

University College Dublin  
&  
Work Research Centre



*"OSH+ for the European Agriculture sector - Stimulating growth in rural areas through capacity building for providers (and beneficiaries) of occupational medicine and OSH services"*

**Module 3. Risk management within agriculture's economic subsectors**

Dr Aoife Osborne  
& Dr Richard Wynne

# Aims of module

- To provide an overview of occupational hazards including how to classify, manage and assess risk.
- To establish occupational hazards relevant to agriculture and the current prevention and protection measures within the agriculture sector.

# Overview of contents

- The key areas of this module are hazard identification and risk management. This module has been organised in this sequence to allow the trainee to:
  - 1) Recognise what are occupational hazards and how these can be managed.
  - 2) Categorise the various occupational hazards within the agriculture sector.
  - 3) Understand current practise to prevent and protect those working in the agriculture sector.

# Learning outcomes

After studying this module the trainee should be able to:

- Define and classify occupational hazards and risks.
- Understand the process of risk management and risk assessment.
- Provide an overview on OSH legal requirements.
- Recognise common occupational hazards relevant for agriculture workers.
- Be aware of the prevention and protection measures within the agriculture sector.

# Background

- Risk assessment is the examination of all characteristics of a work system in order to identify hazards, the level of risk for each hazard and the controls needed to avoid or reduce the risk.
- All employers are required to have a risk assessment completed for their place of work and to keep documentation of that risk assessment.
- This will enable the employer to effectively take the measures necessary for the safety and health protection of workers. These measures include:
  - Prevention of occupational risks
  - Provision of information to workers
  - Provision of training to workers
  - Organisation and means to implement the necessary measures.

# Occupational hazards

# What is an occupational hazard?

- A hazard is any circumstance, substance, device, object or microorganism that can cause death, harm, injury, damage or loss.
- It is any source of potential harm to a worker and therefore cannot be controlled.
- Exposure to hazards can be controlled by **eliminating the hazard or reducing their associated risk** through guards, personal protective equipment, protective devices or containment.

# What is an occupational risk?

- Risk refers to the likelihood or probability of harm to life, property or the environment if exposed to a hazard.
- Factors that influence the degree or likelihood of risk include:
  - how much a person is exposed to a hazard (e.g., several times a day or once a year)
  - how the person is exposed (e.g., breathing in a vapour, skin contact)
  - the severity of the effect (e.g., one substance may cause skin cancer, while another may cause skin irritation).

# Occupational hazards and risks

**In summary, an occupational hazard is something that can cause harm to a worker, whereas, an occupational risk is the likelihood that the hazard will lead to harm.**

# Concept of occupational hazard and risk

- Important concepts of risk management in the workplace are the concepts of hazard and risk. One of the most important aspects of risk assessment is accurately identifying the potential hazards in the workplace e.g. what is it about the activities, processes or substances used that could injure employees or harm their health (HSE, 2014).
- Tools that can help identify hazards include:
  - Check manufacturers' instructions or data sheets for chemicals and equipment as they can be very helpful in explaining the hazards and putting them in their true perspective.
  - Reflecting on accident and ill-health records – these often help to identify the less obvious hazards.
  - Take account of non-routine operations (eg maintenance, cleaning operations or changes in production cycles).
  - Remember to think about long-term hazards to health (eg high levels of noise or exposure to harmful substances).

(HSE, 2014)

# Concept of occupational hazard and risk

- For each hazard it is important to be clear on the occupational risk. Understanding who is at risk will help identify the best way of controlling the risk. It is important to not only think about how employees might be harmed but also about others who may be present, such as contractors or visitors.
- The following risk considerations need to also be accounted for:
  - Some workers may have particular requirements, e.g. new and young workers, migrant workers, new or expectant mothers, people with disabilities, temporary workers, contractors, homeworkers and lone workers.
  - Include people who might not be in the workplace all the time, such as visitors, contractors and maintenance workers.
  - Take members of the public into account if they could be harmed by work activities.
  - It is always import to consult with workers to check if there is anyone that may have been missed.

(HSE,2014)

# Classification of occupational hazards

A common way to classify hazards is by category:

Ergonomic - repetitive movements, poor housekeeping, lifting incorrectly etc.

Biological - bacteria, viruses, insects, plants, birds, animals, and humans, etc.

Psychosocial - stress, tiredness, etc.

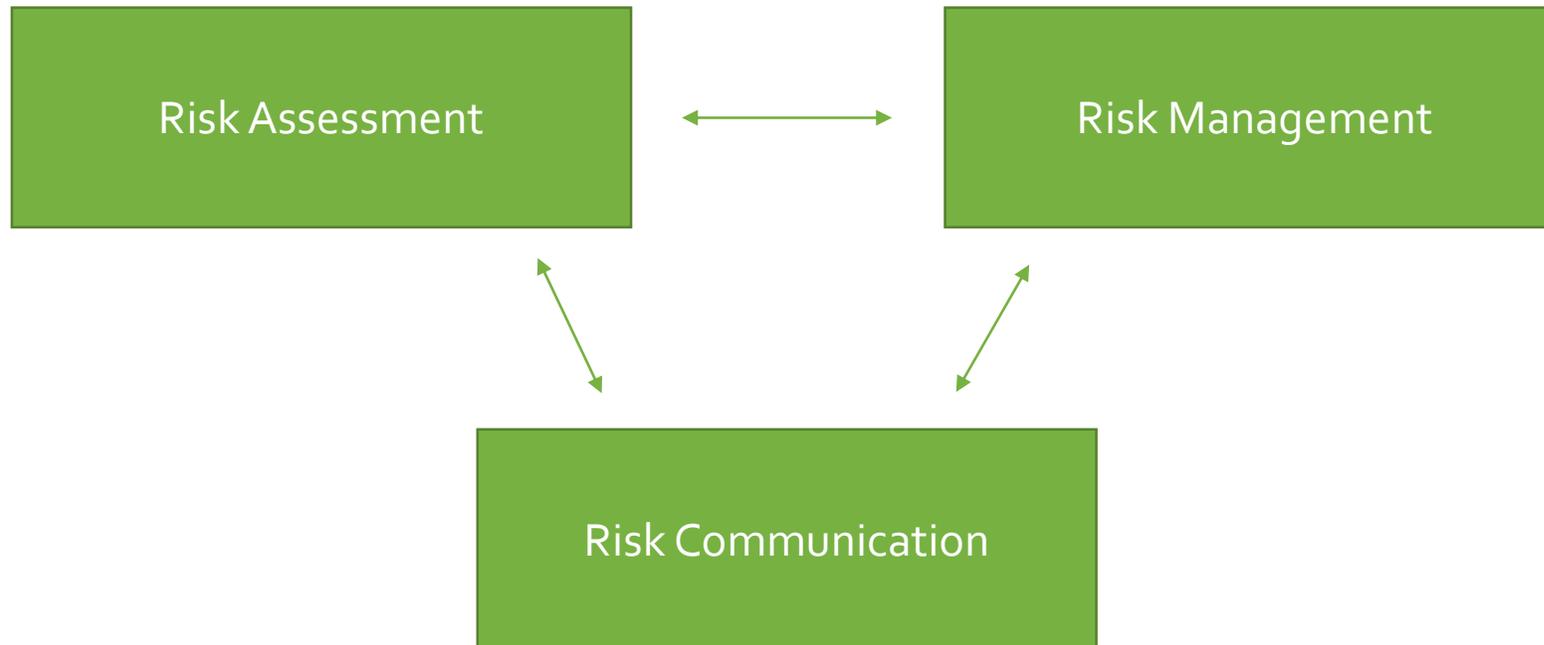
Physical – climate, lighting, noise, etc.

Chemical - depends on the physical, chemical and toxic properties of the chemical

Addressing the risk to human health from exposure to hazards consists of three interrelated processes:

- 1. Risk assessment:** a process of analysing and characterising information about a risk
- 2. Risk management:** the process of integrating the results of a risk assessment with social, economic, political, regulatory, and other information to make decisions about how to manage the risk
- 3. Risk communication:** the process of engaging in a dialogue with stakeholders to identify information that may improve the risk assessment, and to inform stakeholders about the implications of risk management decisions.

These three risk areas are interconnected as they inform and influence one another.



# Risk assessment

- In many EU countries risk assessments in the workplace are required by law and must be recorded in writing.
- Qualitative risk assessments are more commonly used and involve providing a statement on the severity of the risk e.g., low, medium or serious.
- Consideration is made on the likelihood of the danger and severity of risk is decided.

# Risk assessment

Risk assessment includes the examination of all characteristics of the work system where the worker operates:

- the workplace
- the equipment or machines
- materials
- work methods and practices
- work environment

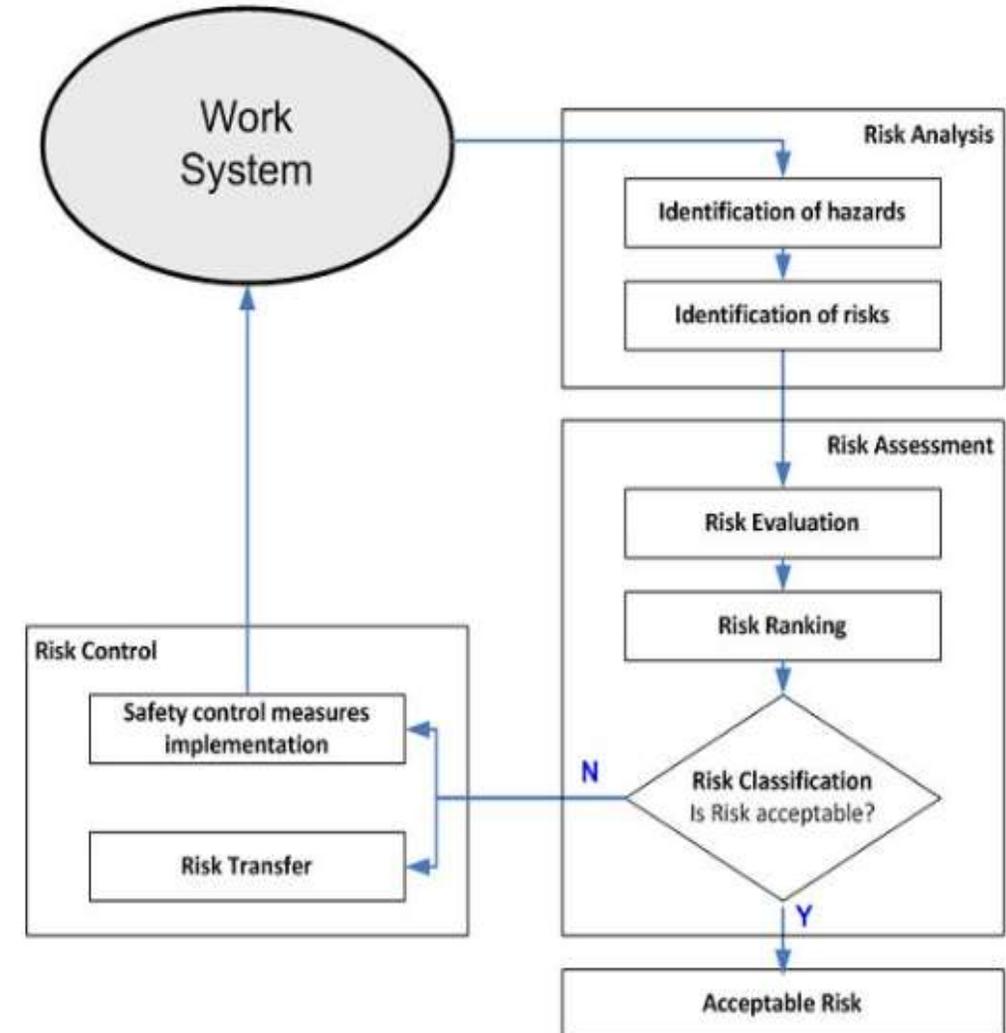


# Risk assessment

- The first step is the **identification of all hazards**.
- This is identifying anything which can potentially cause injury or harm.
- Includes all hazards to health and safety in the enterprise from buildings, to animal handling facilities down to the operation of each vehicle and machine.
- As this involves a detailed examination of every aspect of the workplace to identify potential hazards it is important to include and consult with all employees.
- **Once all the hazards are identified it is then important to assess the risks associated with each hazard.**

