



Health and Safety in Agriculture

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The importance of Agriculture

- Agriculture is the science, art and occupation of cultivating soil, producing crops and raising livestock.
- One of the oldest and most essential sectors.
- Provides the food that we eat, fibers we wear, raw materials that support entire industries.
- Connected with
 - ✓ Growing
 - ✓ Harvesting
 - ✓ Primary processing of all types of crops
 - ✓ Breeding, raising and caring for animals

The importance of Agriculture

- Agriculture forms the foundation of every nation's food security and economic stability.
- It contributes to rural employment, supports global trade, and plays a crucial role in environmental stewardship.
- Globally, about **one in four workers** is employed in agriculture — roughly **1.3 billion people**, according to FAO estimates. In developing countries, that figure can exceed **60%** of the total workforce.
- However, behind the impressive productivity figures are **workers exposed daily to physical, chemical, biological and psychological risks**.

Agriculture hazards



- Agriculture can be dangerous occupation due to many hazards associated with working with heavy machinery, chemicals and animals.
- **Agriculture remains one of the most hazardous occupations worldwide.** According to the International Labour Organization (ILO), agricultural workers account for **over a quarter of all fatal occupational accidents** globally, and millions more suffer from work-related diseases, injuries, and long-term health effects.

Hazard & Risk

Hazard

- Anything with potential to do harm.

Risk

- The likelihood of potential harm from that hazard being realized.

Risk= Hazard x Exposure



Major Hazards in Agriculture



**Physical &
Mechanical**



Chemical



Biological



**Animal
handling**



**Ergonomic &
Psychosocial**

Major Hazards in Agriculture



Physical & Mechanical



- Noise exposure (loud noises),
- Vibration,
- Exposure to the weather (extreme temperatures, wind, etc.),
- Electricity,
- Slippery stairs or floorings, heights,
- Moving, rotating, or falling equipment & objects,
- Poorly designed or guarded agricultural machinery,
- Vehicles (tractors), rollovers, entanglement in power take-off (PTO) shafts, and crushing incidents are common
- Cutting tools.

