



Florida Cooperative Extension Service

An Analysis of Agricultural Accidents in Florida for 1991¹

William J. Becker and Tracy A. Wood²

INTRODUCTION

The agricultural work force in the United States totals 3.2 million, which equates to 2.7% of our total work force. However, there are 1,300 deaths and 120,000 disabling injuries annually, or 12.5% of all workplace deaths and 7.1% of all disabling injuries. Both of these rates--deaths and disabling injuries--exceed the rates of the construction and transportation industries, and only mining has a higher death rate. Unfortunately, agriculture is one of the more hazardous occupations in the United States.

Florida contributes to this problem. Over the past seven years there have been over 150 confirmed deaths due to work-related agricultural accidents, an average of over twenty per year. During this same seven-year period there has been an average of 3,500 serious injuries per year. (A serious injury is one in which the injured person misses a week or more of work.)

This report analyzes the work-related deaths and injuries in Florida agriculture during 1991. The data for this analysis are from the Division of Workers' Compensation, supplemented by newspaper clippings and dialogue with county extension personnel.

The fatality data are for all known agricultural-related deaths. The information on serious injuries is incomplete, since only injuries reported to the Division of Workers' Compensation are included. Many small family farm operations are not required to provide

workers' compensation insurance; therefore, these injuries go unreported. It is estimated that 25% of all serious agricultural injuries go unreported.

FATALITIES

Of the 49 work-related fatalities, 17 were the result of motor vehicle accidents on public or private roads. The National Safety Council (NSC) considers such fatalities as transportation accidents. Therefore, there were 25 agricultural and 17 transportation work-related accidents in Florida agriculture in 1991. Seven deaths were from other, unknown or natural causes.

Tractors, machinery and motor vehicles continue to be the major agents of accidents, accounting for 34 fatalities. Four fatalities were drownings, three were falls, and one was from a falling tree. The other, unknown or natural causes deaths occurred while the workers were on the job but were not determined to be work-related deaths. Accidents which resulted in fatalities are summarized in Table 1, with additional detail in Table 2.

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2. Professor and Extension Safety Specialist, Student, respectively, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences (IFAS), University of Florida, Gainesville, Florida 32611.

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Table 1. Types of accidents resulting in agricultural-related fatalities in Florida for 1991.

Types of Accidents	Number of Fatalities
Motor Vehicle	17*
Tractor/Machinery	17
Falling Trees	1
Drownings	4
Falls	3
Other, Unknown, Natural Causes	7
TOTALS	49
* While these motor vehicle accidents were work-related, they are not considered to be agricultural accidents; rather, they are classified as transportation accidents.	

Table 2. Agricultural fatalities in Florida for 1991.