# Risk Mana

- Having identified the hazards and carrying out the risk assessment to assign a risk rating the next step is to identify the **risk management**.
- Where the risk is deemed unacceptable it must be eliminated or controlled to an acceptable level.
- When we look at control measures we often refer to the hierarchy of control measures.

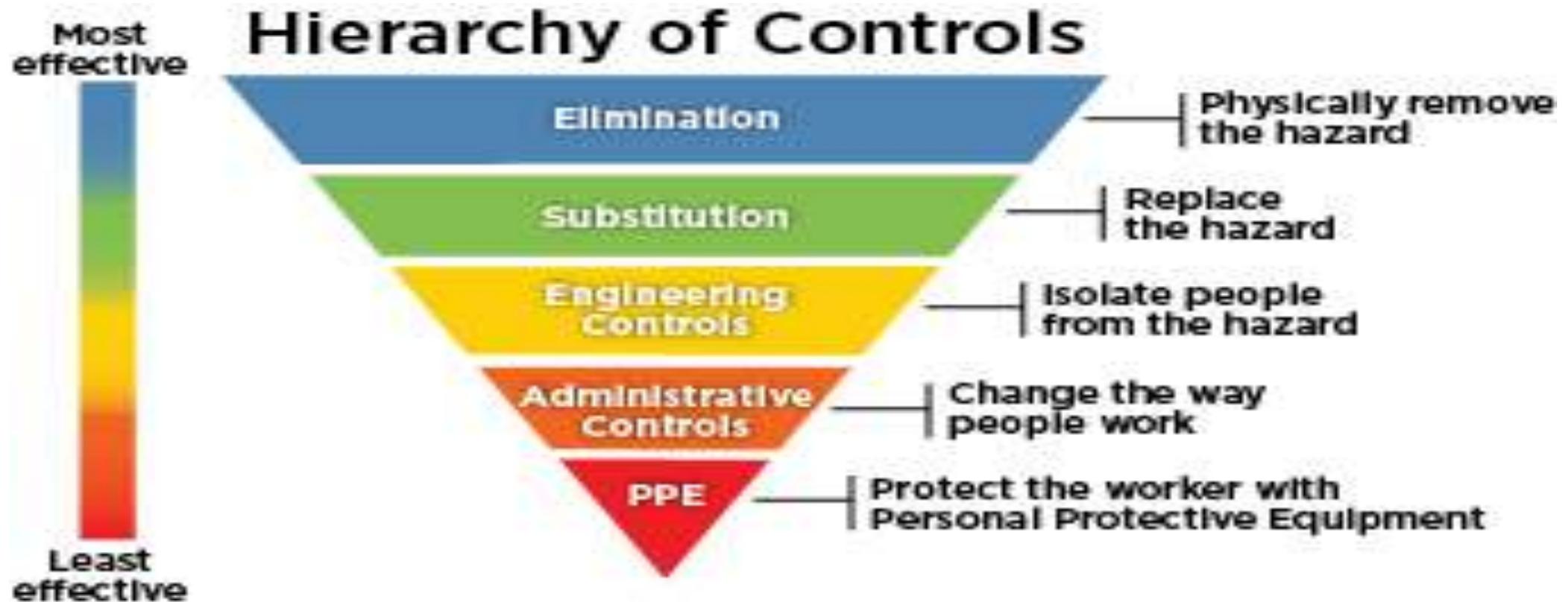


Source: Nunes, 2010

The **general principles of prevention** listed in Directive 89/391/EEC - OSH 'Framework Directive' are the following:

- avoiding risks
- evaluating the risks
- combating the risks at source
- adapting the work to the individual
- adapting to technical progress
- replacing the dangerous by the non- or the less dangerous
- developing a coherent overall prevention policy
- prioritizing collective protective measures (over individual protective measures)
- giving appropriate instructions to the workers

To help further identify what control measures, we can refer to the hierarchy of control measures:



Source: NIOSH

# Elimination and substitution

- Elimination and substitution, are most effective at reducing hazards but tend to be the most difficult to implement in an existing process.
- If the process is still at the design or development stage, elimination and substitution of hazards may be inexpensive and simple to implement.
- For an existing process, major changes in equipment and procedures may be required to eliminate or substitute for a hazard.

# Engineering controls

- Engineering controls are favoured over administrative and PPE for controlling existing worker exposures in the workplace because they are designed to remove the hazard at the source, before it comes in contact with the worker.
- Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
- The initial cost of engineering controls can be higher than the cost of administrative controls or PPE, but over the longer term, operating costs are frequently lower, and in some instances, can provide a cost savings in other areas of the process.

# Administrative controls and PPE

- Administrative controls and PPE are frequently used with existing processes where hazards are not particularly well controlled.
- Administrative controls and PPE programs may be relatively inexpensive to establish but, over the long term, can be very costly to sustain.
- These methods for protecting workers have also proven to be less effective than other measures, requiring significant effort by the affected workers.

# Risk Communication

- Risk communication is the process by which persons or institutions with information of the risk at hand choose to communicate the risk to others.
- The goal is to inform others in a way that helps them to make optimal decisions for themselves, the field of risk communication focuses on finding communication methods that will enable others to make those optimal decisions.
- It allows people at risk to understand and adopt protective behaviours.

# OSH legal requirements (concerning occupational risks) - overview

- The European Union sets legislation in the form of directives.
- European directives are legally binding and have to be transposed into national laws by Member States.
- European Directives set out minimum requirements and fundamental principles, such as the principle of prevention and risk assessment, as well as the responsibilities of employers and employees.
- Thus these requirements and principles are applicable in all Member States of the European Union.

## OSH legal requirements - continued

- The most important legal act is the European Framework Directive (1989/391/EEC). The Framework Directive is transferred into national law of all Member states.
- This Framework Directive brought about considerable improvement including the following:
  - The term ‘working environment’ was set in accordance with International Labour Organization (ILO) Convention No. 155 and defined a modern approach taking into account technical safety as well as general prevention of ill-health.
  - The Framework Directive aimed to establish an equal level of safety and health for the benefit of all workers (the only exceptions are domestic workers and certain public and military services).

## OSH legal requirements - continued

- The Framework Directive obliges employers to take appropriate preventive measures to make work safer and healthier.
- The Framework Directive introduced a key element the principle of risk assessment and defines its main elements (e.g. hazard identification, worker participation, introduction of adequate measures with the priority of eliminating risk at source, documentation and periodical re-assessment of workplace hazards).
- The new obligation to put in place prevention measures implicitly stressed the importance of new forms of safety and health management as part of general management processes.

# Bulgaria, Greece, Ireland and Romania OSH requirements

Who is allowed to undertake risk assessment in each country and how is it employed?

<b>Bulgaria</b>	Owner of the working place (or directors, works manager) is responsible for the risk assessment to be done. The Occupational Health Services, or the other experts are allowed to undertake risk assessment. They are employed within the framework of the general agreement between Occupational Health Services and owner or director of working place
<b>Greece</b>	The employer should have at his/her disposal a written assessment of the occupational health and safety risks at work. This assessment should be carried out by the safety technician, the occupational physician, Internal or External Occupational Safety and Health Services, licensed by the Ministry of Labour. The employer should provide the necessary means and personnel to fulfil this purpose.
<b>Ireland</b>	Every employer is required to manage safety and health at work so as to prevent accidents and ill-health. Employers must: identify the hazards, carry out a Risk Assessment and prepare a written Safety Statement. The system must involve consultation between the employer and his/her employees, who are required by law to cooperate with the employer in the safety-management process.
<b>Romania</b>	Safety at work, including risk management is provided by the employer, through internal or external prevention and protection services, or by designated workers. This service ensures the assessment of professional risks and draws up the risk identification sheet for each worker.

# Bulgaria, Greece Ireland and Romania OSH requirements

How is risk assessment undertaken in agriculture in each country?

Bulgaria	There is no differences between risk assessment in agriculture and the other working places. But in practice, the risk assessment in the field of agriculture is difficult to be done. This is because many of the agriculture producers do not have contracts with Occupational Health Services and the government control is not effective.
Greece	There is no specific law for the agricultural sector. Risk assessment as outlined in national legislation is conducted as follows: according to Law 3850/2010/84 A “Ratification of the code of laws for health and safety of workers”, risk assessment in agriculture can be conducted by specialized in safety technicians, yet when there are less than 50 employees and in the case the employer has one of the mentioned by the Law specialties then he/she can conduct risk assessment. In case there are less than 20 employees then the employer should have a 35 hours training, graduate of technical institute and his studies should be relevant to the activity of the company in order to conduct risk assessment.
Ireland	For farmers with three or less employers they complete the farm safety code of practice risk assessment document. <a href="http://www.hsa.ie/eng/Your_Industry/Agriculture_Forestry/Overview/Agriculture_Code_of_Practice/">(http://www.hsa.ie/eng/Your Industry/Agriculture Forestry/Overview/Agriculture Code of Practice/)</a> For others in the agricultural sector, they use standard employer’s tools.
Romania	No specific data for agriculture, in Romania. Risk assessment is done according to the OHS legislation.

