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Review of Safety Programs at Midsized, Non-Land Grant University Farms

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41 Pages

In 2013, OSHA ranked agriculture as the highest industry in per capita injury and deaths. (OSHA 2013). Agricultural production presents many hazards which may or may not be unique to this industry. Workers can face long hours, exposure to extreme heat and cold, aggressive animals, exposure to chemicals, and hazards regarding heavy equipment. University farms face many of the same problems as private production agriculture, with the added pressure of often being diverse operations with the constant presence of student workers, which have highly variable levels of experience. Based on the amount of hazards present, one would expect to see a high injury rate among university farm workers, but there is very little information surrounding injury rates as well as safety information at university farms. The objective of this exploratory study is to build the knowledge base surrounding non-land grant university farms.

KEYWORDS: agriculture safety, safety, student worker, university farm

REVIEW OF SAFETY PROGRAMS AT MIDSIZED, NON-LAND GRANT UNIVERSITY FARMS

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REVIEW OF SAFETY PROGRAMS AT MIDSIZED, NON-LAND GRANT UNIVERSITY FARMS

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CHAPTER I: GENERAL INTRODUCTION

Introduction

Since the nation's founding, agriculture has had a prominent role in America's success and progress. Agriculture and associated industries currently employ 21 million people (BLS 2015). This industry has consistently ranked as one of the most dangerous industries, with 5,816 worker fatalities between 2003 and 2011 (BLS 2013). The very nature of agricultural work makes it inherently dangerous. Workers are often exposed to extreme temperatures, unpredictable animals, long working hours, potential chemical exposure, and many other hazards. With the inception of land-grant and state supported agriculture universities, an emphasis on increasing production and profitability has proven highly successful. Yet advances in safety have lagged behind.

The land grant university system was created in 1862 when the Morell Act was signed into law, along with the later passed Hatch Act and the Smith-Lever Act, these acts provided land and funding for these schools to produce and share information relating to "agriculture and the mechanical arts" to the general population (Britannica 2013). At that time in history many non-land grant universities were being established. Seeing the demand for agricultural knowledge, these schools also began to establish university farms. Today, many agricultural colleges or universities have one or more farms associated with them. Presently, these farms are used for research, teaching, outreach, and as a place to provide hands on experience for students. Often, farms maintain production in addition to these duties, in order to help lower costs to the university.

With research projects beginning and ending at various times throughout the year and students being hired and leaving every semester, university farms frequently employ

inexperienced workers. Lack of experience can lead to a worker more prone to risk (Trotto 2016). It can take time to become familiar with processes and procedures associated with farming, as well as those associated with the individual operation. Emergencies and extraordinary circumstances can create additional challenges that an inexperienced worker may not have the training or experience to know how to handle. With the frequent presence of more risk prone workers, it would be logical to assume more injuries would occur. However, there appears to be very little information concerning injuries and fatalities at university farms. This lack of information raises several questions surrounding the state of worker safety programs and policies at these institutions.

Purpose Statement

This is an exploratory project, attempting to identify general demographic information, as well as the status and challenges faced by safety programs on non-land grant university farms. This research is focusing on the relationship between various factors present on these farms and the presence or absence of safety programs, as well as the relationship between these farms and the safety enforcement departments at those associated universities.

Research Questions

1) Do non land-grant university farms have worker safety programs?

2) What is the extent of the safety programs that do exist on non-land grant university farms?

3) What factors are associated with the presence of safety programs on midsized non-land grant University farms?

4) How does the relationship between university farms and university safety enforcement departments have an effect on the presence or extent of farm safety programs?

Thesis Organization

This thesis is in an alternate format. It includes a general introduction, a manuscript formatted according to the style of Journal of Agromedicine, a review of the literature, and additional tables in an appendix.