DATE/COUNTY	DESCRIPTION
01/02/91 - Highlands	Arturo Garcia, employee of Moline/Chapp, killed in a goat overturn.
01/15/91 - Dade	Jesus Arias, employee of Alex Farms, died while on the job from unknown causes.
01/28/91 - Indian River	Santas Moreno, employee of Golden J. Harvesting, died while on the job of a heart attack.
02/18/91 - Palm Beach	Unknown name, employee of Tallsmen Sugar Corp, was killed when his truck overturned.
02/19/91 - Broward	Juan Santibanez, employee of Plants for Tomorrow, drowned while on the job.
02/19/91 - Broward	Osca Cordero, employee of Plants for Tomorrow, drowned while on the job.
02/25/91 - Dade	Jose Villasenor, employee of A&J Farms, was killed when a tractor fell on him.
02/28/91 - Polk	Ernest Smith, employee of Growers Fertilizer, Inc., was killed when a forklift overturned.
02/21/90 - Palm Beach	Jesus Anzo, the son of an employee of Blue Trace Farms, was killed when he was run over by a goat.
03/25/91 - Palm Beach	Manuel Figueroa, employee of Sugar Cane Growers, was killed in a collision with a train.
04/01/91 - Palm Beach	Eddie Ward, an employee of A. Duda & Sons, Inc., died of a heart attack while on the job.
04/12/91 - Hendry	Name unknown, killed while repairing a tire.
04/18/91 - Hendry	Oswell Blake, employee of Okeelanta Farms, drowned when trapped under a tractor in a canal.
04/19/91 - St. Lucie	Joseph Fleurstin, employee of Harbor Harvestor, died of an aneurysm while on the job.
05/01/91 - Palm Beach	Epjiania Galvey, employee of Lehtos Lawn Maintenance, drowned while on the job in a pool.
05/01/91 - Palm Beach	Pelipe Guinia, employee of Lehtos Lawn Maintenance, drowned while on the job in a pool.
05/14/91 - Dade	Paul S. Crigler, Jr., employee of South Florida Building Service, was crushed to death when he was run over by a tractor.
05/14/91 - Charlotte	Jose Rafael Aireola, employee of Lipman and Lipman, was killed when running to jump on a truck. He tripped and was run over by the truck.
06/17/91 - Hillsborough	Jerry Sellers, employee of Bay Area Tree Service, died as a result of a fall from a tree.
06/25/91 - Polk	Clarence Gordon, was killed when his tractor was struck by a tractor-trailer.
07/09/91 - DeSoto	Emery Smith, employee of Bright Hour Ranch, was crushed to death in tractor-mower accident.
07/17/91 - Hernando	Luis Membreno, employee of John G. Grubbs, Inc., drowned when his tractor overturned in a ditch.
07/19/91 - Polk	Charles M. Thomas, employee of Dunson Harvesting, Inc., was crushed to death by a tractor.
07/22/91 - Hendry	John Dyers III, employee of Jack Berry Holding Co., was crushed to death by a forklift.
07/25/90 - Holmes	Arthur Bovee, employee of McCormick Logging, was killed by a falling tree.

DATE/COUNTY	DESCRIPTION
08/17/91 - Lake	Deuron Gay, was killed when he fell off a tractor, driven by his father, and was run over by a bushhog.
08/26/91 - Broward	Andres Orta, employee of Landscaping Associates, was killed on the job in a truck accident.
09/05/91 - Dade	Pedro Luis Perez, employee of Perez Tree Service, was killed in a fall from a tree.
09/16/91 - Palm Beach	Samuel Bynum, employee of Royal Palm Citrus, was killed when his tractor went into a canal. Blood alcohol level .12.
09/21/91 - Palm Beach	Unknown, was crushed and killed when he was pinned by the hydraulic arm of a pesticide sprayer.
09/25/91 - ????????	George Edwards, employee of Burton-Bostwick Groves, was killed when his tractor and sprayer were struck by a semi-truck.
09/25/91 - Palm Beach	Justin Harris, employee of Horace Harris, drowned when a truck pulling sugar cane overturned in a canal.
10/12/91 - Hendry	Randy Gibson, employee of U.S. Sugar Corporation, died of unknown causes while on the job.
10/18/91 - Lake	Cruz H. Alvarez, employee of Okeelanta Corp., drowned when a car driven by an employee went into a canal.
10/18/91 - Palm Beach	Diego Mendoza Ailon, employee of Okeelanta Corp., drowned when a car driven by an employee went into a canal.
10/18/91 - Palm Beach	Domingo O. Mejio, employee of Okeelanta Corp., drowned when a car driven by an employee went into a canal.
10/18/91 - Palm Beach	Francisco H. Corince, employee of Okeelanta Corp., drowned when a car driven by an employee went into a canal.
10/18/91 - Palm Beach	Julio M. Corince, employee of Okeelanta Corp., drowned when a car driven by an employee went into a canal.
10/18/91 - Palm Beach	Pablo M. Ortiz, employee of Okeelanta Corp., drowned when a car driven by an employee went into a canal.
10/18/91 - Palm Beach	Pascual V. Mendez, employee of Okeelanta Corp., drowned when a car driven by an employee went into a canal.
10/28/91 - DeSoto	Robert Grubbs, employee of Orange County or Florida, died of unknown causes while on the job.
10/30/91 - Manatee	Bertin Aburto, employee of Schroeder-Manatee, killed in a motor vehicle accident on company property.
11/08/91 - Broward	Rene Barcelo, employee of Florida International University, fell from his tractor and was run over by a bushhog.
11/??/91 - Palm Beach	Walter Brown, employee of Okeelanta Sugar Corp., was killed when his truck went into a canal on the property.
12/16/91 - Martin	Alvin Stanley, employee of Caulkins Indiantown Citrus, died of multiple injuries.
12/16/91 - Palm Beach	Thomas E. Wright, employee of Road Landscaping Co., died of unknown causes on the job.
12/17/91 - Hendry	Unknown, killed while repairing a tire.
12/20/91 - Palm Beach	Jose R. Rivas, employee of Talisman Sugar Corp., was killed in a vehicle accident.
12/??/91 - Alachua	Charles Martin, employee of Dowling Tree Service, died as a result of a fall from a tree.