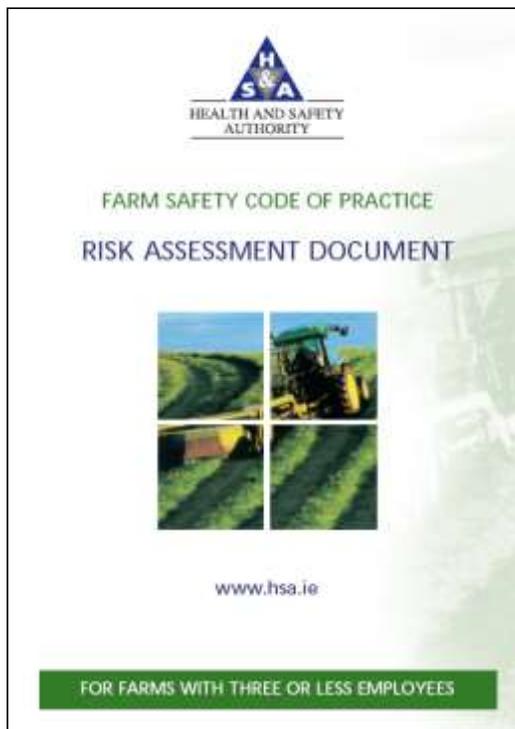
# Example: legislation for agriculture in Ireland

The safety, health and welfare of farmers and their workers are secured by the following legislation:

- Safety, Health and Welfare at Work Act 2005
- Safety, Health and Welfare at Work (General Application) Regulations 2007
- Safety, Health and Welfare at Work (Construction) Regulations 2013
- Safety, Health and Welfare at Work (Chemical) Agent Regulations 2001

# Safety, Health and Welfare at Work Act 2005

- In agriculture in Ireland, the Safety, Health and Welfare at Work Act 2005 requires all farmers to prepare and implement a Safety Statement.
- Farmers with three or fewer employees may instead follow the Code of Practice.



## HOW TO COMPLETE THIS DOCUMENT

### Tractors, Farm Vehicles and ATV's.

Tractor, Vehicle and ATV Risk Assessment	LIST ALL VEHICLES USED ON THE FARM				
	Ford	Zetor	ATV	Loader	Loader
<i>I must ensure that:</i>					
The Catalyst has in good condition.	✓	✓	N/A	✓	✓
The U guard is in place to cover the PTO shaft.	✓	✓	✓	✓	✓
All controls are in working order and are clearly marked/understood.	✓	✓	✓	×	✓
The brakes are in good working order and adequate for the work undertaken.					
The handbrake is fully operational.					
The mirrors, lights, indicators and wipers are all functioning, clean and visible.					
Mowing equipment is free of defects.					
All visible defects on the vehicle are identified and rectified, (not defects on control sheet).					
<b>Safety Practices</b>					
The vehicle is only operated by competent drivers.	✓	✓	✓	✓	×
Where the operator has to leave it will be secured.	✓	✓	N/A	✓	✓
The vehicle is always started and operated from the correct position.					
Passengers are only carried where the manufacturer has designed the vehicle for this purpose.					
When starting and operating any vehicle, bystanders will not be endangered.					
Travel speed will be suitable to the ground or road conditions.					
When a vehicle is stopped, the SAFE parking procedure is used.					
Additional vehicle controls used.					

### My Farm Safety Action List

Where your assessments have indicated safety controls that are missing you must show in the action list below what action you will take to put that control in place. This action should have a date for completion. When the control is in place the action should be signed off and the safety assessment changed to show that the control is now in place.

Safety Assessment	Safety Control Measures that are missing.	Action that I must take on my farm.	Date	Sign
Single Machinery	PEE cover and 'O' gear missing on Vacuum taker.	PEE cover and 'O' gear to PTO attachment under (also the work).		(Signature)

# Safety, Health and Welfare at Work Act 2005

The 2005 Act requires:

- a safe place of work which includes the farmyard and buildings
- safe working practices and procedures
- safe equipment and machinery
- a safe way in and out of the farmyard and other places of work, including farm buildings
- information and training for workers
- personal protective equipment where necessary
- a safe system for the storage, handling and use of articles and substances
- adequate toilet and washing facilities

# Safety, Health and Welfare at Work Act 2005

Farm workers must:

- take care of themselves and others
- co-operate with their employers
- use any personal protective equipment provided
- not misuse or interfere with anything provided for their safety
- report any hazards they become aware of
- consult with their employer on matters of safety and health
- take account of any training and instruction which they have been given

# Occupational hazards relevant for agriculture workers (Part 1)

# Occupational hazards relevant for agriculture workers

- Many significant occupational hazards exist in the agriculture work sector, compared to other work sectors.
- Agriculture workers are exposed to a wide variety of occupational hazards.
- They interact more closely with the outside world.
- They are exposed to many air-borne hazards such as pollen, fungal, spores, grain dust and mites, that produce chronic health conditions such as asthma, allergic asthma and bronchitis (Gerard, 1998).

# Occupational hazards relevant for agriculture workers

- They work long hours, work in all types of weather conditions, use many different types of machinery and chemicals, work with unpredictable animals and carry out a wide range of mentally and physical demanding activities.
- Agriculture in every industrialised country is one of the most hazardous occupations, based on occupational fatality rates, nonfatal occupational injury rates, and occupational illness rates (Donham and Thelin, 2006).

# Occupational hazards related to work task

- During the working day, farmers are exposed to a variety of physical hazards such as:
  - lifting and carrying heavy loads
  - working with the trunk in sustained flexion
  - risk of trips and falls on slippery and uneven walkways
  - unpredictable actions of livestock
  - exposure to vibration from farm vehicles and power hand tools

(Walker-Bone and Palmer, 2002)

# Occupational hazards related to work task

- **Awkward postures:** Working in awkward postures or in the same posture for a long period of time. Using positions that place stress on the body ie: working with small animals, driving a tractor while focusing on machine behind.
- **Excessive force:** Exerting excessive force through pushing or pulling heavy loads, lifting heavy objects or animals or maintaining control of equipment or tools.
- **Vibration:** In agriculture vibration can result from machinery and tool usage. The effects of vibration can damage the body. Whole body vibration is a significant physical risk factor associated with low back pain.

# Occupational hazards related to work task

- **Repetitive motions:** Performing the same motion or series of motions continually or frequently for an extended period of time ie: Milking cows.
- **Combined exposure to several risk factors:** In agriculture workers are involved in a multitude of manual tasks which may place them at a higher risks to occupational hazards than exposure to one risk factor.

# Occupational hazards related to production means

- Production means refer to the technologies and machinery related to agriculture work.
- Farm vehicles and machinery are the most common and dangerous hazard to an agriculture worker.
- Depending on the type of production farm vehicles and machines vary.
- Previous research have revealed that the majority of machinery-related accidents occur as the result of human carelessness for example: improper or lack of maintenance, not reading the operator's manual, ignoring a posted warning, improper or lack of instruction, failure to follow safety rules, ignoring warnings.
- Not only is the operator at risk but other workers near the machine are also at risk from being crushed or knocked down.

# Occupational hazards related to working environment

- Agriculture workers are often exposed to harsh climate conditions, excessive noise and vibration, chemicals, infectious agents, dust and other organic substances.
- Many agriculture workers are self-employed, work alone, work long hours earning low and unstable incomes and often have to combine more than one activity to make a living.
- Also due to the remote nature of rural areas, agricultural workers often lack access to the necessary health, information and training services to adequately respond to occupational hazards.
- In many cases farms are not only a place of business but the family home is usually located on or very near the worksite. Therefore vulnerable groups that are particularly affected include the elderly and children.

# Occupational hazards related to worker

- Agriculture workers are vulnerable to all work task, production means and working environment hazards.
- Occupational hazards related to worker can include:
  - personal factors (eg: age, gender, education, body mass, height)
  - work factors (eg: system, size of operation, hours worked)
  - psychosocial factors (eg: stress, depression, fatigue)

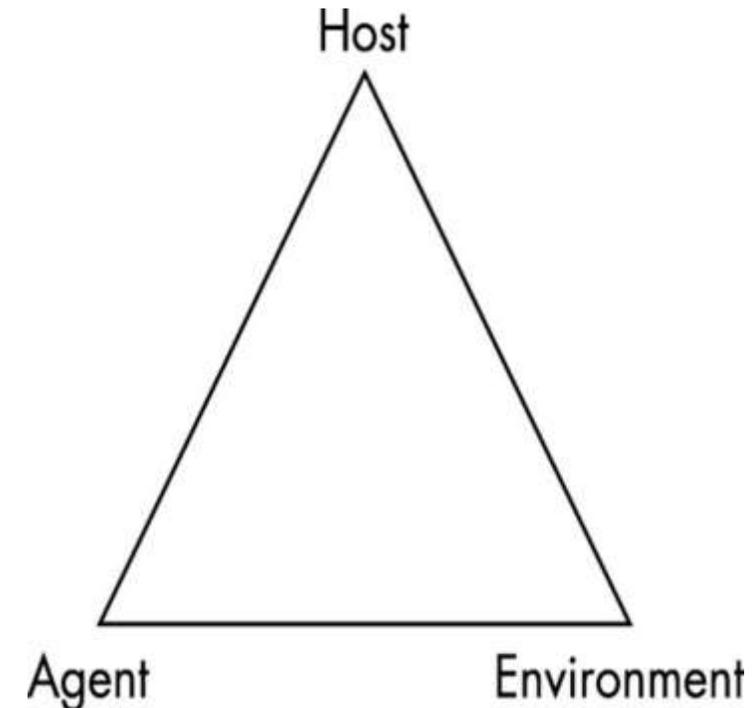
# Occupational hazards related to worker

Other factors to consider are:

- Are users trained in safe operation?
- Are they risk averse?
- Are they wearing proper clothing?
- Are they properly supervised?

# Epidemiological triangle

- The epidemiological triangle is an example of how occupational hazards related to work task/ production means, working environment and worker can interlink and result in individuals becoming ill or injured.
- Disease or injury occurs when an outside agent (ie: work task/production means) capable of causing disease or injury meets a host (ie: the worker) that is vulnerable to the agent.
- This happens in an environment that allows the agent and host to interact. Thus, it is important to fully understand each of these elements.



# Occupational hazards relevant for agriculture workers (Part 2)

# Ergonomic (occupational) hazards relevant for agriculture employees

## Definition of Ergonomics:

- “Ergonomics applies information about human behaviour, abilities and limitations and other characteristics to the design of tools, machines, tasks, jobs and environments for productive, safe, comfortable and effective human use.” (McCormick and Saunders 1993)
- Fitting the job to the person.

# Ergonomic (occupational) hazards relevant for agriculture employees

Ergonomic risk factors include:

- Force
- Repetition
- Awkward postures
- Static postures
- Vibration
- Extreme temperatures
- Pressure and stress at work
- Forceful or twisting movements

# Ergonomic (occupational) hazards relevant for agriculture employees

- Ergonomic occupational hazards are physical factors within an environment that can result in **musculoskeletal disorders**.
- MSDs are defined as a group of disorders that affect the musculoskeletal system including the nerves, tendons, muscles, and supporting structures such as intervertebral discs (NIOSH, 1997).
- Due to the nature of agriculture work, which involves strenuous physical activities and high levels of manual labour, farmers and farm workers are at particular risk of developing MSDs.

