    a. Overwhelming odors
    b. Loud machinery
    c. Cruelty to animals
    d. Pesticides blowing into neighboring property

21) The Right to Farm law states that if an agricultural operation has been in existence and not substantially changed for how long, they are exempt from Agricultural Nuisance lawsuits.
    a. 6 months
    b. 1 year
    c. 5 years
d. 10 years

22) Under the Right to Farm law, agricultural operations are immunized from nuisance lawsuits when they obtain approval of what plan?
   a. Safety Management Plan
   b. Risk Management Plan
   c. Nutrient Management Plan
   d. Agriculture Building and Equipment Plan

Would you like to receive more information on Right to Farm Issues regarding Confined Animal Operations? *Please circle the answer that applies*
Yes No

General

23) Do you have a specific plan or program established for the following items
   (Circle Yes or No):

<table>
<thead>
<tr>
<th>Plan</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Building Ventilation</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Waste Management Plan</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Quarantining of Incoming Animals</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Worker Safety Training</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Fire Extinguisher Maintenance</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

24) How likely are you to adopt or implement the following items into your operation? Circle the response that best reflects your feelings. (If all exist, skip to the next question)

<table>
<thead>
<tr>
<th>Plan</th>
<th>Definitely Yes</th>
<th>Probably Yes</th>
<th>Not Sure</th>
<th>Probably Not</th>
<th>Definitely Not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Building Ventilation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste Management Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Quarantining of Incoming Animals
Definitely Yes   Probably Yes   Not Sure   Probably Not   Definitely Not

Worker Safety Training
Definitely Yes   Probably Yes   Not Sure   Probably Not   Definitely Not

Placing Fire Extinguishers in All Buildings
Definitely Yes   Probably Yes   Not Sure   Probably Not   Definitely Not

25) For all the items below, how likely is it that you would accept Westfield’s assistance in improving or enhancing the effectiveness of the following items? Circle the response that best reflects your feelings.

Proper Building Ventilation
Definitely Yes   Probably Yes   Not Sure   Probably Not   Definitely Not

Waste Management Plan
Definitely Yes   Probably Yes   Not Sure   Probably Not   Definitely Not

Quarantining of Incoming Animals
Definitely Yes   Probably Yes   Not Sure   Probably Not   Definitely Not

Worker Safety Training
Definitely Yes   Probably Yes   Not Sure   Probably Not   Definitely Not

Placing Fire Extinguishers in All Buildings
Definitely Yes   Probably Yes   Not Sure   Probably Not   Definitely Not
If you would like information on more specific areas or have general comments about the survey feel free to add them here.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Thank You!!
Appendix D-I

Educational Materials
Animal Rights Groups

There are many animal rights groups existing throughout the United States. The most popular of these groups is the People for the Ethical Treatment of Animals, commonly known as PETA. PETA is an activist group that promotes ethical animal treatment in large-scale farms, laboratories, clothing industries, and entertainment industries. The Humane Society of the United States is another animal activist group that is growing in popularity. The Humane Society is the nation's largest animal protection organization with more than seven million members. The Animal Liberation Front (ALF) is yet another example of radical activist group. All three groups make a point to take action against anything they feel is disrupting the normal practices of animals. These groups have the ability to cause damage to a large-scale farms, especially operations that are not appropriately prepared for such an event. Animal cruelty does happen and should be addressed. However, farm operations should protect themselves from inaccurate allegations. For example, The Humane Society has filed suits in California, New Hampshire, and Arizona regarding laying hens and the size of cages that are provided for these animals. They have also worked with many large-scale organizations to ban usage of eggs from layers that use battery cages.

Hiring Practices

Title VII of the Civil Rights Act of 1964 prohibits employment discrimination based on race, color, religion, sex, or national origin. This also includes one's involvement in activities and organizations including animal rights groups. An employee cannot be fired for their affiliation with an animal rights group. The key is to be prepared for the situation.

When interviewing potential employees it is important to ask questions in a legal manner. For example:

ILLEGAL: What clubs, lodges, or social organizations do you belong to?