SERIOUS INJURIES

The Division of Workers' Compensation divides agriculture into the eight Standard Industrial Codes. The first four are production occupations: Fruit and Vegetable, Livestock, General Farm, and Horticulture Production. The three service occupational areas are: Crop Services, Livestock Services, and Horticultural Services. The "Other Services" category includes forestry and fishery accidents.

Table 3 indicates that there were 2,636 serious injuries reported to the Division of Workers' Compensation during 1991: This is a 5.8% decrease from the previous year. The Livestock Production and General Farm Production categories both had an increased number of serious injuries in 1991. The Horticultural Services category had the greatest number of serious injuries: 712 or 27.0% of the total. Fruit and Vegetable Production (421), General Farm Production (420), and Crop Services (406) each had over 15% of the serious injuries. These occupations tend to employ the lower-skilled and lower-paid workers. They need to be given more safety training and closer supervision.

Table 3. Number of serious agricultural accidents by type of agricultural business in 1991.

CATEGORY	NUMBER SERIOUSLY INJURED	PERCENT OF TOTAL
Fruit and Vegetable Production: Citrus, berries, melons, vegetables, etc.	421	15.9
Livestock Production: Dairy, beef, hogs, poultry	234	8.9
General Farm Production: Crops and livestock. No single enterprise produces 50% of the farm's total income.	420	15.9
Horticultural Production: Greenhouse, nurseries, flowers, potted plants and sod	299	11.3
Crop Services: Field and grove work, chemical application, farm labor contracts, fruits and vegetables	406	15.4
Livestock Services: Veterinarian services, breeding, training, alligator, horse, game farms	81	3.1
Horticultural Services: Landscaping, grounds maintenance, tree services	712	27.0
Other Services: Cashgrain, forestry, fisheries, etc.	63	2.5
TOTAL	2,636	100.0

MAJOR AGENTS OF INJURY

If an object can be found on a farm or ranch, in a grove, or at any other agricultural location, it is likely to be an agent of injury. It can be as small as a particle of dust in the eye or as large and heavy as a loaded tractor-trailer. Table 4 identifies the major agents of injury in the various types of agricultural occupations.

Working Surfaces, which lead to slips, trips and falls, continue to be the major agent of injury, accounting for 19% of all serious injuries. Bodily Motion (14.4%) is second, and Heavy Objects (10.9%) is third. These three agents of injury account for nearly 45% of all serious injuries in Florida agriculture.

Fruit and Vegetable Production: Serious injuries tend to parallel the injuries in all of Florida agriculture with Working Surfaces and Heavy Objects each causing 19% of the injuries and Bodily Motions causing 15% of the injuries.

Livestock Production: Animals cause 20% and Working Surfaces cause 17% of the serious injuries to workers in animal production. Bodily Motion (10%) and Heavy Objects (9%) are other major causal agents.

General Farm Production: Twenty-two percent of the serious injuries in general farm production are due to Working Surfaces. Another 12% are caused by improper Bodily Motions.

Horticultural Production: In horticultural production there are five agents which cause over 60% of the serious injuries. They are: Working Surfaces (19%), Bodily Motion (11%), Trees (11%), Heavy Objects (10%) and Tractors/Vehicles (10%).

Crop Services: In this category Working Surfaces are the major agent of serious injuries causing 30% of all injuries. The other major agents of injury are Trees (14%) and Bodily Motion (12%).

Livestock Services: Working Surfaces are the major agent of serious injuries in this category causing 28% of all injuries. Animals are the agent of injury in 16% and Bodily Motion in 12% of all the accidents.