# Ergonomic (occupational) hazards relevant for agriculture employees

Examples of some of the work exposures that agricultural workers face include:

- lifting and carrying heavy loads
- working with the trunk frequently flexed
- risk of accidents caused by the unpredictable actions of livestock
- exposure to vibration from farm vehicles and powered hand tools

(Walker-Bone and Palmer, 2002).

# Biological (occupational) hazards relevant for agriculture employees

There are two main groups of biological agents regarded as occupational hazards:

1. Allergenic and/or toxic agents forming bioaerosols (bacteria, endotoxin, fungi, mycotoxins,  $\beta$ -glucans, particles of plant and animal origin) causing occupational diseases of the respiratory tract, conjunctiva and skin.
2. Agents causing zoonoses and other infectious diseases that could be spread by tick or insect vectors, by the airborne route, by the alimentary route, or immediately by contact with skin

(Dutkiewicz et al., 2011).

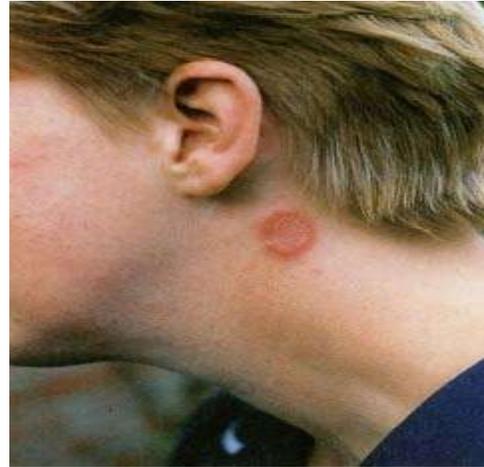
Disease	Animals affected	Contracting routes	Repercussions
<i>Escherichia coli</i> O157	Cattle, sheep, deer, goats	Mouth	Diarrhoea Kidney failure Death
Cryptosporidiosis	Calves, lambs, deer, goats	Contact with animal dung Water contaminated with dung Hand-to-mouth contact	Diarrhoea Abdominal pain Flu-like symptoms
Leptospirosis	Rats, cattle	Cuts and grazes Contact of infected urine with eyes, nose or mouth Placental products entered through broken skin Inhalation of droplets of urine	Fever Headache Vomiting Muscle pain Jaundice Meningitis Kidney failure Death
Bovine tuberculosis	Cattle, badgers, deer	Inhalation Hand-to-mouth contact	Chest pain Coughing up blood Fever Chills Night sweats Appetite loss Weight loss Pallor
<i>Salmonella</i>	Farm animals	Contaminated food Contact with animal dung Hand-to-mouth and hand-to-hand contact	Diarrhoea Fever Abdominal pain
<i>Streptococcus suis</i>	Pigs	Cuts and grazes Inhalation	Meningitis Death
Orf	Sheep, goats, lambs	Contact with lesions on animals or infected wool Fencing or hedges	Ulcers on face, hands and arms
Ovine chlamydiosis ( <i>Chlamydia psittaci</i> )	Sheep, goats	Handling or contact with infected afterbirth	Flu-like symptoms Abortion risk to pregnant women

<b>Psittacosis</b>	Ducks, poultry	Inhalation of dust from dung	Flu-like symptoms Pneumonia Endocarditis Hepatitis Death
<b>Q fever</b>	Sheep, cattle	Inhalation of dust contaminated with urine, faeces or birth products Drinking unpasteurised milk Tick bites Skin abrasions	Flu-like symptoms Pneumonia Liver and heart valve damage Death
<b>Ringworm</b>	Cattle, pigs, sheep, horses, dogs	Entering the skin through cuts and abrasions	Inflammation and swelling Crusty skin Skin lesions on hands, forearms, head and neck
<b>Cryptosporidiosis</b>	Poultry, cattle, sheep, small mammals	Ingestion of animal faeces (water or food contamination)	Diarrhoea Stomach pain and cramps Low fever
<b>Campylobacter</b>	Poultry, cattle	Ingestion of contaminated food, water, milk	Bloody Diarrhoea Periodontitis or dysentery syndrome Cramps Fever and pain
<b>Brucellosis (undulant or Maltese fever)</b>	Cattle, swine, goats, sheep	Contact with placenta and other contaminated tissues; consumption of unpasteurised milk and soft cheeses made from the milk of infected animals	Intermittent fevers Sweating Weakness Anaemia Headaches Depression and muscular and body pain Septicaemia
<b>Rabies</b>	Wild carnivores, dogs, cats, livestock	Exposure of virus-laden saliva to breaks in the skin, bite from an infected animal	Flu-like symptoms Anxiety Insomnia Confusion Agitation Abnormal behaviour Paranoia Hydrophobia Death

## Consequences to the exposure to the biological hazards



Orf



Ringworm



Actinomyces



Streptococcus  
Infection

# Psychosocial (occupational) hazards relevant for agriculture employees

- Psychosocial hazards are defined by the International Labour Organization (ILO, 1986) in terms of the **interactions among job content, work organisation and management, and other environmental and organisational conditions, on the one hand, and the employees' competencies and needs** on the other.
- As such, they refer to those interactions that prove to have a hazardous influence over employees' health through their perceptions and experience (ILO, 1986).

# Psychosocial (occupational) hazards relevant for agriculture employees

- Psychosocial risks go hand in hand with the experience of work-related stress (WHO, 2010).
- Work-related stress is the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope (WHO, 2003).

# Psychosocial (occupational) hazards relevant for agriculture employees

Agriculture work can be very physically and mentally demanding which can result in agriculture workers experiencing a number of **psychosocial hazards** such as:

- long working hours
- Isolation
- financial uncertainty
- planning difficulties
- administrative demands
- interaction between stress and exposure to multiple physical risks

# Physical (occupational) hazards relevant for agriculture employees

- Physical hazards are environmental hazards that can cause harm to agriculture employees with or without contact.
- Examples of **physical hazards** include:
  - noise and vibration
  - electricity
  - death and injuries from machinery and animals
  - falls from height
  - Climate

# Noise and vibration

- A variety of significant health effects are associated with occupational exposures to noise and vibration.
- Vibrating surfaces represent one of the primary sources of noise, therefore, exposures to both types of physical stressors are commonly encountered.
- The effects of noise and vibration exposures may be intensified among farm workers because they tend to be more isolated than workers in other types of industry.
- As a consequence, access to health and safety information, medical care, and hazard control technology may be more restricted.

(Crutchfield and Sparks, 1991)

# Electricity

In agriculture electrical accidents occur mainly for the following reasons:

- Plug contains a loose (floating) earth.
- Equipment is connected without using a plug top and/or socket.
- Unsuitable domestic-type plugs and other accessories are used.
- 'Temporary' joints, both taped and un-taped, are used on extension cables.
- Portable equipment, including infra-red lamps, is connected to lighting circuits.

## Electricity - continued

- Improvised measures are taken and repairs carried out in an amateur fashion.
- Incorrectly rated or 'make do' fuses (including silver paper and nails) are used.
- Faulty equipment and installations are used.
- Frayed cable insulations cause galvanised roofs of outhouses and rolled steel joist pillars to become live.
- High voltages are imposed on electric fences where the fence earth electrode is too near the farm installation earth electrode.
- Buildings are erected and straw, hay or other materials are stacked under or near power lines.
- High machinery or equipment is operated under or near overhead power lines.

([http://www.hsa.ie/eng/Publications\\_and\\_Forms/Publications/Agriculture\\_and\\_Forestry/Agriculture\\_Code\\_of\\_Practice.html](http://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Agriculture_Code_of_Practice.html))

# Machinery

- A review published by the European Union in 2016 found that the industry where the risk of accidents due to the use of machines or hand tools was deemed to be the most frequently reported risk factor was agriculture.

*(Second European Survey of Enterprises on New and Emerging Risks (ESENER-2) Overview Report: Managing Safety and Health at Work)*

# Machinery - continued

Previous research have developed a safety hierarchy to eliminate an injury hazard that included the following elements:

- (1) design and manufacture equipment according to standards;
  - (2) guard moving parts by using shields, casings or interlocks;
  - (3) train operators with respect to machinery operation and safety; and
  - (4) prescribe personal protective equipment
- (Murphy, 1992).

## Machinery - continued

- Although design and provision of safety features for farm machinery are 'built-in' and are the responsibility of the manufacturer, the farm owner or employer is responsible for operator training and ensuring compliance with standard safety practices.
- Many machinery in agriculture can become outdated and do not have up-to-date safety features.
- Additionally, machinery may not be serviced regularly by mechanical experts and therefore can pose risks for example due to faulty breaks or untested hydraulic lifts.

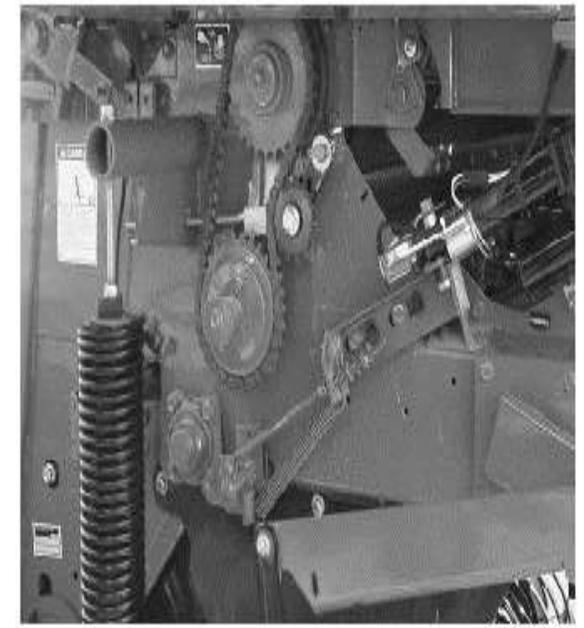
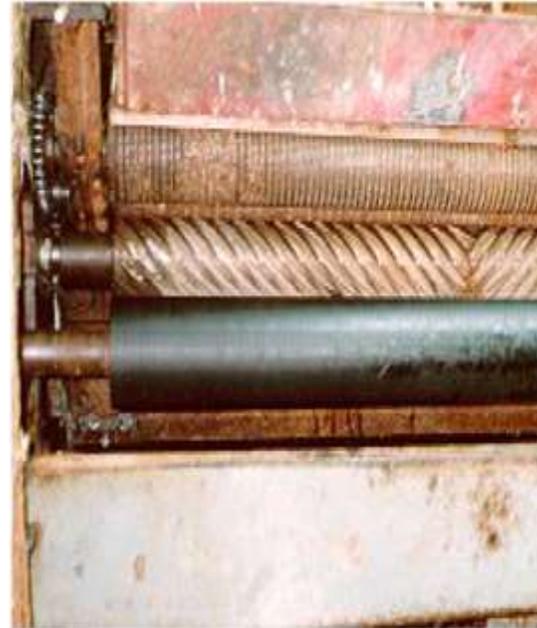
## Machinery - continued

Machinery crush hazard and unguarded machines are the biggest risk



## Machinery - continued

- Can you identify the machinery hazards below?