CHAPTER II: MANUSCRIPT

Abstract

In 2013, OSHA ranked agriculture as the highest industry in per capita injury and deaths (OSHA 2013). Agricultural production presents many hazard which may or may not be unique to this industry. Workers can face long hours, exposure to extreme heat and cold, aggressive animals, and hazards regarding heavy equipment. University farms face many of the same problems as private production agriculture, with the added pressure of often being diverse operations with the constant presence of student workers, which have highly variable levels of experience. Based on the amount of hazards present, one would expect to see a high injury rate among university farm workers, but there is very little information available regarding the state of safety programs and policies at these farms. The objective of this exploratory study is to build the knowledge base surrounding non-land grant university farms in order to address this apparent lack of injury.

Introduction

Since the nation's founding, agriculture has been central to America's progress. Agriculture and associated industries currently employ 21 million people (BLS 2015). This industry has consistently ranked as one of the most dangerous industries, with 5,816 reported worker fatalities between 2003 and 2011 (CFOI 2015). The very nature of agricultural work makes it inherently dangerous. With the inception of land-grant and state supported agriculture universities, an emphasis on increasing production and profitability has proven highly successful. Yet advances in safety have lagged behind.

The land grant university system was created in 1862 when the Morell Act was signed into law, along with the later passed Hatch Act and the Smith-Lever Act, these acts provided land and funding for these schools to produce and share information relating to "agriculture and the mechanical arts" to the general population (Britannica 2016). At this time in history many non-land grant universities were also being established. Presently, these farms are used for research, teaching, outreach, and as a place to provide hands on experience for students. Often, farms maintain production in addition to these duties, in order to help lower costs to the university.

With research projects beginning and ending at various times throughout the year and students being hired and leaving every semester, university farms frequently employ inexperienced workers. Lack of experience has the potential to make a worker more prone to risk (Trotto 2016). It can take time to become familiar with processes and procedures associated with a farming operation. With the frequent presence of more risk prone workers, it would be logical to assume more injuries would occur. However, there is a distinct lack of information surrounding worker health and safety programs and policies at university farms. This raises several questions pertaining to the condition of worker safety at university farms. Based on the rate of injuries associated with agriculture, and very little information being available on university farm safety, the objective of this study was to determine the role of safety programs at non-land grant university farms.

Methodology

A twenty four (24) question survey was developed to determine the extent of safety programs at university farms. Questions pertained to general farm demographics, farm employee age, and general safety program information. Participant schools were selected from the official

list of certified non-land grant colleges of agriculture (updated September 15, 2015). Colleges were screened by observing their official websites for indications that a farm, ranch, or other agricultural production facility were present. If such a facility was present, contact information for farm managers or related staff was gathered from the colleges' publicly accessible websites. A total of thirty four (n=34) schools had a farm, ranch, or similar facility. The survey was developed and implemented using SelectSurvey.NETv4.081.000. Following Institutional Review Board approval (#963686), the surveys were sent out via email to these contacts on October 14, 2016, with reminders being sent out on October 28, 2016 and November 11, 2016. The survey was closed on November 16, 2016 after being open for 32 days. Survey results were kept anonymous, the results were analyzed using IBM SPSS Statistics 20.

Results and Discussion

Table 1 shows the acreage of responding farms. The greatest number of responding farms reported an acreage of 500-999 acres. This is slightly larger than the average of 441 acres for all farms in the U.S. (Census of Ag 2012). The acreages reported varied somewhat from the 200-499 range, which was the second most common response, to the 1000-1999 range.

Table 2 shows that university farms tend to have a wide array of operations present. Livestock in some form were present on every farm. An additional question in the survey showed that cow/calf production was present at all farms, whereas more specialized operations such as lumber production or wild game management are reasonably rare. The survey also showed that there is a very wide variety of crops raised. This is likely due to the wide variety of locations and climates that were covered by the survey. The amount of operations present on an individual farm both increases the labor needs of a farm and increases the number of hazards present on a farm. With more operations present, there will more be daily activities; more

machinery moving around the farm, more workers doing varied tasks, and a wider variety of materials and chemicals present on the farm. This naturally increases the number of hazards present on the farm. Each type of operation presents its own set of hazards. A farm that only has a feed lot and the storage required to keep a feed lot running will have very different risks from one that has six different operations.