Horticultural Services: Over 25% of all serious injuries in Florida agriculture occur to workers in horticultural service occupations. Bodily Motion activities (pushing, pulling, reaching and twisting) is the agent of injury in 20% of all injuries. Heavy Objects (14%) and Working Surfaces (13%) are the two other major agents of injury.

Other Services: Few employees, only 63, are placed in this category. Working Surfaces (20%), Heavy Objects (14%), and Bodily Motions (14%) are the other major agents of injury for these employees.

In six of the eight types of agribusinesses, Working Surfaces are the major agent of injury. In Livestock Production, Animals are the number one agent of injury and in Horticultural Services, Bodily Motion is the most frequent agent of injury. It should be evident that more emphasis must be given to providing employees with safer Working Surfaces and/or safer work shoes.

Table 4. Major agents of injury (expressed in percentages).

Type of Agribusiness	A%	B%	C%	D%	E%	F%	G%	H%	I%	J%	K%
Fruit and Vegetable Production	421	19	19	6	15	5	6	1	2	4	23
Livestock Production	234	17	9	7	10	4	4	5	1	20	23
General Farm Production	420	22	6	7	12	4	1	4	2	5	37
Horticultural Production	299	19	10	10	11	3	11	1	2	4	29
Crop Services	406	30	4	7	12	4	14	0	2	0	27
Livestock Services	81	28	8	4	12	2	2	2	0	16	26
Horticultural Services	712	13	14	9	20	7	6	1	1	3	26
Other Services	63	20	14	8	14	6	4	6	2	0	26
TOTAL	2,636	19.0	10.9	7.6	14.4	4.8	6.7	1.8	1.5	5.0	28.3

A - Total Number of Injuries : **B** - Working Surfaces* : **C** - Heavy Objects* : **D** - Tractors/Vehicles* : **E** - Bodily Motions*
F - Handpower Tools : **G** - Trees : **H** - Machines : **I** - Infections/Poisons : **J** - Insects/Animals : **K** - Unknown/Other
 * Four major agents of injury cause over 50% of serious injury. The problem of dangerous Working Surfaces, Heavy Objects, Bodily Motion, and Tractors/Vehicles need special attention if accident rates are to be significantly reduced.

ACCIDENT TYPES

The types of accidents which result in serious injuries are shown in Table 5. Overexertion-type accidents account for nearly 30% of all serious accidents. These are the lifting, pulling, pushing-type activities. Being Struck by Something or Striking against Something also account for nearly 30% of all serious injuries. Falls from Different Levels (14.3%) and Same-Level Falls (9.0%), together account for nearly another quarter of the serious accidents.

Note the relationships between "Accident Type" and "Major Agent of Injury:" Falls (type) are associated with Working Surfaces (agent) and Overexertion (type) is associated with Heavy Objects and Bodily Motion (agents). These two tables, Table 4 and Table 5, certainly indicate hazardous conditions which require more attention.

Fruit and Vegetable Production: Overexertion (28%), Falls (23%), and Struck by Something/Struck Against (32%) account for over 80% of all the accident types in fruit and vegetable production.

Livestock Production: In livestock production there are five agents of injury that each contribute 12% or more to the serious injuries. Struck-by-Something (animals) is the major agent of injury, causing 25% of all injuries. The other four agents of injury are: Struck Against (19%), Overexertion (16%), and Same-Level Falls and Caught-in-Something types of accidents, each at 12%.

General Farm Production: Overexertion is the most frequent type of accident to general farmworkers, which accounts for 28% of serious injuries. Other frequent types of accidents are Different- or Same-Level Falls (25%), Struck-by-Something (19%) and Caught-in-Something (12%).

Horticultural Production: In horticultural production Struck-by-Something or Struck-Against types of accidents cause 31% of all serious injuries, Overexertion accounts for 25% of the injuries, and Falls, Different- and Same-Level, total another 23% of the injuries.

Crop Services: Different- and Same-Level Falls account for 35% of all serious injuries in crop production services occupations. The majority of these (27%) are Falls from Different Levels. Other common types of accidents are Overexertion (19%), Struck by Something (13%), and struck against (14%).

Livestock Services: Over a third of all serious injuries in livestock production services is of the Overexertion (34%) type. Other common-type accidents in this category are Struck-by-Something/Struck-Against (26%) and Falls, both Different- and Same-Level, (30%).