Major Hazards in Agriculture



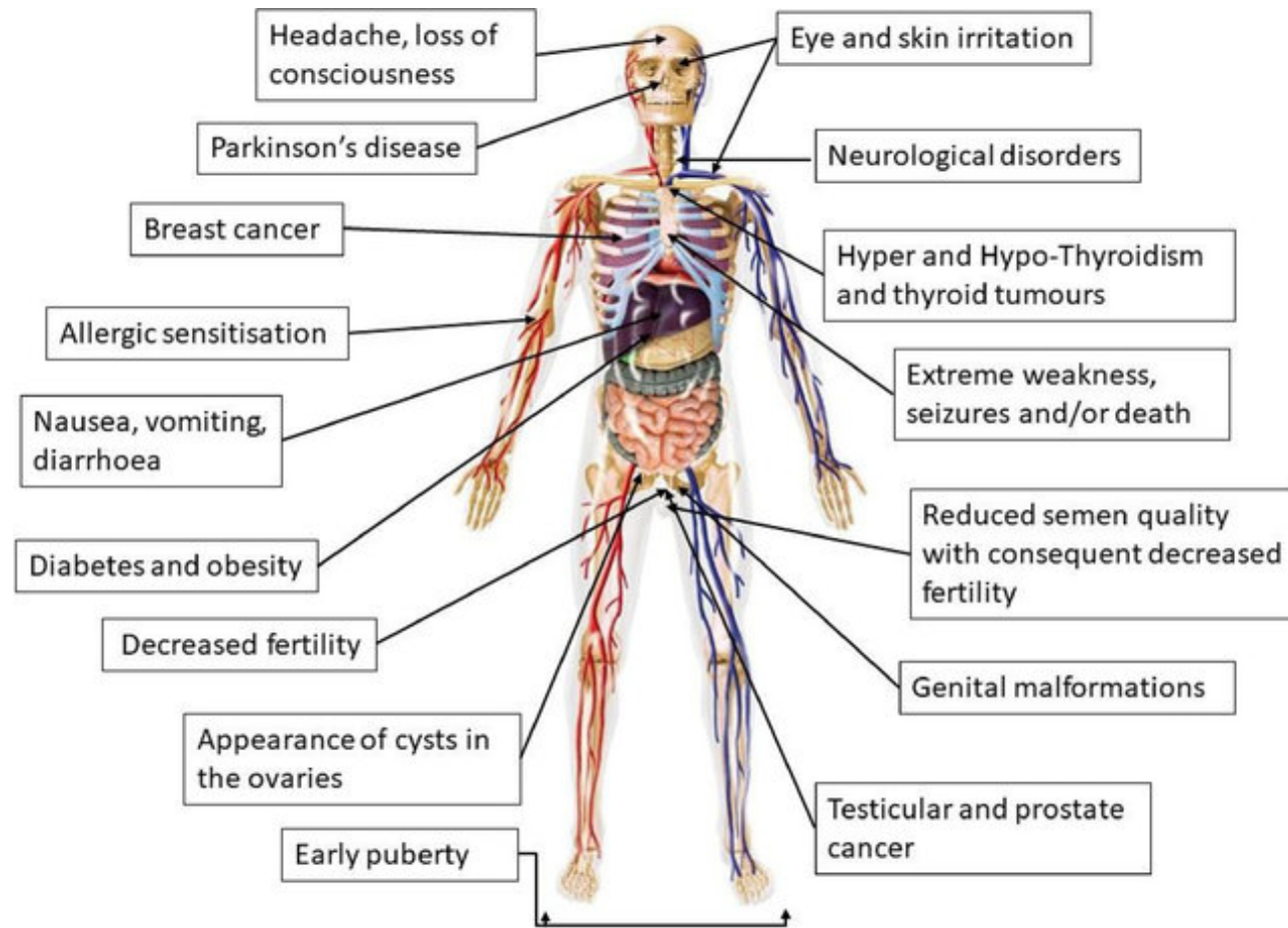
Chemical

- Exposure to pesticides, fertilizers & disinfectants,
- Improper storage & handling,
- Intensive use,
- Short (acute) and long-term (chronic) adverse effects,
- Acute: fire and explosion, poisoning, corrosion etc.,
- Chronic: Carcinogens, mutagens, teratogens, flammables, asphyxiants, endocrine disruptors etc.,
- Residual concentrations in both environment and humans.