Table 3 indicates the methods in which farms store grain. From a safety prospective this is important as grain handling can present several hazards. Building collapse, worker entrapment, excessive noise while grain handling, and air quality issues are only a few the hazards grain storage presents. There are extensive resources available, both educational and equipment, to farms to make this process as safe as possible. Yet, an average of 16.7 workers still die in grain handling related incidents each year in the U.S. (Purdue 2015). Survey results show that grain is primarily stored in bins, however one farm utilizes converted buildings. This can be additionally problematic as far as safety is concerned, as most buildings are not designed to store grain. If the building is not properly reinforced, the pressure from the grain can knock down the building, harming anything or anyone who is too close to it. Table 3 also shows that only two farms have the ability to dry grain. Drying grain can present a severe fire risk as the majority of grain dryers use gas or propane to provide very hot, dry air to remove moisture. Dust and chaff can ignite easily in these conditions, and dryer fires are often quite intense. Farms may choose not to dry grain on site as it can be cost or labor prohibitive, in addition to the added hazards it presents.

Table 4 indicates the number of full time employees at each responding farm. Having more full time workers would be required on farms that are larger in size or have more operations in place. Universities with a larger operating budget may be able to afford a greater number of full time workers, or at least provide greater financial stability for those workers who

plan to stay long term. A smaller full time workforce could also indicate a greater reliance on part-time or student workers. Table 5 deals with the similar subject; the number of student workers. There is a vast range in the number student workers employed, which could indicate a difference in the role that each type of worker plays on these farms. Students working on farms with large numbers of full time workers may only play a small role, simply assisting the full time worker, or even just helping with menial labor such as mowing or cleaning. Conversely, students working on farms with few full time workers may be given a greater level of responsibility. This should be addressed in future studies.

Table 6 shows the age of full time employees at responding farms. Older workers (65 years old or older) tend to have the highest permanent disability rate of all workers (Mitchel 1988). Fortunately for the farms that responded, it is fairly rare to have workers in this age group. Of the 57 workers whose ages were reported, only 2 fall into this highest risk category.

Tables 7 and 8 reveal the presence or absence of Environmental Health and Safety or similar departments at responding schools, and the relationship responding farms had with said department, respectively. The majority of farms reported that such a department was present at their schools, and most farms had a cooperative relationship with those departments. The remaining farms either had no relationship, had no department, or simply were not sure if there was a safety oversite department. This indicates that there is generally a good relationship between farms and oversite offices. Cooperation is key in ensuring compliance with regulations, as well as a positive attitude among workers with respect toward safety.

Table 9 indicates the number of emergency action plans that are in place for university farms. The number of emergency action plans can be indicative of what natural or cultural threats each farm faces. It can also show how much time farm management has spent looking at

what if situations, or if there are particular situations that farms have been forced to face previously. Emergency action plans become of greater importance when there are students or other members of the public are present. Organization and communication are key in these situations. It is important to have a plan in place rather than attempt to react to a situation when action must be taken.

Table 10 shows how many farms have gone through OSHA, Environmental Health and Safety, or similar audits. With 6 farms going through audits, 6 not, and one not responding, we see that audits do happen, but they are perhaps not overly common. While these audits can reveal important problems, they can be costly; due to abatement costs and possible fines. While many are opposed to going through a safety audit, it does provide an opportunity to take a fresh look at improving infrastructure and ensuring programs are adequate.

Tables 11 and 12 indicate the methods used to train workers and how that training is documented respectively. There are several different methods used to train workers. Discussions and handouts were used by the majority of farms. These are highly practical methods as they can cover all necessary subjects in a clear and concise manner that workers will generally understand the message presented. Documenting on a sign in sheet was a popular option. This allows the manager to only have to file one piece of information. Sign in sheets work especially well when training a large number of workers at one time. Technological advances are beginning to allow documentation to occur online. This is somewhat slow to catch on, especially among older managers. The key with both training and documentation is to do it in a manner that meets all legal requirements, but is fairly easy for the operation. There is no definitive method that will be best for every farm. What is important is that training and learning is taking place, and management is keeping track of it.