Horticultural Services: Overexertion-type accidents account for 42% of all serious injuries in horticultural services occupations. Struck-by-Something/Struck-Against accidents total 28%, Falls, both Different- and Same-Level, total 16%.

Other Services: In this category Overexertion is again the leading type of serious injury, accounting for 36% of the total. Falls account for 28%, Struck-by-Something/Struck-Against 16%, and Caught-in-Something 10% of the serious injuries.

Overexertion is the leading accident type in six of the eight types of agribusinesses. More attention must be given to the lifting, pushing, pulling, carrying activities of the employees. As could be expected, animals which kick, push or, in some other manner, strike employees is the major accident type in livestock production. Falls from Different Levels is the major accident type in Crop Services, largely by citrus pickers falling from ladders.

NATURE OF INJURY

Strains--the stretching or tearing of muscles--and Sprains--the stretching or tearing of ligaments--are the most frequent serious injuries (65.2%) suffered by agricultural workers as shown in Table 6. Note that Strains and Sprains are the major injury in all eight categories of occupations from a high of 74% of the injuries in General Farm Production occupations, to a low of 57% in Livestock Production occupations.

Cuts and Abrasions are the nature of injury in over 14% of all injuries, accounting for 22% of all injuries to Livestock Services employees. This indicates a need to use additional care while working with livestock--around milking parlors, loading and squeeze chutes.

How do workers incur strains and sprains? Table 4 and Table 5 provide the answers. Working surfaces, heavy objectives and bodily motion are the agents of injury; overexertion and falls are the accident types which result in strains and sprains.

Fruit and Vegetable Production: Strains and Sprains are the nature of injury in over 60% of all serious accidents to workers in fruit and vegetable

production. The only other nature of injury which exceeds ten percent is in the "Cuts and Abrasions" category at 14%.

Livestock Production: Again, Strains and Sprains are the major nature of injury with 57% of all seriously injured persons incurring this type of injury. Cuts and Abrasions account for 18% of all the serious injuries. A more detailed analysis of the data (not shown in Table 6) is that dairy workers incur considerably more Strains and Sprains than beef cattle workers, 73% to 43%. However, beef cattle workers have more serious Cuts, Punctures, Abrasions, Bruises and Contusions than dairy workers, 43% to 10%.

General Farm Production: Nearly three of every four serious injuries (74%) to general farm production workers are Strains and Sprains. This is the only category which accounted for more than ten percent of the injuries.

Horticultural Production: Sixty-one percent of all serious injuries in horticultural production was Strains and Sprains. Cuts and Abrasions accounted for 15% of the injuries; Bruises and Contusions, 10%.

Crop Services: Of all the serious injuries to crop service workers, 62% were Strains and Sprains. Another 17% were Cuts and Abrasions.

Livestock Services: Again, Strains and Sprains are the major nature of injury with 66% of the total. Cuts and Abrasions were the second most frequent nature of injury with 22%.

Horticultural Services: Once again, Strains and Sprains were the major nature of injury with 69% of the injuries. And again, Cuts and Abrasions were second with 15% of the total.

Other Services: Strains and Sprains were the nature of injury in 62% of all serious accidents. Fractures accounted for 12%; Cuts and Abrasions with 10% of all the serious injuries.

The major injury problem in Florida agriculture is that of Strains and Sprains. If the industry is ever going to effectively control their injury problem with its associated cost, lost time, and productivity, it must identify the causes of Strains and Sprains and alter conditions which cause these problems.

PART OF BODY INJURED

Twenty percent of all serious injuries are Strains and Sprains to the Back, as shown in Table 7. They are caused by lifting, pushing and pulling, improper bodily motions, slips, trips and falls. In six of the eight categories of agribusinesses, back injuries were more frequent than injuries to any other body part.

Arm (11.9%) and Hand (15.3%) injuries account for over a quarter (27.4%) of the agricultural accidents, while Leg (18.4%) and Foot (6.3%) injuries account for nearly another quarter of the accidents. Many of these injuries are strains and sprains to the wrists and elbows, the ankles and knees.