Major Hazards in Agriculture



Chemical



Pesticide

How pesticides get in

Inhalation

Through food or water

Absorption through skin

Exposure levels

Chronic exposure

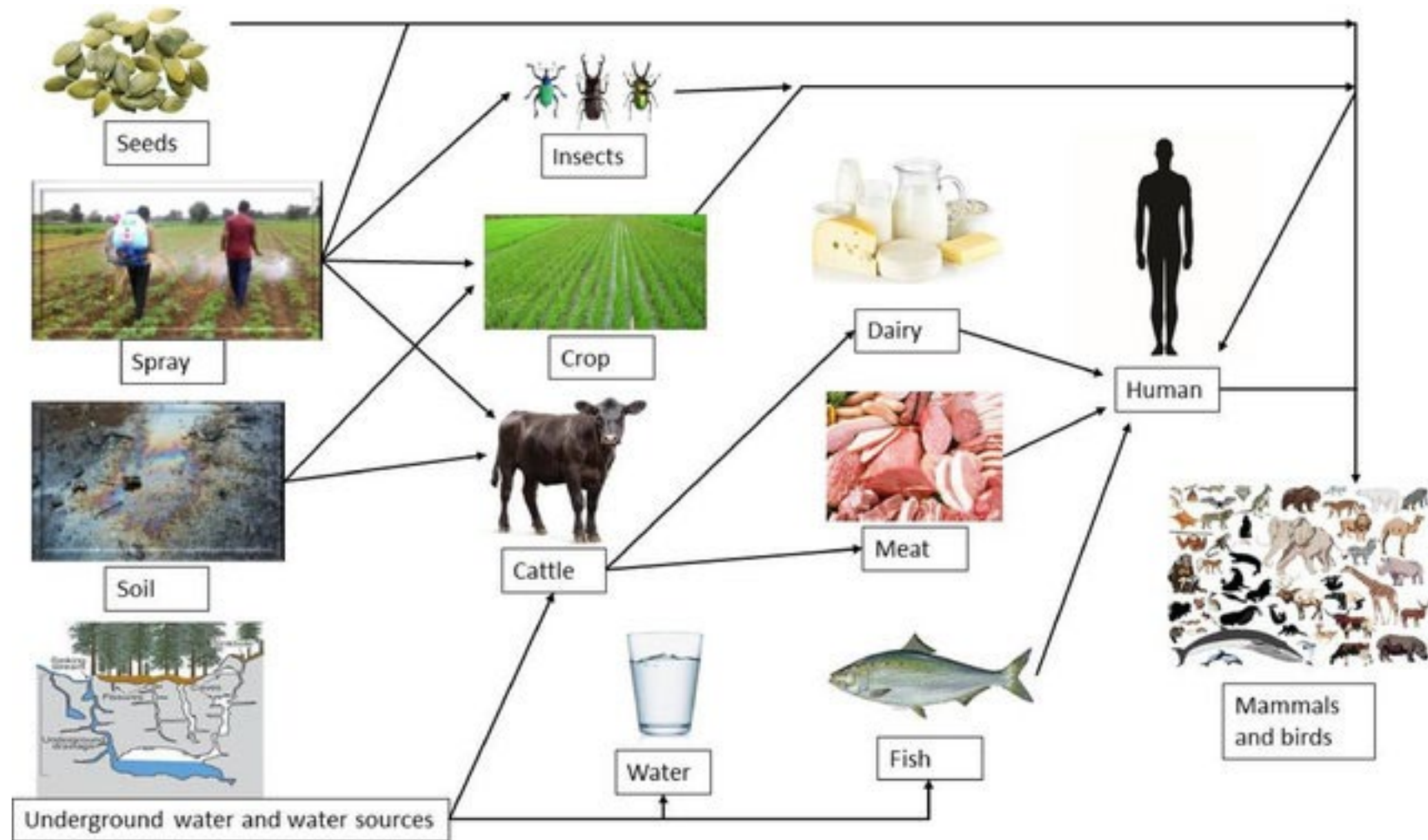
Acute exposure



Major Hazards in Agriculture



Chemical



Major Hazards in Agriculture



Biological

- Workers are constantly exposed to pathogens, animal-borne diseases, and plant allergens.
- **Zoonoses** — diseases transmitted between animals and humans — such as leptospirosis, brucellosis, or avian influenza — are occupational concerns.
- Exposure to molds, dust, and organic matter can trigger allergic reactions and chronic respiratory illnesses.

Major Hazards in Agriculture



Animal handling

- Improper or no training at handling animals.
- Bulls, stallions, rams, stags and female animals with newborns can be dangerous.
- Animal attacks.

Major Hazards in Agriculture



Ergonomic & Psychosocial

- Repetitive motions, awkward postures, and long working hours can cause strain injuries and mental fatigue.
- Incorrect body movements that cause injury or other health concern that may affect musculoskeletal system. May appear not too serious at first but may develop into serious health problems with permanent damage.
- Many farmers experience **stress, depression, and anxiety** due to financial pressure, isolation, and unpredictable weather or market conditions.
- Rural suicide rates among farmers are significantly higher than average in many countries — showing that **mental health** is also a safety issue.

Major Hazards in Agriculture



Ergonomic &
Psychosocial



Case Study 1: Tractor Rollovers (United States)

- In the U.S., tractor overturns remain the single largest cause of occupational deaths in agriculture.
- A study by the National Institute for Occupational Safety and Health (NIOSH) found that **one in seven tractor operators** will experience a rollover during their career.
- Most fatalities occur because tractors lack **rollover protective structures (ROPS)** or seatbelts. Where ROPS are installed and used, survival rates exceed **99%**.
- This shows that engineering controls — not just behavior — can save lives.