## Machinery - continued

- Can you identify the machinery hazards below?



# Machinery - continued

As well as moving parts always consider other types of machinery hazards....

- Do any surfaces get extreme hot or cold?
- Are any live electrical components exposed?
- Does the machine emit toxic exhausts?
- Does the machine use hazardous chemicals (e.g. petrol / diesel)?
- Are there any parts under pressure e.g. hydraulic lines?
- Is the machine noisy?
- Does it vibrate excessively?

# Animal's

Some agriculture workers will work closely or come in contact with a range of animals as part of their work.

The most common farm animals include:

- Bovine animals
- Pigs
- Sheep
- Goats
- Poultry

# Animal's

- Due to the size and unpredictable nature many fatal and non-fatal injuries are caused by bovine animals.
- Bulls cause an alarming number of all farm livestock deaths. They must always be treated with caution. Even placid bulls are unpredictable, so care is essential at all times.
- Attacks by recently calved cows have increased in recent years and this calls for particular vigilance while attending cows at calving time.

# Animal's

- Handling facilities play a major role in preventing injury. Well-designed facilities allow the farmer to control animals, giving easy and safe access to stock for veterinary and other tasks.

([http://www.hsa.ie/eng/Publications\\_and\\_Forms/Publications/Agriculture\\_and\\_Forestry/Agriculture\\_Code\\_of\\_Practice.html](http://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Agriculture_Code_of_Practice.html))

# Falls from heights

- The principal risk when working at height is falls, either from ladders, through fragile roofing materials or from unprotected edges of roofs or other structures.
- In many cases, simple straightforward physical protection measures can prevent falls occurring.
- Lack of planning results in the necessary protection being neglected during this high-risk work.
- Deaths and serious injuries can be caused from ladders slipping sideways or kicking out at the base or someone simply falling from the ladder.
- Ladders should only be used as a means of access or for work of very short duration when there is no other safer way of doing a job.
- It is much safer to use a mobile elevating work platform or a tower scaffold.

# Climate

- Climate conditions can amplify existing health and safety issues and can lead to occupational hazards.
- Examples include:
  - Occupational exposure to hot and cold environments eg: heat related stress, cold related problems, etc.
  - Air pollution can be linked with both acute and chronic health effects.
  - Climate conditions can affect the prevalence and distribution of vectors, pathogens, hosts and allergens.
  - Extreme weather events can lead to occupational deaths, injuries, diseases and mental stress eg: floods, wildfires, storms etc.

# Chemical (occupational) hazards relevant for agriculture employees

- Chemical hazards are a type of occupational hazard caused by exposure to chemicals in the workplace.
- For a chemical agent to cause harm it must come into contact with or enter the body. The main ways for this to happen are:
  - Inhalation
  - Skin Contact
  - Through Damaged Skin
  - Ingestion
  - Eye contact

# Chemical (occupational) hazards relevant for agriculture employees

The adverse effect that a chemical can have on a person exposed to that chemical depends on a number of factors. These include:

- Nature and physical form of the chemical
- The route of entry into the body
- Mix of substances
- Acute poisoning
- Amount absorbed – dose : response relationship
- The individual concerned
- Target organ
- Frequency, duration and intensity of exposure

# Chemical (occupational) hazards relevant for agriculture employees

- The hazards associated with a chemical can be obtained from the chemical's classification and its SDS.
- There is a statutory requirement for a supplier of a hazardous material to provide a SDS.
- The steps that need to be taken to protect oneself from a chemical can be obtained from the SDS.

 **Drucker Diagnostics**  
Innovative Solutions for a Healthier World

SAFETY DATA SHEET

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**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

**Product Name:** QBC AccuTube Test Kit  
**Catalog Number:** 423406  
**Manufacturer:** Drucker Diagnostics  
 168 Bradford Drive  
 Port Matilda, PA, 16870 USA  
 Telephone (814) 692-7661

**In case of an emergency, spill, fire, exposure, or accident contact:**

QBC Diagnostic Technical Support  
866-265-1486

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**2. HAZARDS IDENTIFICATION**

**Classifications :**

Specific Target Organ Toxicity (Repeated Exposure) – Category 2  
 Skin Irritation – Category 3  
 Eye Irritation – Category 2B  
 Germ Cell Mutagenicity- Category 1B



**Health Statements:**

H302/H312/H332 Harmful by inhalation, in contact with skin and if swallowed.  
 H313 May be harmful in contact with skin.  
 H315/H320/H335 Irritating to eyes, respiratory system and skin.  
 H333 May be harmful if inhaled.  
 H318 May cause serious eye damage.  
 H373 May cause damage to organs through prolonged or repeated exposure.

**Precautionary Statements:**

P101 If medical advice is needed, have product container or label at hand.  
 P102 Keep out of reach of children.  
 P103 Read label before use.  
 P262 Avoid contact with skin and eyes.

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QBC AccuTube Test Kit (423406) Page 1 of 6  
 Form No. 221  
 Revision B

# Chemical (occupational) hazards relevant for agriculture employees

Agriculture chemical examples include:

- Pesticides
- Herbicides
- Rodenticides
- Sheep dips
- Oils
- Fuels

# Prevention and protection measures within the agriculture economic sector

# Prevention and protection measures

- World Health Assembly resolution WHA60.26, “**Workers’ Health: Global Plan of Action**”, urged Member States “to work towards full coverage of all workers, particularly those in the informal sector, agriculture, small enterprises and migrant workers with essential interventions and basic occupational health services for primary prevention of occupational and work-related diseases and injuries”(WHO,2014).
- The World Health Organisation (WHO, 2014) has proposed a strategy to improve health coverage of workers to help address this ‘Workers health global plan of action’. This recommends:
  - Increasing skills of primary care providers, general practitioners, nurses, environmental and public health technicians, and community health workers to provide basic occupational health services such as advice on improving working conditions, monitoring the health status of workers and detecting the most common occupational diseases among workers in small companies, rural areas, farms, the informal sector and among migrants.
  - Expanding the coverage and improving quality of specialized occupational health services in big and medium-sized companies and industrial zones, with a focus on assessing and reducing occupational risks; surveillance and improvement of the work environment, work organization, machinery and equipment; early detection and rehabilitation of occupational diseases; promotion of health; and the provision of first aid at the workplace.

## Prevention and protection measures

- Establishing connections between occupational health services and primary care centres to facilitate the care of workers suffering from chronic diseases and their return to work after long-term absence due to sickness.
- Developing workplace health initiatives, tools and methods for empowering companies and other work settings to take better care of health, without unduly relying on professional health services.
- Including occupational health in the pre- and in-service training of all frontline health providers and certain medical specialists dealing with cancer, skin, respiratory and neurological diseases, and musculoskeletal disorders.
- Developing roadmaps for scaling up access of workers to essential interventions and services, as defined nationally, for prevention and control of occupational and work-related diseases. These include

# Prevention and protection measures

- Occupational Health Physicians can help assess agriculture risks and develop recommendations for prevention of occupational and work-related diseases.
- Workers at risk need regular medical check-ups to detect any health problem at an early stage, when treatment and modification of the workplace can help avoid permanent damage.

(WHO, 2014)

# Main causes of workplace accidents in agriculture

- One of the problems in dealing with OSH in agriculture in an EU context is the glaring lack of detailed statistical information on the extent, route cause and nature of workplace deaths, injury and ill-health across all EU – 28 member states.
- In many countries, statistics on fatal accidents in agriculture are well recorded however non fatal accidents go under reported each year.
- Module 4 will explore workplace accidents in more detail.

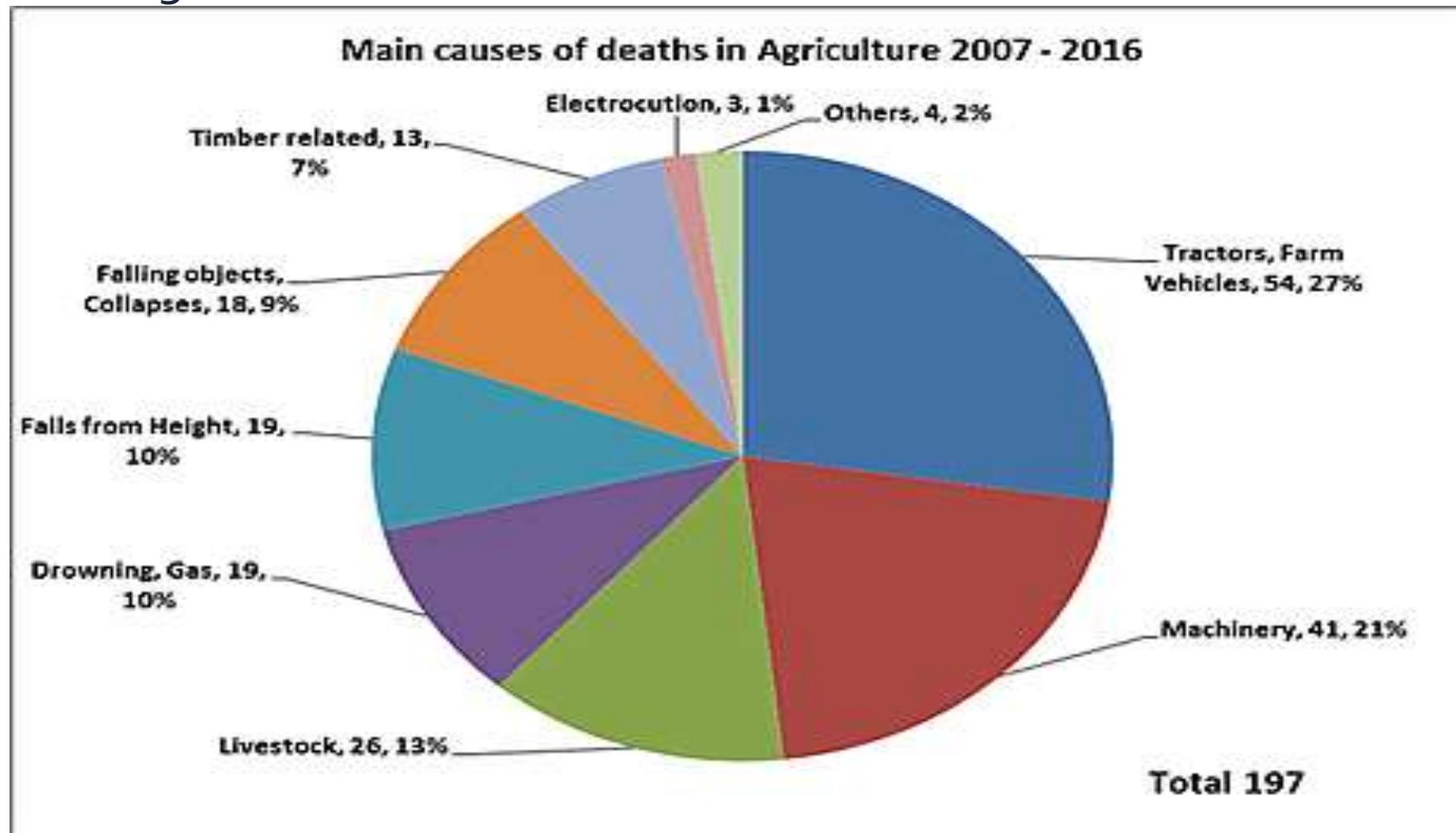
# Main causes of workplace accidents in agriculture