Fruit and Vegetable Production: Nearly one-fourth (24%) of all injuries to fruit and vegetable production workers were to the Back. The Leg or Foot were injured in 27% of the serious accidents; the Arm and Hand 21% of the time. Eleven percent of the workers suffered serious multiple injuries, to several parts of the body.

Livestock Production: Hand (22%) injuries were most common in livestock production occupations while Back injuries occurred to 17% of the livestock production workers. Thirty-three percent received Arm or Hand injuries; 23% Leg or Foot injuries. Another 12% had serious Multiple Part injuries.

General Farm Production: Serious injuries to general farm production workers were 18% Back injuries, 29% of the injuries to the Arm and Hand, 20% to the Leg and Foot, and 17% were Multiple Part injuries.

Horticultural Production: Nearly one-fourth (23%) of all serious injuries to horticultural production workers were to the Back. Over a quarter (26%) of the injuries were to the Arm and Hand, primarily to the hand. Another quarter (26%) of the injuries to the Leg and Foot, primarily to the leg. Fifteen percent of the serious injuries affected Multiple Parts of the body.

Crop Services: Leg (25%) injuries were most frequent among crop production service workers. Hand (15%) and Arm (14%) injuries accounted for a total of 29% of the total injuries. Back (15%) and Trunk (11%) added up to 26% of the serious injuries.

Livestock Services: Again, the Back was the body part with the most serious injuries totalling 22%. Another 12% of the injuries were to the Trunk. A total

of 26% of the injuries were to the Arms and Hands; 24% to the Legs and Feet; and Multiple Parts injuries were another 16%.

Horticultural Services: The Back, again, was the body part most often suffering serious injuries with 21%. Another 27 percent was to the Arms and Hands; 23% to the Legs and Feet. Fourteen percent of the serious injuries were injuries to Multiple Parts of the body.

Other Services: Again, most (24%) of all serious injuries were to the Back. Twenty-eight percent were to the Arms and Hands; 24% to the Legs and Feet.

By studying this, and the other tables in this publication any agricultural producer or agricultural service provider should be able to identify the major occupational risks to their employees. These then, are the areas in which hazards need correction, equipment and work stations should be modified, work tasks reviewed, additional safety training and safety supervision provided. Only then can we begin to see a significant decrease in the number and seriousness of injuries.

Table 5. Accident type (expressed in percentages).

Type of Agribusiness	A	B%	C%	D%	E%	F%	G%	H%	I%
Fruit and Vegetable Production	421	28	15	8	4	5	15	17	8
Livestock Production	234	16	7	12	4	12	25	19	5
General Farm Production	420	28	13	12	5	12	19	7	4
Horticultural Production	299	25	14	9	3	4	18	13	14
Crop Services	406	19	27	8	4	8	13	14	7
Livestock Services	81	34	16	14	4	2	14	12	4
Horticultural Services	712	42	9	7	5	2	12	16	7
Other Services	63	36	20	8	2	10	10	6	8
TOTAL	2,636	29.8	14.3	9.0	4.2	6.3	15.8	14.0	6.6
A - Total Number of Injuries : B - Overexertion : C - Falls, Different Level : D - Falls, Same Level : E - Vehicle : F - Caught in Something : G - Struck by Something : H - Struck Against : I - Other									

Table 6. Nature of injury (expressed in percentages).

Type of Agribusiness	A	B%	C%	D%	E%	F%	G%
Fruit and Vegetable Production	421	61	8	2	14	7	8
Livestock Production	234	57	7	3	18	8	7
General Farm Production	420	74	9	1	7	5	4
Horticultural Production	299	61	7	0	15	10	7
Crop Services	406	62	5	0	17	9	7
Livestock Services	81	66	8	0	22	2	2
Horticultural Services	712	69	8	1	15	3	4
Other Services	63	62	12	4	10	4	8
TOTAL	2,636	65.2	7.6	1.0	14.2	6.2	5.8
A - Total Number of Injuries : B - Strains Sprains : C - Fractures : D - Crushings : E - Cuts and Abrasions : F - Bruises and Contusions : G - Other							

Table 7. Part of body injured (expressed in percentages).