Case Study 2: Pesticide Poisoning (India)

- In 2017, in Maharashtra, India, more than **800 farmers were hospitalized** due to inhalation of toxic pesticide fumes while spraying cotton fields infested with pests.
- The pesticides used contained highly hazardous organophosphates. Inadequate protective gear, poor ventilation, and lack of training contributed to several fatalities.
- This tragedy led to national reforms, including **stricter pesticide labeling, training requirements, and bans on certain compounds.**

Case Study 3: Livestock Handling (New Zealand)

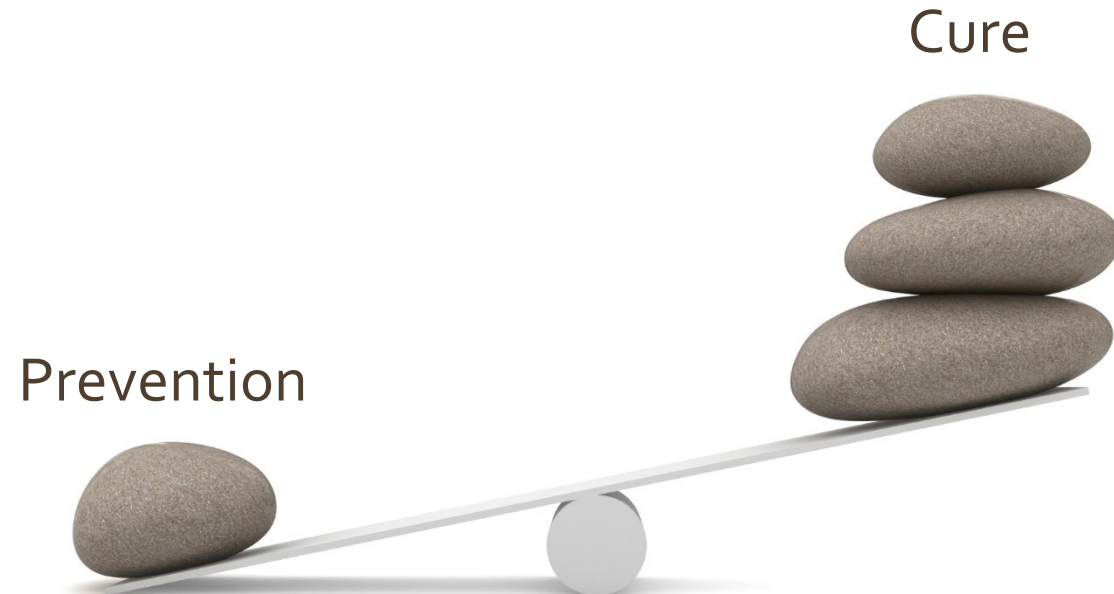
- Livestock-related injuries account for nearly **20% of all farm injuries** in New Zealand.
- A farmer suffered multiple fractures after being crushed by a bull during routine handling. Investigation revealed that the holding pens lacked proper escape routes and safety barriers.
- The incident led to the adoption of **new pen design standards** and **mandatory animal handling training** across several cooperatives.

Case Study 4: Heat Stress (Spain)

- During a heatwave in southern Spain, several seasonal farm workers suffered from **heat exhaustion**, and one fatal case of **heatstroke** occurred.
- These workers were harvesting fruits in temperatures exceeding 40°C, without shade or adequate hydration.
- After the incident, authorities introduced **mandatory rest breaks**, **shade tents**, and **on-site medical supervision** during high-risk periods.

Prevention is better than Cure

- The best way of protection is to take action before an injury, illness or even fatality occurs.



Reducing Risk: Principles and Prevention

The foundation of agricultural safety lies in **risk assessment and prevention**. The key principle is to identify, evaluate, and control hazards before they cause harm.