LEGAL: Do you belong to any professional or trade organizations that you consider relevant to your ability to do this job.

Animal Cruelty Does Happen

In March 2005, a 78 year-old Ohio farmer was charged with two counts of allowing cows to run at large and one count of animal neglect after 37 dead Angus cattle were removed from his farm. After several complaints from community members, local veterinarians checked out the situation and found little to no feed available for the animals. Local farmers began bringing hay to feed cattle, but damage had already been done. After the 37 dead cattle were found, charges were brought against the farm owner. Post-mortem examinations showed the cause of death was severe malnutrition. The farmer was found guilty of misdemeanor charges.

*Note: Animal neglect is counted as a misdemeanor charge. However, animal beating or cruelty is a more severe act that qualifies for felony charges.
Importance of Documentation

A smart business keeps detailed records of all transactions and events that happen involving the enterprise.

- **Rules**: Keep a detailed set of rules on the grounds of the operation. Give a copy to each employee, and have him or her sign a document agreeing to abide by the rules.
  *No video equipment or unannounced visitors are two good rules to have on large-scale animal operation.*

- **Policy**: Within the policy statement of a large-scale animal operation, it is important to state the high priority of animal welfare for the organization. Also state specific actions the farm takes to ensure animal welfare, and stick to them.

- **Records**: Detailed records provide strong support for the owner of an animal operation. First, keep records of when organizational policies and rulebooks are given to employees. It is also useful to keep disciplinary records. They show negative behavioral patterns exhibited by employees. It is also useful for managers to keep a daily behavior log of employees. Details that may seem mundane and insignificant at the time can be important at a later date.

Tips for Spotting Activist Infiltrations

- Look for unusual characteristics that make them stand out from the general employment pool.
- Over-qualified individuals for the job.
- Ask legal questions about their experience and why they are interested in their job.
- Keep documentation of unlikely behaviors.

Spotting Animal Cruelty

If you witness animal cruelty acts you should report them to you local organizations. The following websites can help you find the right people to get in contact with.

- [http://www.hsus.org/pets/issues_affecting_our_pets/animal_abuse_and_neglect/reporting_animal_abuse_or_neglect.html](http://www.hsus.org/pets/issues_affecting_our_pets/animal_abuse_and_neglect/reporting_animal_abuse_or_neglect.html)
- [http://www.hsus.org/pets/issues_affecting_our_pets/animal_abuse_and_neglect/reporting_animal_abuse_or_neglect.html](http://www.hsus.org/pets/issues_affecting_our_pets/animal_abuse_and_neglect/reporting_animal_abuse_or_neglect.html)
The greatest risk to the health of livestock on your farm is from other animals and their manure. For this reason, it is important to quarantine animals entering the herd. Being able to isolate sick animals and quarantine new or returning animals will help overall herd health and promote your farm’s bio-security. Listed to the right are situations in which animals should be quarantined and the appropriate facilities that should be used for isolation.

**Isolation and Quarantine**

When to Quarantine:
- When adding new livestock to the farm.
- When livestock returns from shows, fairs, or exhibitions.

Recommended Procedures:
- Quarantine animals for at least 30 days
- Make sure incoming livestock has been vaccinated.
- Do not allow other animals (domestic or wild) to have contact with livestock, feed, or water sources.
- Prevent human transfer by cleaning vehicles, equipment, shoes, and other equipment used on other farms.

Isolation Facilities:
- Should provide air space, feed supply and water separate from rest of herd.
- Provide clean, dry, and comfortable space.
- Provide a transition period to new rations.
- Use separate equipment such as shovels and buckets for isolation area.
- Ensure that workers clean boots before entering other areas of the farm.

**Adding New Animals to the Farm**

Bringing new animals onto the farm is the most common vehicle for transmission of disease. Before new animals enter your farm, use the following checklist of items to guide you through the process of adding livestock. These items should be taken into consideration before animals reach an enterprise.