The most common causes of deaths in agriculture are:

- **Transportation accidents (being run over or overturning of vehicles)**
- **Falls from height (from trees, through roofs)**
- **Being struck by falling or moving objects (machinery, buildings, bales, tree trunks)**
- **Drowning (in water reservoirs, slurry tanks, grain silos)**
- **Handling livestock (attacked or crushed by animals, zoonotic diseases)**
- **Contact with machinery (unguarded moving parts)**
- **Entrapments (under collapsed structures)**
- **Electricity (electrocutions)**

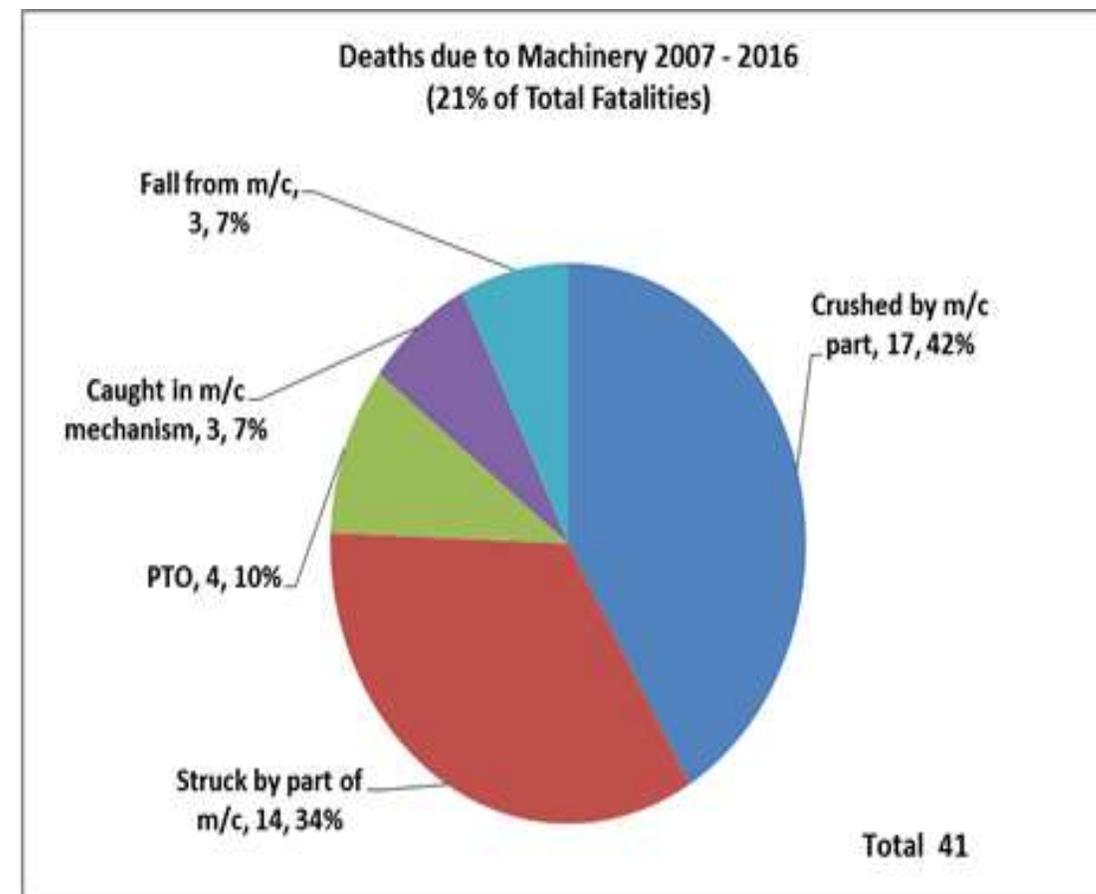
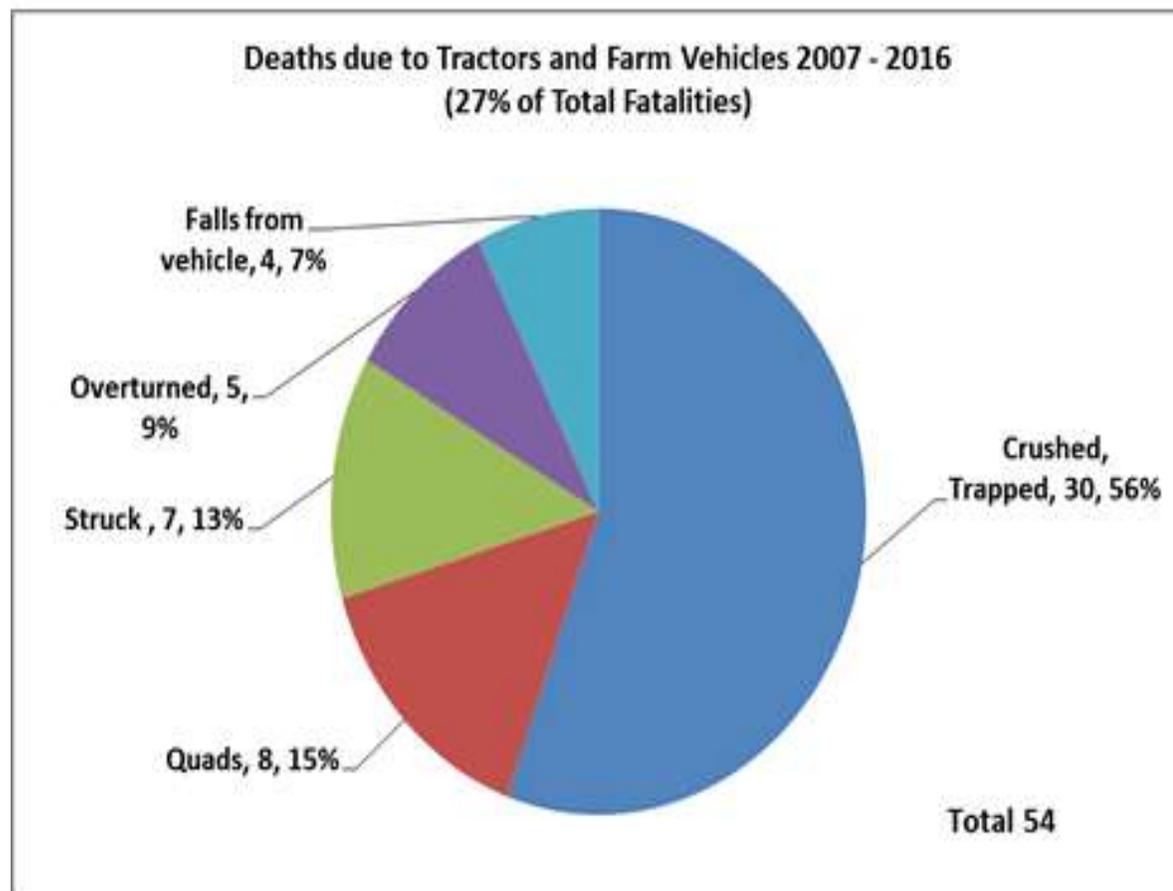
**(European Commission, 2012)**

In Ireland, statistics on fatal accidents are well documented for all sectors including agriculture and will therefore be used as a primary example to explain workplace accidents in agriculture in more detail