- a) The Hierarchy of Controls
- b) Training and Education
- c) Workplace Design
- d) Technology and Innovation
- e) Policy and Regulation
- f) Community and Organizational Culture

a. The Hierarchy of Controls

- This is a globally recognized framework in occupational health:
 1. **Elimination** – Remove the hazard entirely (e.g., replace toxic pesticides with biological controls).
 2. **Substitution** – Use safer alternatives (e.g., low-toxicity fertilizers).
 3. **Engineering Controls** – Design safety into equipment (e.g., tractor ROPS, guarded PTOs).
 4. **Administrative Controls** – Set safe work procedures, training, and scheduling (e.g., limit exposure time).
 5. **Personal Protective Equipment (PPE)** – The last line of defense (gloves, masks, goggles, boots).

b. Training and Education

Knowledge is one of the most powerful tools in reducing risk. Regular, hands-on training should include:

- Machinery operation and maintenance
- Safe chemical handling and storage
- First aid and emergency response
- Animal handling techniques
- Heat stress prevention and hydration awareness

c. Workplace Design

Farms should be designed with safety in mind:

- clear signage,
- safe storage for chemicals,
- proper lighting,
- well-maintained access routes can prevent many accidents.

d. Technology and Innovation

Modern technology offers many ways to make agriculture safer:

- **Autonomous and GPS-guided machinery** reduce operator exposure to danger.
- **Drones** can apply pesticides remotely, reducing chemical contact.
- **Wearable sensors** monitor fatigue, heart rate, and environmental heat.
- **Mobile apps** now deliver real-time safety alerts and training modules to rural workers.

e. Policy and Regulation

Effective legislation supports safety by setting enforceable standards. Examples include:

- **EU Directive 2009/128/EC**, promoting sustainable pesticide use.
- **Sustainable Use of Pesticides Regulation:** A proposed regulation (COM(2022)305) aims to halve the use and risk of chemical pesticides by 2030, aligning with the EU's Farm to Fork Strategy.
- **ILO Convention No. 184** on safety and health in agriculture — the only international labor standard dedicated to this sector.
- **REACH and CLP Regulations:** In addition to specific pesticide rules, the EU's general chemical regulations, such as REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) and CLP (Classification, Labelling and Packaging), also apply.

Governments must ensure compliance through inspection, incentives, and accessible reporting systems.

f. Community and Organizational Culture

Safety culture starts with leadership but grows through participation.

- Encourage workers to **report near-misses** without fear of punishment.
- Reward safe behavior.
- Integrate safety into daily routines — from morning briefings to equipment checks.
- Foster **peer-to-peer learning**, where experienced farmers mentor younger ones.

When safety becomes part of the farm's identity, everyone benefits.

Agricultural Safety

Strategies for Agricultural Safety



Agricultural Safety refers to the practices and precautions taken to ensure the safety and health of farmers, agricultural workers and the environment.

Agricultural Safety

Importance of Agricultural Safety



Agricultural Safety

Agricultural Safety ideas



Emerging Challenges and Future Directions

Agriculture is evolving rapidly. As we adopt new technologies and face climate pressures, new safety considerations emerge:

- **Automation and robotics** reduce manual labor risks but introduce electronic and cybersecurity hazards.
- **Climate adaptation** will require new training for heat management, flood response, and crop resilience.
- **Sustainable farming** movements emphasize reducing chemical inputs, which can lower toxic exposure.
- **Mental health awareness** is becoming integral to overall farm safety programs.

International collaboration, research, and data sharing will be essential to addressing these complex challenges.

Closing...

- Agriculture is not only the backbone of human civilization but also a sector where **health and safety must be treated as fundamental rights** — not optional extras.
- The hazards are real and varied: from machinery accidents to chemical exposures, from animal injuries to heat stress. But every one of these risks can be **managed, reduced, or even eliminated** through knowledge, technology, and proactive management.
- A safer agricultural world benefits everyone — the workers, their families, the consumers, and the global food system.

Let us remember...

- **Safety is productivity.**
- **Prevention is cheaper than recovery.**
- **Protecting the hands that feed us** is the most important investment any society can make.

THANK YOU