**Pre-Purchase Checklist**
- Mastitis (dairy only)
- Hoof health
- Vaccination Status
- Herd Health Status
- Deworming/anitparasitic program

**Importance of Emergency Preparation**

In 2001, the United Kingdom had a Foot and Mouth outbreak that cost the country 6 million animals and $3.6-11.6 billion. The United Kingdom land size would fit within the state of Oregon. Would Pennsylvania’s response personnel be able to handle that size emergency on their own???
Common Infectious Diseases in Livestock

**CATTLE**

**BVD** - A common viral agent, present in most herds. May cause respiratory, digestive, or reproductive problems.

**Brucellosis** - Most states are free of this disease but vaccination is still encouraged.

**IBR** - Viral infection of the upper respiratory tract. Most cattle carry disease and release during periods of stress.

**Leptosporosis** - May cause abortion and illness. Spread through water and urine.

**Tuberculosis** - Lesions affect liver, lymph nodes, and lungs.

**Virus pneumonia** - Common in calves. Includes coughing, loss of appetite, and scours.

**Johnne’s disease** - Chronic infection of the small and large intestines. Characterized by diarrhea, emaciation, and weakness. This is a highly infectious disease that spreads quickly through a herd.

**Swine Dysetery** - This bacteria causes severe inflammation of the large intestine with a bloody mucous diarrhea.

**POULTRY**

**Avian Influenza** - Caused by the avian influenza (H5N1) virus. Very contagious among birds. Virus spread through saliva, nasal secretions, and feces.

**Pullorum-Typhoid** - Bacterial disease that has fatal outcomes, especially in young.

**BE PREPARED!!**

The key to protecting your operation from an outbreak is being prepared. As herd size increases and as herds are placed in more intensive housing management systems, it is easier for infectious diseases to enter and spread. There are many different ways disease can be introduced to the herd. In addition to new animals, people trafficking, feed and other truck deliveries, rodents, birds, and other wildlife are all common ways to introduce disease. One way to concisely introduce biosecurity and biocontainment is to use the acronym IRS. IRS stands for Isolation-Resistance-Sanitation.

Isolation - New additions to the farm create the most susceptible situation for disease to enter into a herd. It is important to implement a screening, quarantining, and monitoring system with new animals. Work with your local veterinarian to use appropriate screening tests. Always remember, even with test results showing no infectious disease, it is important to quarantine animals anyway; tests can be wrong. Monitoring new animals is also important for early detection. Animals that become sick shortly after being introduced into the herd should be removed immediately.

Resistance - Resistance includes nutritional, environmental, pharmacological and immunological practices that improve the animal’s ability to resist disease. These external factors coupled with the natural genetic disposition of certain animals provide an animal with either increased or decreased susceptibility to certain infectious diseases. In the past immunizations has been the main focus in creating disease resistance. Recently however, more emphasis has been placed on good nutrition and less stressful environments to promote disease resistance.

Sanitation - Sanitation involves the removal of contaminated animals and equipment. Failure to remove pathogens can re-introduce disease into a herd. Any equipment used on diseased animals should be thoroughly cleaned before use from another animal. Boots and clothing can also become soiled when working with diseased animals and should be routinely cleaned. If visitors enter your operation, plastic boot coverings should be provided. Also, if you visit another farm, be sure to clean soiled clothing before re-entering your own operation.
OLD BARNs

Almost 6,000 barns are lost due to fire each year in America. The two most common times for barn fires are summer and winter. Summer fires are often the result of electrical storms or spontaneous combustion of hot hay. Straw and hay produces oxygen for a short time after being stored. Bacteria eats this oxygen, which creates heat. If there is too much heat, combustion occurs. Be aware of stored hay temperatures reaching levels above 150 degrees Fahrenheit. Rodents chewing through wires or dust collecting on electrical surfaces often cause winter fires. Electrical deficiencies are consistently among the leading cause of fires. It is important to replace deteriorated wiring on electrical fixtures. Consider eliminating electric wiring that is no longer in use to prevent confusion over “hot” vs. dead wires. Another electrical risk comes when dust collects around the hot wires. Barns can be very dirty and dusty. To prevent a possible fire from hot light bulbs igniting combustible materials, it is recommended that the lights in these areas be equipped with dust proof covers.