Tables 13 and 14 show what written safety programs are in place and what programs workers are trained on. What written programs are required by OSHA are dependent on what operations and facilities are present on each farm. Some programs are very common, as they cover a wide variety of needs of any farm such as PPE and Hazardous Materials Communication. Almost every farm have some hazard that will require PPE, so the associated program must be in place. All of the farms that responded reported that livestock are present. Having livestock generally means a farm will be vaccinating their animals. The needles used in this process are considered hazardous materials or potential infectious material, and that must be communicated in some manner. Workers who are expected to perform a task that could expose them to known hazards must be trained on how to handle that hazard. This can vary with job duties, but it does need to properly prepare a worker to safely perform their job.

Table 15 indicates if written safety programs are currently being developed. There were three that responded that programs that were being developed. This shows that these farms are actively trying to improve or expand their safety programs.

Conclusions

This survey was designed to provide general information about non-land grant university farms and the safety programs present on these farms. It revealed that there are a wide variety of farming operations in place at these universities. Safety programs, policies, and trainings are equally variable at these farms. While there are no universal safety initiatives on these farms, worker and student safety does appear to be a priority. Further research is required to expand this knowledge base and to develop enough information to see national trends concerning student and worker safety at these farms. This information would be valuable to anyone who is working with

the safety and health of university farm workers, such as farm managers, environmental health and safety workers, or farm employees.

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Tables

Table 1: Acreage

	Frequency	Percent
200-499	4	30.8
500-999	6	46.2
1000-1999	3	23
total	13	100

Table 2: Type of Operation(s) Present

	Frequency	Percent
Livestock	13	100
Crops	9	69.2
Horticulture	9	69.2
Composting	8	61.5
Feed Mill	4	30.8
Waste Treatment	3	23.1
Lumber	2	15.4
Wild Game Management	1	7.7

Table 3: Grain Handling and Storage

	Frequency	Percent
Bin	8	61.5
No Storage	4	30.8
Converted Building	1	7.7
Other	1	7.7
Bunker	0	0
Converted Silo	0	0
Ability to dry Grain	2	15.4

Table 4: Number of Full Time Employees

Number of Employees	Frequency	Percent
1	1	7.7
2	2	15.4
3	4	30.8
4	1	7.7
5	1	7.7
7	1	7.7
8	1	7.7
15	1	7.7
Did Not Answer	1	7.7

Table 5: Number of Student Workers

Number of Student Workers	Frequency
4	1
5	2
8	1
10	1
11	1
12	1
15	1
20	1
40	1
50	1
60	1

Table 6: Worker Age

Age Range	Frequency
18-19	0
20-24	2
25-34	11
35-44	21
45-54	6
55-64	15
65+	2

Table 7: Does your School have an EHS or Similar Department

	Yes	No	Unsure
Frequency	10	1	2
Percent	76.9	7.7	15.4

Table 8: Relationship with EHS

Relationship with EHS	Cooperative	No Relationship	Unsure
Frequency	7	4	2
Percent	53.8	30.8	15.4

Table 9: Types of Emergency Action Plans

	Frequency
Tornado	7
Life Threatening Injury or Illness	6
Extreme Heat	6
Building Fire	5
Wildfire	4
Flood	3
Protest	3
War	2
Earthquake	2
Other Emergency Action Plan	1
Hurricane	1

Table 10: Has the Farm gone through an EHS/OSHA Audit

Has the Farm gone through an EHS/OSHA Audit	Yes	No	No Answer
Frequency	6	6	1

Table 11: How Workers are Trained

	Frequency	Percent
Discussion	12	92.3
Handouts	8	61.5
PowerPoint	6	46.2
Online	4	30.8
Off Farm Training	0	0

Table 12: How Training is Documented

How Training is Documented	Frequency	Percent
Sign in Sheet	8	61.5
Paper Document	6	46.2
Electronically	5	38.5

Table 13: Programs in Place

	Frequency	Percent
PPE	7	53.8
Hazardous Materials Communication	5	38.5
Fire Prevention	4	30.8
Biosecurity	4	30.8
Respiratory Protection	3	23.1
Confined Space Entry	3	23.1
CPR	3	23.1
Hearing Conservation	2	15.4
Hot Work	2	15.4
Grain Bin Entry	2	15.4
Bloodborne Pathogen Control	2	15.4
Ladder	2	15.4
Lockout/Tagout	1	7.7
None	2	15.4
Other	1	7.7