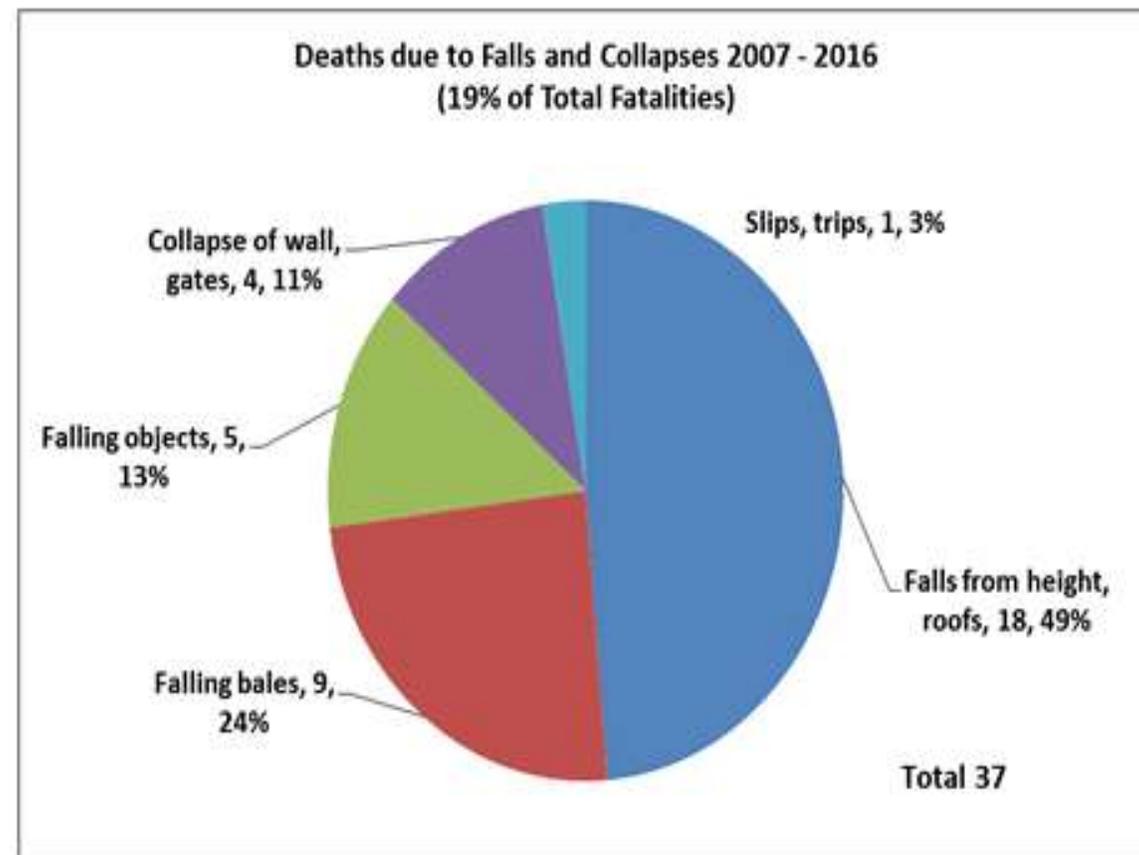
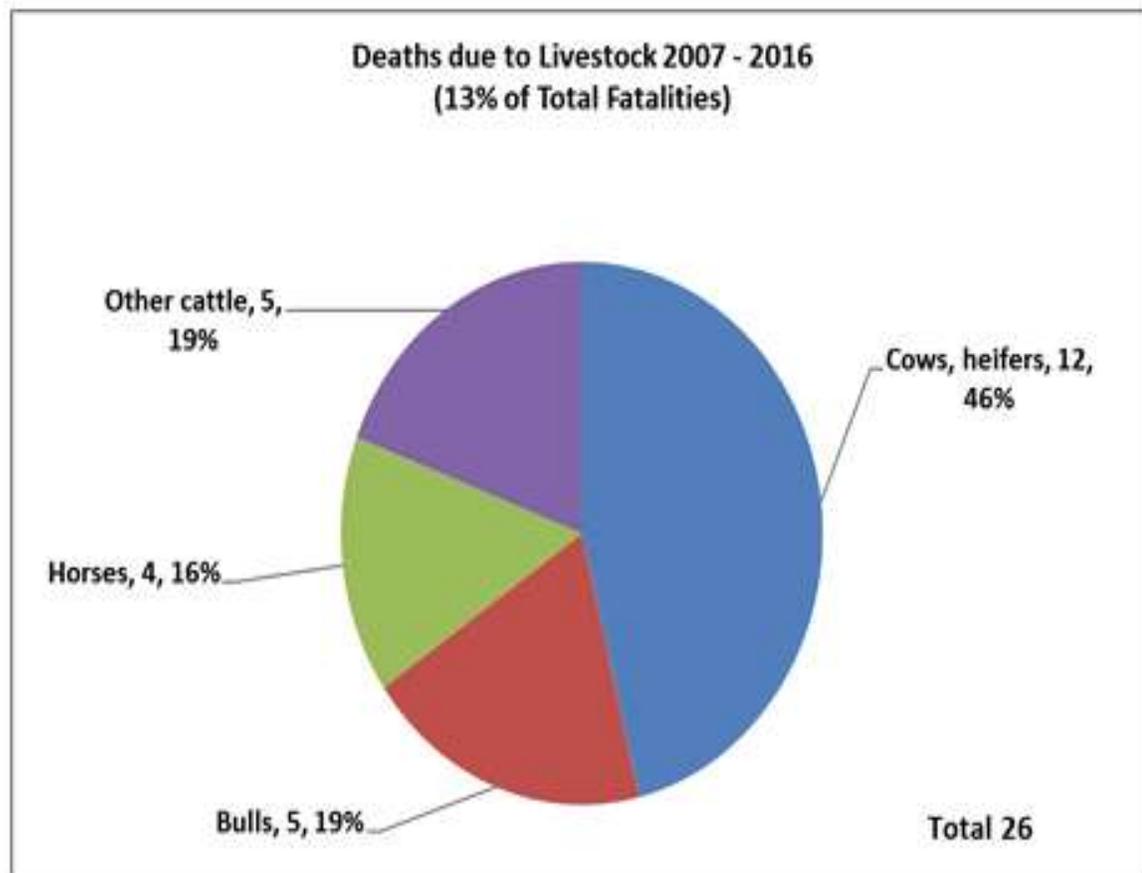
Source: HSA, Ireland

# Overview on the most often needs of preventive actions



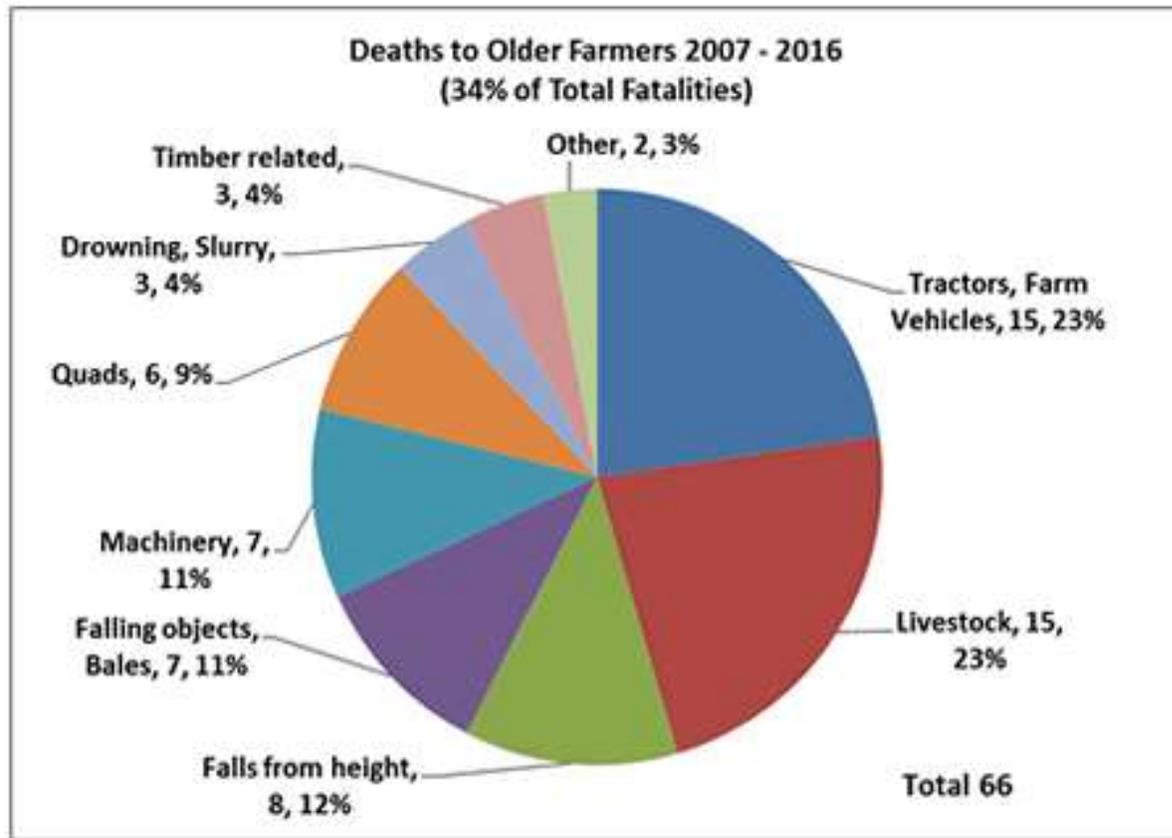
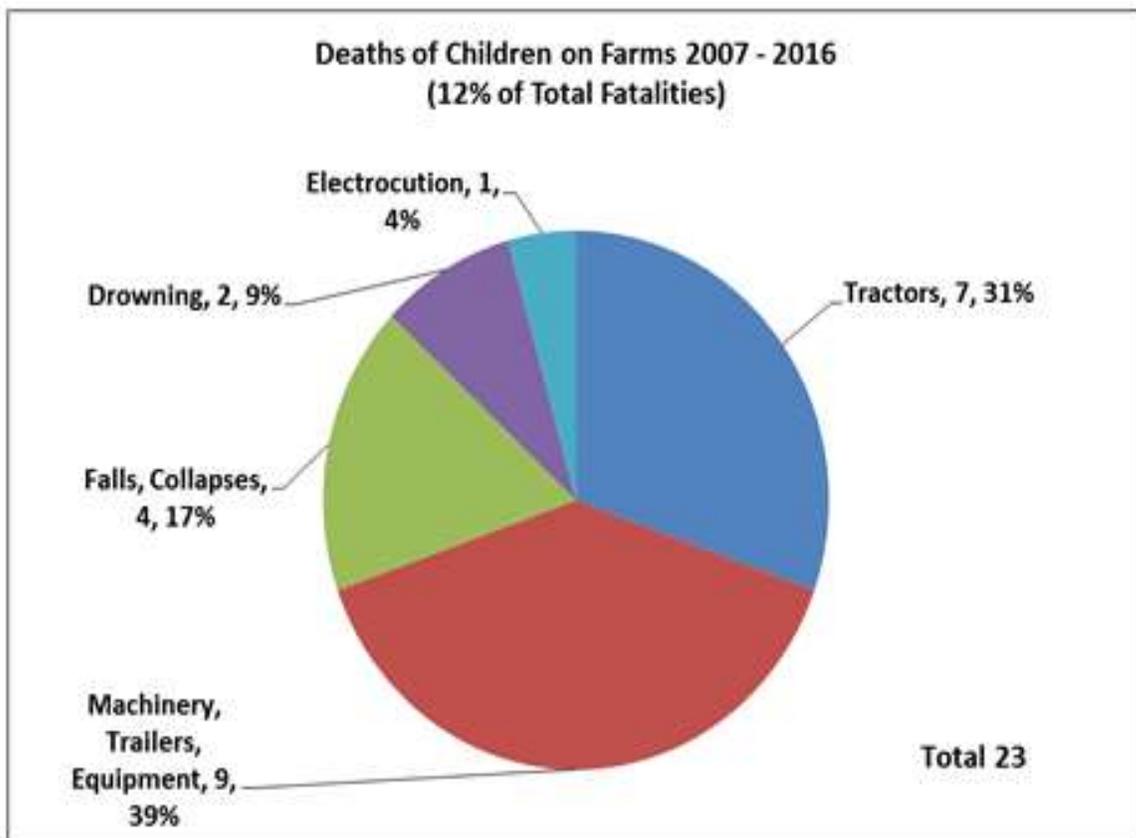
Source: HSA, Ireland

# Overview on the most often needs of preventive actions



Source: HSA, Ireland

# Overview on the most often needs of preventive actions



Source: HSA, Ireland

# Technical and organizational actions as part of preventive programs

- Improving health and safety at work is a major part of the European social model and this was set out in the EU Strategy on health and safety at work—Improving the Quality of Work and Productivity for 2007-2012, and continued by the OSH Strategy *2013 - 2020*.
- However, due to the characteristics of the Agriculture sector with its persistently high and disproportionate levels of fatal and non-fatal injuries and ill-health improvement is significantly less compared to other sectors.
- Each country has their own responsibility in improving OSH in agriculture and in implementing preventative programmes to assist this.