Type of Agribusiness	A	B%	C%	D%	E%	F%	G%	H%	I%
Fruit and Vegetable Production	421	24	9	10	11	8	19	11	8
Livestock Production	234	17	9	11	22	10	13	12	6
General Farm Production	420	18	9	16	13	6	14	17	7
Horticultural Production	299	23	4	6	20	8	18	15	6
Crop Services	406	15	11	14	15	6	25	9	5
Livestock Services	81	22	12	16	10	6	18	16	0
Horticultural Services	712	21	7	12	15	4	19	14	8
Other Services	63	24	4	8	20	6	18	8	12
TOTAL	2,636	20.0	8.2	11.9	15.3	6.3	18.4	13.1	6.8
A - Total Number of Injuries : B - Back : C - Trunk : D - Arm : E - Hand : F - Foot : G - Leg : H - Multiple Parts : I - Head/Eyes									

Table 8. Percentage of serious injuries for 1991 (by sex and age).

Type of Agribusiness	A	B%	C%	D%	E%	F%	G%	H%	I%	J%
Fruit and Vegetable Production	421	80	20	3	30	28	21	12	5	1
Livestock Production	234	84	16	3	33	26	24	9	4	1
General Farm Production	420	83	17	3	22	37	21	10	6	1
Horticultural Production	299	74	26	5	38	24	19	11	3	0
Crop Services	406	86	14	3	26	24	25	14	7	1
Livestock Services	81	46	54	4	30	34	18	8	6	0
Horticultural Services	712	89	11	8	34	43	7	6	2	0
Other Services	63	80	20	4	38	28	20	4	6	0
TOTAL	2,636	81.1	18.2	4.0	29.9	32.3	17.8	9.7	4.4	1.9
A - Total Number : B - Male : C - Female : D - Age 20 : E - Age 20-29 : F - Age 30-39 : G - Age 40-49 : H - Age 50-59 : I - Age 60-69 : J - Age 70+										

AGE AND SEX

Of the 2,636 seriously injured employees in Florida agriculture during 1991, 81.8% were male, 18.2 were female. Livestock Services had the highest percentage of injured females, 54% of the total; only 11% of the injured workers in Horticultural Services was female.

Nearly two-thirds of the seriously injured workers in Florida agriculture were under the age of 40. The percentage of all workers under 40 is unknown, but it is probably less than 60%. In the Horticultural Services occupations 85% of the injured employees were in their teens, twenties and thirties.

In the Crop Services occupations 22% of the seriously injured workers were 50 years of age or over. In the Horticultural Services occupations only 8% was age 50 or over. Table 8 provides information on sex and age for the eight categories of agribusinesses.

NUMBER OF INJURIES BY COUNTY

Table 9 identifies the number of serious injuries by county for the past four years, 1988-1991.

Two counties, Dade and Palm Beach, had over 200 serious agricultural injuries in 1991. Other counties, Collier, Hillsborough, Orange, Polk and St. Lucie, each, had over 100 accidents. These seven counties had over 45% of all the state's serious injuries in 1991. However, it should be noted that these are large counties with many agricultural workers.

Another concern are the counties with more than a 25% increase in the number of serious injuries in 1991. These are Alachua, Baker, Citrus, Dade, Gilchrist, Highlands, Indian River, Levy, Osceola, Putnam, Union and Walton. Several counties had a significant decrease in the number of serious injuries. These were Clay, DeSoto, Duval, Escambia, Gadsden, Hernando, Jackson, Lafayette, Marion, Okaloosa, Okeechobee, Pasco, Pinellas, Polk, Suwannee and Taylor counties.

Thirty-two counties reported fewer than ten serious agricultural injuries during 1991. These tend to be the smaller, nonagricultural counties or agricultural counties with smaller family-operated farms which are not required to provide workers' compensation insurance. Therefore, serious injuries which occur on these farms go unreported.