Table 14: Programs Workers are Trained on

	Frequency	Percent
PPE	6	46.2
Hazardous Materials Communication	6	46.2
Respiratory Protection	5	38.5
Hearing Conservation	4	30.8
Fire Prevention	4	30.8
CPR	3	23.1
Biosecurity	3	23.1
Confined Space Entry	3	23.1
Grain Bin Entry	2	15.4
Bloodborne Pathogen Control	2	15.4
Lockout/Tagout	1	7.7
Ladder	1	7.7
None	3	23.1
Other	2	15.4
Hot Work	0	0

Table 15: Are Programs Being Developed

Are Programs Being Developed?	Yes	No
Frequency	3	10
Percent	23.1	76.9

CHAPTER III: REVIEW OF THE LITERATURE

Agriculture in the United States

Since the nation's founding, agriculture has had a prominent role in its success and progress. In 2014, the agriculture industry made up $177.2 billion of the Gross Domestic Product of the United States (ERS 2015). Agriculture and associated industries currently employ 21 million people (BLS 2015). This industry is far more than production agriculture. It includes a variety of careers, from farm laborers, welders, and mechanics, to chemists, lawyers and company presidents. Sales and the supporting agribusiness industry also contribute substantially to this work force.

According to the USDA, the vast majority of agricultural products consumed in the United States are produced domestically. This has led to domestic agricultural and transportation industries growing to meet the demands of consumers. The most widely produced and consumed products include corn, soybeans, wheat, poultry, pork, beef, and dairy products (ERS 2014). In 2015 the average American consumed 53.9 pounds of beef, 49.7 pounds of pork products, and 90 pound of chicken (National Chicken Council 2016). Since the Second World War, the US has consistently produced a surplus of food and feed. This has led to the development of a varied and expansive export industry. In 2015 the US exported approximately $133 billion worth of agricultural goods. This was a decrease from $152.5 billion in 2014 (ERS 2016).

Hazards Associated with Agriculture

As of 2012, 73.4 percent of agricultural goods in the United States are produced by 12.7 percent of farms (census of agriculture 2012). Therefore, the majority of industry relevant farms are quite large, with $500,000 in sales or more. The remaining 87.3 percent of farms vary greatly

in size and scale of production. This has led to difficulty concerning how to approach safety on farms. Large farms share similarities with general industry settings, such as factories or machining shops, where infrastructure and the number of personnel employed legally require certain safety measures. Excluding very special circumstances, smaller producers with no or few employees other than family members face very little safety oversite. This reveals that the vast majority of farms in the US see very little safety oversite.

Agriculture has consistently ranked as one of the most dangerous industries, with 5,816 reported worker fatalities between 2003 and 2011 (OSHA 2013). The very nature of agricultural work makes it inherently dangerous. Workers are often exposed to extreme temperatures, unpredictable animals, long working hours, potential chemical exposure, and many other hazards. Farm tractor overturns were the leading cause of death of farmers in 2012 (CDC 2014). Exposure to hazardous chemicals are a frequent cause of injury and illness. This can come from a number of sources, from improper or nonexistent use of personal protective equipment (PPE) while applying chemicals, to tank leaks and machine malfunctions, or even agricultural products themselves producing chemical hazards such as green tobacco sickness and hydrogen sulfide gas produced by animal waste. With the inception of land-grant and state supported agriculture universities, an emphasis on increasing production and profitability has proven highly successful. Yet advances in safety have lagged behind.

University Farms

The land-grant university system was created in 1862 when the Morell Act was signed into law. The act provided land and funding for these schools to produce and share information relating to “agriculture and the mechanical arts” to the general population (Britannica 2016). In 1887 the Hatch Act was passed in order to set up agricultural research stations. These research

stations were tasked with producing area-relevant information (Britannica 2016). The Smith-Lever act was then passed in 1914 in order to share the information created at these research stations and universities with farmers through the extension system. At this time in history many non-land grant universities were being established. Seeing the demand for agricultural knowledge, these schools also began to establish university farms. Today, many agricultural colleges or universities have one or more farms associated with them. Presently, these farms are used for research, teaching, outreach, and as a place to provide hands on experience for students. Often, farms maintain production in addition to these duties, in order to help lower costs to the university.