The following combustible materials should not be found near an electrical or heat source: hay/straw, bedding materials, cobwebs, horse blankets, paint, fertilizer, or pesticides/herbicides. Accelerants are substances that increase the speed at which fire can spread. Possible accelerants include gasoline, kerosene, oil, and aerosol cans. These products should be kept in approved fire-resistant containers and labeled as such. An ignition source is something that will cause an accelerant or flammable material to ignite or smolder. Ignition sources include cigarettes and matches, sparks from welders, motors, fence chargers, electric sparks, and batteries. Be careful of activities done in the barn and their risk to starting a fire.

NEW BARNs

When constructing a new barn where livestock will be housed, there are many important aspects to consider in reducing the chance of barn fires. Installing a firewall between bedding/hay storage and animals, using flame resistant materials, installing heat detectors, fire alarms, sprinkler systems, and having water storage on location will help to ensure your buildings fire safety. Also, when building a barn, it is important to remember a few things about electrical systems. It is important to put an electrical box in a dry area that stays clear of dust and debris. The panel boxes should be weatherproofed and corrosive resistant. Wires should be covered with metal pipe to avoid rodent damage.

A final note about fire protection involves lightning. All buildings should be equipped with professionally installed lightning rods of copper or aluminum. These systems should be properly grounded, along with all pipes, water systems, electrical systems, and telephone lines.

Ventilation

Ventilation systems in barns serve an important function for maintaining animal comfort, reducing odors, removing moisture, replenishing the oxygen supply, and removing gases. Ammonia, hydrogen sulfide, and methane are all common gases that form in poorly ventilated barns. These gases can be damaging to the health of both livestock and workers. A proper ventilation system will be able to accomplish sufficient airflow, adjust according to outside weather conditions, and account for season variability. These are accomplished with manually opened and closed curtains, doors, and ventilation panels. A proper ventilation system will bring in cool dry air, pick up heat, moisture, and contaminants from the barn, and expel them.
The storage and handling of flammable liquids in barns can cause a fire hazard. Compressed gas cylinders should be chained to walls to support them and prevent tipping.

To prevent possible damage from an explosion or fire, make sure all diesel and gasoline tanks are outside and away from the nearest buildings according to NFPA regulations.

### Storing Chemicals

<table>
<thead>
<tr>
<th>Gallons</th>
<th>Distance (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-125</td>
<td>5</td>
</tr>
<tr>
<td>126-500</td>
<td>10</td>
</tr>
<tr>
<td>501-750</td>
<td>15</td>
</tr>
<tr>
<td>751-1500</td>
<td>20</td>
</tr>
<tr>
<td>1500-2000</td>
<td>25</td>
</tr>
<tr>
<td>2001-5000</td>
<td>35</td>
</tr>
</tbody>
</table>

### Fire Extinguishers

In the event of a barn fire, every building should be equipped with a fire extinguisher. The ideal weight for an extinguisher is 10 lbs. Extinguishers should be stored in all exterior doorways, middle of long aisles, and beside all electrical box panels. Fire extinguishers should be for class ABC type fires, and professionally inspected annually. Type A fires consist of ignition sources such as wood, paper, rubbish, and plastic. Type B involves burnable liquids like grease, oil, and fuels. The final class, type C fires, is electrical fires.

When using a fire extinguisher, remember the acronym PASS!
- **P**ull the pin
- **A**im at the base of the fire
- **S**queeze the trigger
- **S**weep from side to side

It is important to remember to aim at the base of the fire in order to use materials most efficiently and to create a barrier between yourself and the fire.

### RESOURCES:

For more questions, contact the following:

- National Fire protection Association

- National Ag Safety Database

- Natural Resource, Agriculture, and Engineering Service
  [http://www.nraes.org/nra_order.taf?_function=view&ct_id=7](http://www.nraes.org/nra_order.taf?_function=view&ct_id=7)

- Ventilation
  [http://www.extension.psu.edu/scregion/Agriculture/AgEngActicles/VentBasic.s.PDF](http://www.extension.psu.edu/scregion/Agriculture/AgEngActicles/VentBasic.s.PDF)
Confined Animal Operation Topic: Manure Management

What is ACRE?