RECOMMENDATIONS

The number of recommendations which could be reached from the data analyzed in this report are many. However, only ten major recommendations are presented:

1. Tractors should be equipped with roll-over protective structures (ROPS) and seat belts. Operators should be required to wear the seat belts.
2. No riders should be permitted on tractors, machinery or other vehicles, unless a safe seat for riding is provided.
3. All agricultural workers should be provided with safety training BEFORE being assigned a task and on a regular basis thereafter. While this is important for all employees, it is critical for those in the lower-skilled, lower-paid occupations.
4. Responsible safety supervision should be provided for all employees; it is critical for inexperienced employees.
5. Inspections of work areas and work tasks should be undertaken to identify unsafe conditions and practices. Immediate corrective action should be taken.
6. Work tasks should be evaluated to identify both overexertion and repetitive tasks, which could lead to injury. The task and the work station should be modified to reduce worker over-exertion (excessive lifting, pushing, pulling or reaching).
7. While modifying the work environment to prevent slips, trips, and falls is important, all employees should be required to wear appropriate footwear. For the majority of agricultural tasks, high-quality, laced shoes which extend over the ankle should be worn. A soft rubber or rubber-like slip-resistant sole and heel are recommended.
8. Keep all machines, equipment and tools in good working condition with all guards and shields in place. When guards and shields are inadequate or inappropriate, provide employees with the necessary personal protective equipment.
9. Encourage all employees to maintain good physical condition, free of drugs and excessive weight. Their muscle tone should be appropriate for their tasks.
10. Reward employees who do their tasks right--SAFELY. This can be done with words, promotions and awards. Convince the employees that they are too important to be injured.

Table 9. Number of serious agricultural accidents¹ (expressed in percentages).

COUNTY	1988	1989	1990	1991	COUNTY	1988	1989	1990	1991	COUNTY	1988	1989	1990	1991
Alachua	31	27	22	31x	Hamilton	3	4	3	3	Okeechobee	67x	48x	52x	43
Baker	7	11	7	11	Hardee	25x	56x	60x	56x	Orange	171x	186x	171x	171x
Bay	8	9	8	6	Hendry	60x	65x	75x	85x	Osceola	17	22	21	29
Bradford	0	2	2	2	Hernando	12	11	19	10	Palm Beach	239x	252x	273x	266x
Brevard	28	59x	52x	62x	Highlands	57x	56x	61x	83x	Pasco	38x	46x	49x	35
Broward	87x	96x	92x	92x	Hillsborough	169x	225x	146x	161x	Pinellas	68x	59x	65x	55x
Calhoun	0	0	0	1	Holmes	0	4	2	0	Polk	220x	234x	190x	160x
Charlotte	11	21x	24x	25	Indian River	51x	69x	49x	71x	Putnam	6	10	5	9
Citrus	0	3	2	7	Jackson	2	8	8	3	St. Johns	3	4	8	6
Clay	20	31x	19	8	Jefferson	6	5	3	4	St. Lucie	95x	109x	108x	118x
Collier	85x	85x	117x	105x	Lafayette	3	4	7	4	Santa Rosa	5	7	4	3
Columbia	5	11	5	4	Lake	65x	72x	60x	70x	Sarasota	31x	39x	27	31
Dade	218x	251x	163x	231x	Lee	70x	71x	65x	62x	Seminole	31x	33x	33x	27
DeSoto	42x	48x	63x	53x	Leon	12	23	16	14	Sumpter	9	18	10	12
Dixie	0	4	1	1	Levy	11	12	5	11	Suwannee	11	7	11	7
Duval	62x	76x	64x	43x	Liberty	2	1	0	2	Taylor	2	2	4	1
Escambia	21	36x	19	10	Madison	5	3	6	4	Union	0	2	1	3
Flagler	2	5	8	6	Manatee	58x	89x	66x	61x	Volusia	39x	31	45x	42x
Franklin	0	1	1	2	Marion	65x	47x	50x	35	Wakulla	3	4	0	1
Gadsden	7	6	13	8	Martin	46x	54x	62x	62	Walton	5	2	0	7
Gilchrist	4	5	6	9	Monroe	4	2	4	4	Washington	1	0	1	0
Glades	3	4	3	3	Nassau	4	6	6	5	Out-of-state	135	108	97	37
Gulf	4	4	1	2	Okaloosa	5	3	13	6	Unknown	167	232	100	38
										TOTAL	2,954	3,140	2,797	2,636
¹ Serious agricultural accidents result in death or injuries which keep employees off the job for one week or more, as reported to the Florida Division of Workers' Compensation. Since many of our family farms are not covered by workers' compensation, serious agricultural accidents on these farms go unreported.														
* Efforts to reduce the number of serious agricultural accidents are needed in these counties.														