Student employees on university farms are subject to high turnover because students may graduate, or leave the farm to peruse other activities such as an internship, or funding for a research project may end. These less experienced workers can take time to train properly, both in practical operations and in safety programs and policies. Processes and procedures associated with a farming operation take time to become familiar with. Emergencies and extraordinary circumstances can create additional risks that an inexperienced worker may not have the training or experience to know how to handle. With the frequent presence of inexperienced workers, it would be logical to assume more injuries would occur. However, there is very little information available concerning safety or injury rates at university farms.

OSHA and Workplace Safety

The Occupational Safety and Health administration (OSHA) act of 1970 states that "each employer shall furnish each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees"(USC 654). The standards put forward by OSHA provides a framework

for the various actions that need to happen to help keep workers safe. Penalties and fines have been put forward to punish those who willingly violate these safety standards, give direction to businesses starting out, and act as a deterrent to those who are considering cutting safety programs. These fines are assessed during inspections, which can either be partial or complete. A partial inspection covers one designated area of a facility, often resulting from a complaint or concern made about that particular area. A complete inspection encompasses the entire facility in question. OSHA has their standards grouped into industries that the standards are relevant to such as construction, maritime, general industry, and agriculture. Industries other than those outlined with their own standards fall under the general industry section. These standards can be thought of as a minimum for keeping workers from being exposed to undue hazards. OSHA standards also put forward requirements on training workers. On particularly critical programs the standards go as far as to lay out line by line what needs to be covered in training.

The safety movement that we see today in this country is nothing new. As early as 1877 there were laws in place in the state of Massachusetts with the objective of providing a safe working environment for workers. These laws were somewhat similar to today's machine guarding standards in OSHA's general industry standards. By 1890 state laws concerning worker safety were spreading across the country. In 1903 the Bureau of Labor Statistics began to publish detailed studies concerning the safety and health of workers. These studies began to show an increased need for safety measures in industrial settings. Secretary of Labor Frances Perkins set the goal in 1934 of making workplaces "as safe as science and law can make them". This set the framework for what would eventually become OSHA under President Nixon in 1970. The first formal set of standards was put in place in 1971 (OSHA 2009). Every standard can be found in part 29 of the United States Code of Federal Regulations (CFR). Each division of standards is

denoted by its subpart title; for example general industry legislation is part 1910. A common piece of legislation that is required in many shops is Lock out Tag out. It can be found in CFR 29 1910.147. This can be thought of as the reference number, similar to the cataloging system in a library.

When OSHA was first developing standards there were concerns that it would be difficult to make fair and relevant standards regarding small farms; ones that would not place undue financial strain on farmers. In 1976 the appropriations bill provided regulatory oversite relief for small farms. These farms were made exempt from inspections and certain types of record keeping. It still requires employers to provide a safe workplace for their employees. This exemption has led to misunderstanding whereby producers believe they are completely exempt from all OSHA regulation, but that is incorrect. It should be made clear that university farms do not qualify for any kind of exemption from safety regulation.

Relationship between OSHA and University Farms

With respect to OSHA regulations, university farms are in a unique position. University health and safety regulatory oversite offices will often specialize in dealing with general industry and construction standards, which govern most of the school's operations. However, having their own set of unique regulations, farms can be somewhat difficult to oversee. Programs unique to agriculture and related industries, such as grain handling, share many components with more common programs such as confined space entry. Both require permits for entry from the supervisor, trapped entrant rescue procedures, and air monitoring, but grain handling has the added hazard of working with a flowable material. The machine guarding standard is one that applies to all industries, but in agriculture there are more guards, as well as more specific guards required for using power take off (pto) powered equipment. These health and safety oversite

offices are also charged with helping to ensure the safety of students. In chemistry and biology labs this means ensuring lab protocols are being followed, accidents reported, and chemicals handled properly. On university farms this can be complicated, as extreme weather, unpredictable animal behavior, and the use of equipment by newer workers, all of which have the potential to add additional hazards to the learning process. Adding to this complication, university health and safety enforcement workers have typically been trained to work with general industry and construction standards, as these are what they will most commonly be working with. This is where work protocols and training procedures can become very important. If there is a sound protocol, then workers who may not know about safety regulations, and safety professionals who are not familiar with farm practices will be able to communicate more effectively.