Governor Rendell recently signed the Agriculture Communities and Rural Environment (ACRE) bill, which aims to benefit both farmers and the environment. This law is meant to revise the Nutrient Management Act by retaining most of the current laws, but adding more manure management requirements. This law has two parts to it. First, farmers can now request a review by the Attorney General of ordinances that limit normal agricultural operations. Farmers are now the only citizens able to request that of the Attorney General. The Attorney General then has the ability to limit ordinances they feel are unnecessary. Any disputes between the farmer and surrounding public will be dealt with in a Commonwealth Court.

The second part of the bill includes Best Management Practices (BMP). These BMP’s for odor control will be required for all concentrated animal feeding operations (CAFO) and concentrated animal operations (CAO) when they expand existing structures or construct new buildings for housing animals or storing manure. Farms are prohibited from spreading animal manure within 100 feet of streams, lakes, and ponds. If the farm establishes a vegetative buffer along the waterway, spreading can occur up to 35 feet from streams, lakes, and ponds.

Clean Water Act

In recent decades the concern for water pollution has created a greater public awareness of the issue. In 1972, the Federal Water Pollution Act Amendment was created and updated in 1977 to become known as the Clean Water Act. It established basic structures for regulating discharges of pollutants into waterways. In a joint effort, the Environmental Protection Agency created several programs that dealt with pollution control. It also helped to fund sewage treatment plants that treated the already existing pollution.

Top 4 Manure Gases

- Hydrogen Sulfide
- Ammonia
- Carbon Dioxide
- Methane

It can happen to you!

A 31-year-old male dairy farmer and his 33-year-old brother died after entering a 25 square foot, 4 1/2 feet deep manure pit inside a building on their farm. A pump intake pipe in the pit had clogged, and the farmer descended into the pit to clear the obstruction. While in the pit, he was overcome and collapsed. The victim's brother was standing at the entrance of the pit and apparently saw the victim collapse. He entered the pit in an attempt to rescue him. The brother was overcome and collapsed inside the pit. Four hours later, another family member discovered the two victims inside the pit and called the local fire department to rescue them. The victims were pronounced dead at the scene by the coroner. The coroner's report attributed the cause of death in both cases to methane asphyxiation.
Manure is a byproduct of what animals eat and digest. It contains decomposing materials that soon begin a fermentation process after being passed. The fermentation process is what produces both foul smelling gases and other odorless gases that can be harmful to one's health. Listed on the previous page are four common gases that can accumulate within a storage facility.

BE AWARE!!!
Common side effects of a low-level exposure include:
- Lung irritation
- Eye irritation
- Dizziness
- Drowsiness
- Headaches
Higher levels of gases can deplete your oxygen supply and knock someone unconscious and suffocate them almost instantly.

Be Safe!!
- Keep people and animals out of confinement buildings during manure storage agitation and pumping.
- Ventilate the area for several hours after pumping activities.
- Keep manure agitators below liquid manure surface level to reduce volume of gases released.
- Remove temporary access ladders leaning against the above ground manure tanks.
- Never work alone when agitating or emptying a storage facility.
- Never enter a manure pit without a self-contained breathing apparatus (SCBA); ventilating the pit before and during the entry; wearing a safety harness attached to a mechanical lift device outside the pit, and an assistant to operate the lift and go for assistance in an emergency.

Resources
For more information on manure and odor management, check out the following websites:
ACRE Law:
http://agenvpolicy.ers.psu.edu/ACRE.htm
Natural Resources Conservation Service:
http://www.nrcs.usda.gov/
Pennsylvania Department of Agriculture:
http://www.agriculture.state.pa.us/
Environmental Protection Agency:
http://www.epa.gov/
HOSTA Training Materials
http://nstmop.psu.edu/
What is the Right to Farm Law?