# Technical and organizational actions as part of preventive programs -Greece

## **Development Of Public Health Indicators For Reporting Environmental/Occupational Risks Related To Agriculture And Fishery – DIRERAF**

- The project aimed at developing a tool for reporting and assessing the impact of policies and practices with regards to occupational and environmental health risks for the agricultural and fishery sector in the EU.
- Implemented between November 2004 and January 2008 by a partnership of reputable research institutions in 10 EU countries.
- The project was supported by the European Commission in the framework of the 2003-2008 Health Program of the Health and Consumer Protection Directorate- General and was also supported by a grant received from the Stavros S. Niarchos Foundation.
- Focus was on the development of public health indicators for the reporting of occupational and environmental risks related to agriculture and fishery aiming to provide a useful tool for policy makers to monitor these risks in time and across different backgrounds, assessing the impact of related policies and practices.

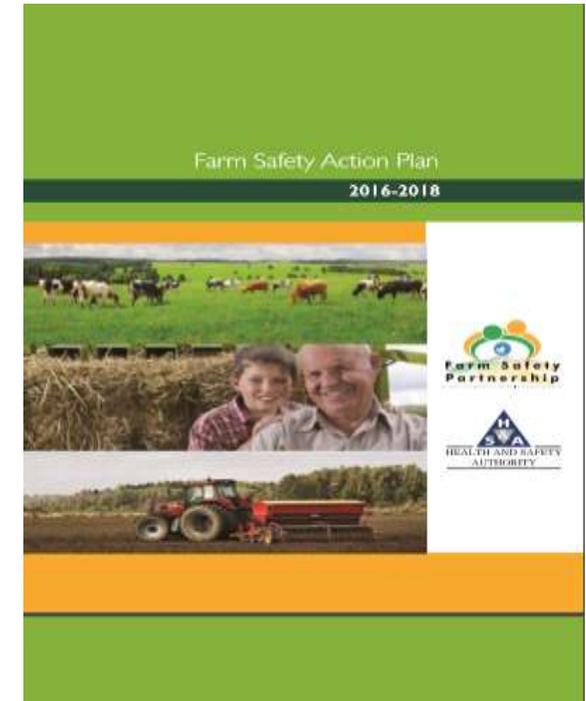
# Technical and organizational actions as part of preventive programs -Greece

- The project has developed and proposes a set of indicators to collect information on demographics of the workforce, occupational risks, occupational health outcomes, implemented policies, and environmental hazards related to agriculture and fishery.
- This set of indicators should be part of a European monitoring system that will routinely collect data on the health of farmers and fishermen and on environmental hazards related to agriculture and fishery.
- The indicators as well as related recommendations are presented in a set of documents which are accessible from the project website - <http://euprojects.org/direraf.com/>

# Technical and organizational actions as part of preventive programs - Ireland

- The Health and Safety Authority (HSA) are the national statutory body with responsibility for ensuring that all workers (employed and self-employed) are protected from work related injury and ill-health
- Farm Safety Partnership Advisory Committee (an advisory committee of the Board of the HSA), sets out the goals and associated actions in relation to improving occupational safety and health in agriculture.
- First Plan was developed for 2013-2015.
- The new Plan (2016–2018) builds on the achievements and actions of the previous plans.

([www.hsa.ie/.../Agriculture.../Farm\\_Safety\\_Action\\_Plan\\_2016-2018.pdf](http://www.hsa.ie/.../Agriculture.../Farm_Safety_Action_Plan_2016-2018.pdf))

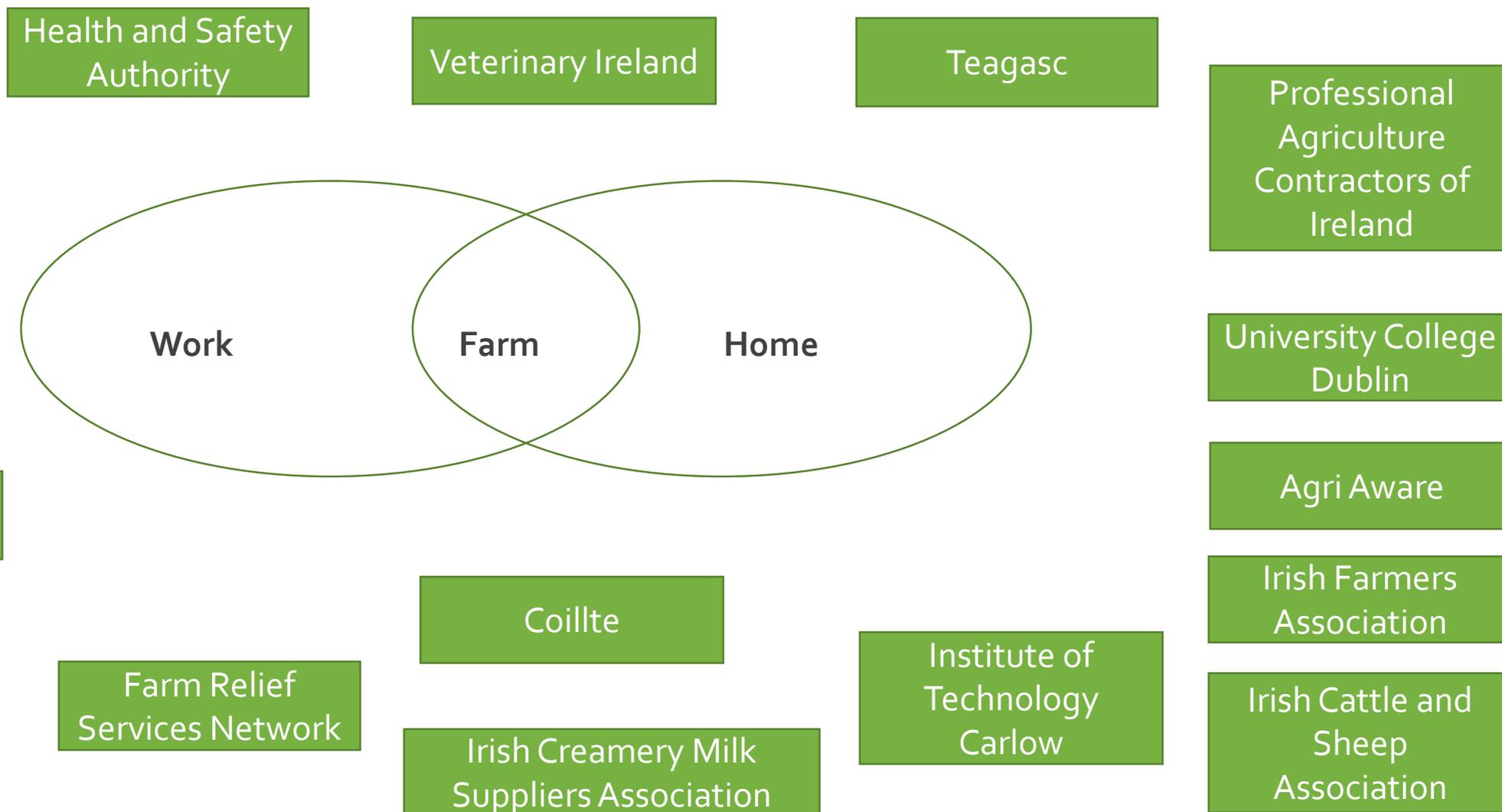


# Technical and organizational actions as part of preventive programs

The following are the six goals for the Farm Safety Action Plan (2016–2018):

- 1. To achieve cultural behavioural change in health and safety of persons working in the agricultural sector through research, education and training.
- 2. To develop programmes that will foster innovative approaches and deliver engineering solutions to reduce the risks to persons working in agriculture.
- 3. To reduce the level of death and injury arising from tractor and machinery use.
- 4. To establish initiatives to reduce the level of death and injuries arising from working with livestock.
- 5. To ensure high standards of health and safety are adopted in forestry and timber work on farms.
- 6. To implement programmes for the protection of health and wellbeing of persons, including vulnerable groups, working in agriculture.

# Farm Safety Partnership



# Individual and other actions as part of preventive programs

Department of Agriculture Food and Marine:

TAMS 2 Programme

- Specify Standards for Grant Aided Buildings and Installations.
- €675 Million for farm infrastructure (to 2020) 40/60% Rebate rates.
- Items eligible for Grant Aid:
  - Slurry related
  - Slat replacement
  - Electrical wiring and lighting
  - Cattle and sheep handling facilities
  - Sliding and roller doors

Further Information: <http://www.agriculture.gov.ie/>



# Individual and other actions as part of preventive programs

Department of Agriculture Food and Marine:

## KNOWLEDGE TRANSFER PROGRAMME

- Circa 20,000 in Programme
- Circa 500 KT Facilitators ( Advisors/ consultants).

OHS KT Programme requires:

- Training of KT Facilitators (1 day)
- Provision of OHS meeting in year 1
- Inclusion of OHS Plan in Farm Improvement Plan prepared jointly by farmer and facilitator



# Individual and other actions as part of preventive programs

Department of Agriculture Food and Marine:

- Access to TAMS safety grants requires completion of half day risk assessment training.
- Safety and health now a mandatory element of Knowledge Transfer groups.

# Individual and other actions as part of preventive programs

HSA E-Learning:



**HEALTH AND SAFETY  
AUTHORITY**

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Education News

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## Farm Safety

### Farm Safely with Slurry



This short course will help farmers to plan and prepare for slurry spreading. It provides an opportunity for farmers to increase their awareness of the dangers associated with slurry and how to prevent accidents occurring to themselves and to others.

**Learning Outcomes:**

At the end of this module you should be able to:

- identify the best times and conditions for spreading slurry
- recognise the need to plan ahead and make appropriate preparations to work safely
- recognise the dangers associated with slurry
- implement the appropriate control measures to prevent accidents when working with slurry
- search and find important information from the Health and Safety Authority on farming safely.

Enter course ▶

Last modified: Wednesday, 18 February 2015, 10:51 AM

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# Individual and other actions as part of preventive programs

Macra na Feirme:

- Safe Agri Skills card : Complete a suite of short training courses in relevant areas around farm safety
- Modules include:
  - tractor safety
  - livestock handling
  - manual handling
  - first aid and health for farming
  - chainsaw use
  - ATV / Quad Bike safety



**Macra na Feirme**

# Conclusions

- Workers health can be protected by controlling hazards in the workplace and risk assessment is an important tool to help identify anything in the work place that can potentially cause occupational ill health or injury.
- Employers must take appropriate preventative measures to make work safer and healthier and this is also the case for the agriculture sector.
- Many significant occupational hazards exist in the agriculture work sector compared to other work sectors, therefore it is important to know the types of hazards they must encounter depending on the sector in their area of influence.
- Important to ask or listen to the workers in order to suspect work-related harm.
- Prevention and protection measures that are agriculture specific are important in tackling workplace accidents in agriculture.

# Recommendations

- Understanding the occupational hazards and risks that exist in the agriculture sector will help improve your advice to agriculture workers.
- Where possible, encourage agriculture employers to have an up-to-date risk assessment document.
- Advise agriculture employers and workers on health promotion activities and how to improve working conditions.
- Collaboration is important to help reduce workplace accidents in agriculture. Try and get involved in prevention and protection measures in your community.