A programmatic success in safety is one where a set of policies and procedures are responsible for a lack of injury or fatality at a facility. This is the goal of standards and regulations put forward by legislative bodies such as OSHA. With a few exemptions all businesses are required to have formal policies and procedures. These policies create a documented plan for training workers, ensuring safeguards are in place and puts responsibility for each workers safety both on themselves and proper management. If programs are followed correctly, there would be very little chance for workers to be exposed to injury. Some facilities either by lack of knowledge, willful neglect, or exempt classification do not abide by these regulations. That does not necessarily mean that these places will always have incidents. There can be a culture of safety at an institution. Simply being aware of ones surroundings and generally being careful can help prevent injury. This leads to a fundamental question; is the lack of injury on university farms due to a programmatic success or is it simply due to a culture of caution and safety.

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APPENDIX A: SURVEY

1. Please indicate the approximate size of your farm (in acres).

   0-9

   10-49

   50-99

   100-199

   200-499

   500-999

   1,000-1,999

   >2000

2. What operations exist on your farm? Please indicate all that apply.

   Crop Production

   Livestock Production

   Feed Milling

   Waste Treatment/Storage

   Composting

   Wild Game Management

   Lumber Production

   Horticulture

   Other, please specify

3. What kinds of crops does your farm produce? Please indicate all that apply.

Corn

Soybeans

Wheat

Cotton

Sorghum

Oats

Barley

Orchard Crops

Vegetables

Berries

Hay Crops

Tobacco

None

Other, please specify

4. What livestock is present on your farm? Please indicate all that apply.

Beef Cattle Finishing

Cow/Calf Production

Dairy

Swine Finishing

Swine Farrowing/Nursery

Poultry Finishing

Egg Production

Poultry Breeding

Ostrich

Sheep

Goats

Equine

Fish/Shellfish

Lamas

Alpacas

Other, please specify

5. If your farm stores silage, haylage, or forage crops, please indicate your method(s) of storage

Silos

In Ground Bunkers

Above Ground Bunkers

Bags

Bales

Piles

I do not store silage, haylage, or forage crops

Other, please specify

6. Does your farm utilize on farm grain storage? If so, what storage method do you use? Please indicate all that apply.

Bin

Bunker

Converted Building

Converted Silo

I do not store grain on farm

Other, please specify

7. Does your farm have the ability to dry grain?

Yes

No

8. How many bushels of grain can your farm store?

	Number of Bushels
Wet	
Dry	

9. At any time in the last three years has your farm been at maximum grain capacity

Yes

No

10. How many non-student workers does your farm employ annually?

11. Please indicate how many of your full time workers fit into each of these age ranges.

	Age Groups
18-19	
20-24	
25-34	
35-44	
45-54	
55-64	
65+	

12. How many student workers does your farm employ annually?

13. What is your role with the farm?

Farm Manager

Farm Employee

Department/College Faculty or Staff

Department Administrator or Related staff

Other, please specify

14. Does your University/College have any kind of an administrative office charged with overseeing health and safety compliance?

Yes

No

Unsure

15. How would you best describe the relationship the farm has with the administrative office charged with overseeing health and safety compliance?