**Who:**
The Right to Farm law was originally designed to protect agricultural operations that meet specific requirements from nuisance suits that may be brought against them.

**What:**
A nuisance lawsuit is a neighbor suing a farmer to force them to stop doing a farming activity or force them to pay damages for their actions.

**Where:**
There are several types of right to farm laws that vary from state-to-state, but generally have the same basic rules.

**When:**
The right to farm law was developed in the 1970's when lawmakers were becoming more aware of disappearing agricultural land. Persons not involved in farming were moving into traditional agricultural areas, bringing new complaints.

**Why:**
Common complaints from neighbors include concerns about odor, flies, dust, noise from field work, spraying of chemicals, and slow moving farm machinery. The most common issue that is subject to complaint is odor.

**How:**
Courts have the option of closing the operation, altering the way it runs, or assessing penalties to compensate the landowner for the nuisance.

Pennsylvania Law

**PA Law Protects when:**
1. The agricultural operation has been operating lawfully without a complaint for one year or more prior to the time when the operation is claimed to be a nuisance.
2. The agricultural operation has adopted and is operating in compliance with an approved nutrient management plan.

**PA Law Does NOT Protect Against:**
1. Water Pollution
2. Soil Erosion
To protect your operation from nuisance lawsuits, there are a few things any operator can do. First is to be conducting business using normal agricultural activities. A normal agricultural activity is an activity that farmers use to produce and prepare animals and products for market. The activities must take place on no less than ten continuous acres of land, or if on less than ten acres, the activity must have an anticipated yearly gross income of at least $10,000. If the “nuisance” complained about is determined to be a normal agricultural activity, the farmer is protected.

A second action to take to protect your farm is to create a nutrient management plan. Governor Rendell recently implemented the Agriculture Communities and Rural Environment (ACRE) law. The ACRE law requires all large animal feeding operations to implement a nutrient management plan. These plans benefit both the farmer and the environment by using best management practices developed specifically for each operation. Farmers can talk with their local extension educator to receive information on how to create a successful plan.

The Right to Farm Law in Action

There have been many cases already cited where the Right to Farm Law has benefited the agricultural industry. On April 5, 2006, a Wisconsin judge dismissed a lawsuit filed by the Attorney General and 13 out-of-state landowners against a Wisconsin cranberry grower. The judge denied the lawsuit against the farmer that was claiming his cranberry operation released phosphorus from the application of fertilizer into the Musky bay. The plaintiffs were asking the cranberry grower to:

1) stop discharges of phosphorus into the lake,
2) dredge the lake,
3) pay the landowners general damages for loss of use of the lake,
4) pay their attorney fees and other expenses, and,
5) pay any other equitable relief deemed proper.

The judge ruled that the cranberry grower’s farming practices were not unreasonable and did not substantially impact the water in the bay. This case shows how operating according to regular guidelines can protect an operation from potentially devastating nuisance lawsuits.
Agriculture continues to be one of the most dangerous industries in the country. Over 700 farmers and ranchers die in work-related accidents yearly. Many of these injuries occur when farm tractors roll over on the operator and its passengers. Another 120,000 agricultural workers suffer disabling injuries from work related accidents. Although working with machinery and equipment is a top reason for injury and fatality, there are a variety of hazardous situations associated with production agriculture. Working with animals can be hazardous as well. People regularly working on farms may develop adverse health effects including respiratory illness, musculoskeletal injuries, hearing loss and many other health problems. Employee injuries/death will negatively impact a business in several different ways. Insurance costs, inefficient workers, lost production from the non-injured, and emotional tolls are all ways one injury can affect an entire business.

Ag Safety and Health Plan

There are five different parts to an Ag Safety and Health Plan. These plans help large operations to stay in compliance with OSHA, Worker Protection Standards, and the Pennsylvania Pesticide Control Act. Component 1 is the Development of Management and Employee Commitment. The involvement of each and every individual is crucial to the success of a safety plan. Component 2 is the Work Site Analysis. A close inspection of the worksite for hazards is an important action that shows commitment to safety. Component 3 is Hazard Prevention and Control. Seeking out the multiple causes of injuries aides in developing preventive behaviors and actions to avoid injury. Component 4 is the Training of Employees and Managers. Having established guidelines for training will ensure the abilities of employees to complete tasks. And finally, component five is Record Keeping and Documentation. Records are an important way to document that you have a safety plan, are complying with regulations, and properly training workers.

Coping with Stress

Studies by the National Institute for Occupational Safety and Health show that farmers have the highest rate of death as a result of stress related conditions. Heat stress, artery disease, hypertension, ulcers, and nervous disorders top the list of killers. Dealing with stress is the first step to overcoming it.
- Acknowledge that there is stress in your life
- Don’t hide stress. When it builds up inside it is likely to cause physical harm.
- Stay well rested and well nourished.
- Try to anticipate problems and solve them in advance to reduce stressful times.
Being one of the most hazardous industries, it is important to be aware of the various risk factors associated with raising animals for production agriculture.

- Livestock: animal handling, disease
- Equipment: skid-steers, tractors, forklifts
- Storage Facilities: silos, manure pits
- Working Surfaces: parlors, ladders
- Electrical Equipment: pumps, cords, fuses, breakers
- Agrotainment: petting zoo
- Structural Openings: hay holes, doors, gates

Keep Kids Safe

When working with animals, encourage children to:

- Be calm, move slowly, and avoid loud noises
- Wear steel toed shoes
- Avoid the hind legs of the animal
- Approach large animals at the shoulder
- Avoid animals with newborns
- Avoid stallions, bulls, rams and boars
- Always have an escape route when working with animals in close quarters
- Wear helmets when riding horses

Resources:

Check out these websites for more information on how to make your farm, a safe one!

http://osha.gov/
http://www.cdc.gov/niosh/homepage.html
http://www.abe.psu.edu/
http://research.marshfieldclinic.org/children/
http://www.fs4jk.org/
Appendix J

Interview Protocol
**XXXX Insurance Interviews**

*Thank participant for agreeing to be interviewed*

*Explain purpose of the study-*

The purpose of the study we are conducting with XXXX is twofold—1) Our first goal is to learn what types of activities XXXX Confined Animal Operators are doing to ensure a safer enterprise and 2) to understand what kinds of services clients would like to receive from XXXX regarding Confined Animal Operations.

*Confidentiality of Data-*

The information you provide today is for group data purposes only. All information collected will be confidential and will not be individually labeled for anyone at Penn State University or XXXX Insurance. Names of interviewees will not be associated with the tapes. The sessions will be audio taped, and the tapes will be kept in a secure filing cabinet in Dr. Dennis Murphy’s office and in secure files on my computer.

*Do you have any questions before we begin?*

1. Can you tell me what types of precautions your operation takes to keep buildings up to code?

2. Can you tell me what types of actions or activities your operation does to follow the guidelines of manure and odor management established by the new ACRE law?

3. Can you tell me what types of actions or activities your operation does to ensure worker safety?

4. Can you tell me what types of actions or activities your operation does to protect yourself from animal rights activists?

5. Can you tell me what types of actions or activities your operation does to ensure biosecurity and prevent disease epidemics?

6. Have you ever dealt with a complaint by a neighbor regarding your farming practices?

7. You listed on your survey that you would like to receive information regarding _____________. How would you like this information delivered to you?

**OR**
7. You listed on your survey that you did **not** want to receive any information from XXXX regarding Confined Animal Operations. What types of information can XXXX provide to you to ensure the success of your operation?
Appendix K

Reminder/Thank You Cards
Thank You!

Two weeks ago a questionnaire seeking your opinion on how Westfield Insurance can better address certain issues that affect confined animal operations was sent to you.

If you have already completed and returned it to us please accept our sincere thanks. If not, please do so today. Because it has been sent to only a small group of confined animal operators, it is extremely important that yours be included in the study.

If by some chance you did not receive the questionnaire, or it got misplaced, another copy will be sent to you soon.

Sincerely,

Scott Orndorff
Senior Executive Specialty Lines