Cooperative

Strictly Used as a Resource

Adversarial

No Relationship

Unsure

16. Does your farm have an emergency response plan for any of the following? Please indicate all that apply.

Tornado

Life Threatening Illness or Injury

Flood

Wild fire

Hurricane/Typhoon

Building Fire

Animal Rights Protest

Acts of War or Terrorism

Earthquake

Extreme Heat

Other, please specify

17. What percentage of farm equipment used on your farm was made before 1977?

	Percent made before 1977
Tractors	
Skid Loaders/Front end Loaders	
Combines/Harvesters	
Implements	
Mills Buildings	
Educational Facilities not covered by other categories	

18. Has your farm ever gone through any kind of safety audit? (University oversite office, OSHA, Department of Labor or similar)

Yes

No

19. Please indicate the approximate range of expenses incurred to bring the farm into compliance after such an audit. (Do not include any fines in this amount).

$0-100

$101-500

$501-1,000

$1,001-5,000

$5,001-20,000

$20,001-100,000

$100,001 or more

20. How do you provide training for the workers on your farm? Please indicate all that apply.

PowerPoint Presentation

Discussion

Handouts

Online

Off Farm Training Organization

Other, please specify

21. How do you document the training of workers? Please indicate all methods that apply.

Electronically

Sign in Sheets

Paper Forms

Other, please specify

22. What written safety programs does your farm have in place? Please indicate all that apply.

Lockout/Tagout

Confined Space Entry

Grain Bin Entry

Hearing Conservation

Respiratory Protection

Fire Prevention

CPR/First Aid

Biosecurity

Hot Work (Welding, Brazing, Plasma Cutting or Similar)

Personal Protective Equipment (PPE)

Hazardous Chemical Storage/Communication

Blood Borne Pathogen Control

Ladder Safety

None

Other, please specify

23. What safety and health programs are your workers trained on? Please indicate all that apply.

Lockout/Tagout

Confined Space Entry

Grain Bin Entry

Hearing Conservation

Respiratory Protection

Fire Prevention

CPR/ First Aid

Biosecurity

Hot Work (Welding, Brazing, Plasma Cutting or Similar)

Personal Protective Equipment (PPE)

Hazardous Chemical Storage/Communication

Blood Borne Pathogen Control

Ladder Safety

None

Other, please specify

24. Do you have any safety programs currently being developed?

Yes

No

APPENDIX B: TABLES

Table 1: Crops Raised

	Yes	Percent
Corn	9	69.2
Soybeans	7	53.8
Wheat	7	53.8
Cotton	1	7.7
Sorghum	1	7.7
Oats	2	15.4
Barley	0	0
Orchard	2	15.4
Vegetables	3	23.1
Berries	2	15.4
Hay	12	92.3
Tobacco	1	7.7

Table 2: Animals Raised

	Frequency	Percent
Beef Finishing	7	53.8
Cow/Calf	13	100
Dairy	5	38.5
Swine Finishing	5	38.5
Swine Farrowing	8	61.5
Poultry Finishing	1	7.7
Egg Production	1	7.7
Poultry Breeding	1	7.7
Ostrich	0	0
Sheep	4	30.8
Goats	4	30.8
Equine	6	46.2
Fish/Shellfish	0	0
Lamas	1	7.7
Alpacas	0	0

Table 3: How Forage is Stored

	Frequency	Percent
Silos	2	15.4
In Ground Bunkers	0	0
Above Ground Bunkers	1	7.7
Bags	4	30.8
Bales	8	61.5
Piles	0	0
No Forage Stored	1	7.7

Table 4: Storage Ability Dry Grain

	Frequency	Percent
0	1	7.7
18000	1	7.7
26000	1	7.7
30000	2	15.4
34000	1	7.7
Total Valid Responses	6	46.2
Missing Responses	7	53.8

Table 5: Storage Ability Wet Grain

	Frequency	Percent Yes
0	5	38.5
5000	1	7.7
Total Valid Responses	6	46.2
Missing Responses	7	53.8

Table 6: Have Been At Grain Holding Capacity

	Yes	No	No answer
Frequency	2	8	3
Percent Yes	15.4	61.5	23.1

Table 7: Respondent Role on Farm

	Frequency	Percent of Response
Farm Manager	9	69.2
Department/College Faculty or Staff	2	15.4
Department Administrator/Related Staff	2	15.4

Table 8: Expenses Resulting from Audit Abetment

	Frequency
No Response	7
100-999	1
1000-4999	2
5000-19999	1
20000+	2