



Project: Technical assistance to improve implementation of food safety standards and disease crisis preparedness

Training course: Disposal of carcasses

Lecturer: Blagojcho Tabakovski

Date: 16 March 2023

Place: Nicosia, Cyprus

*Project funded by the European Union within the scope of the Aid Programme for the Turkish Cypriot community,
implemented by the NSF Euro Consultants Consortium*



Disclaimer: This presentation has been produced with the financial support of the European Union. Its contents are the sole responsibility of NSF Euro Consultants Consortium – Contractor, and do not necessarily reflect the views of the European Union.

CONTENT



- General
- Disposal methods
- Challenges
- Critical points
- Practical considerations
- Burial and Burning
- Summary



- The overall goal of disposal is to **protect the agricultural** and national economy through the **control and containment of animal disease** by conducting operations in a timely, safe, biosecure, socially acceptable, and environmentally responsible manner.
- Based on world-wide experience, carcass management is one of the **costliest aspects** of animal disease outbreak response.
- In order to **minimize the cost and increase the speed** of response it is necessary to plan and ensure full preparedness of all responsible institutions.

Challenges



- The mass killing and disposal of animals in the event of a disease outbreak should proceed with the **minimum delay**. The success is determined by the **structures, policies and infrastructure** established in advance:
- **disposal protocols or procedures** that environmental requirements before an
- suitable disposal personnel, supplies, outbreak;
- prevention of the spread of the disease in environment;
- considering community preferences.

Preparedness

Responsibilities



- **Veterinary authorities** typically oversee the strategy implementation, the animal health emergency response including carcass and related waste management activities. These authorities may need **support** from other agencies, depending on the scope of the animal disease outbreak.
- **Operators /farmers** – allow access to the premises, use of equipment, maintenance of the disposal site,
- **Environmental protection officials** may provide identification of location, technical advice, coordination,
- **Law enforcement officials** may ensure site security and movement controls.
- **Other** – Agency for emergency response, MoF, Army, local community, etc...

Disposal methods



- In an emergency animal disease response, there are a number of methods for disposing of carcasses and other items.
- The most common disposal methods for carcasses and other materials are:
 - burial (either at an existing licensed landfill site or in a specially designed and excavated pit),
 - burning (either on a pyre or in pit burner),
 - rendering,
 - incineration,
 - composting,
 - other.

Waste type



- A list of common waste material types likely to be encountered during a response include:
 - animal carcasses;
 - - animal products (e.g. meat, eggs, milk, wool, semen, ova, embryos);
 - - bedding and manure;
 - - feed and feeding stuff;
 - - contaminated equipment, supplies, and materials,
 - - vaccination or diagnostic syringes, PPE;

Critical element



Timelines	Staff resources
Occupational health and safety	Social acceptance
Pathogen inactivation	Acceptance by farmers
Environmental concerns	Equipment
Availability of capacities	Scavenger and vectors
Financial funds	Economic impact

Practical consideration



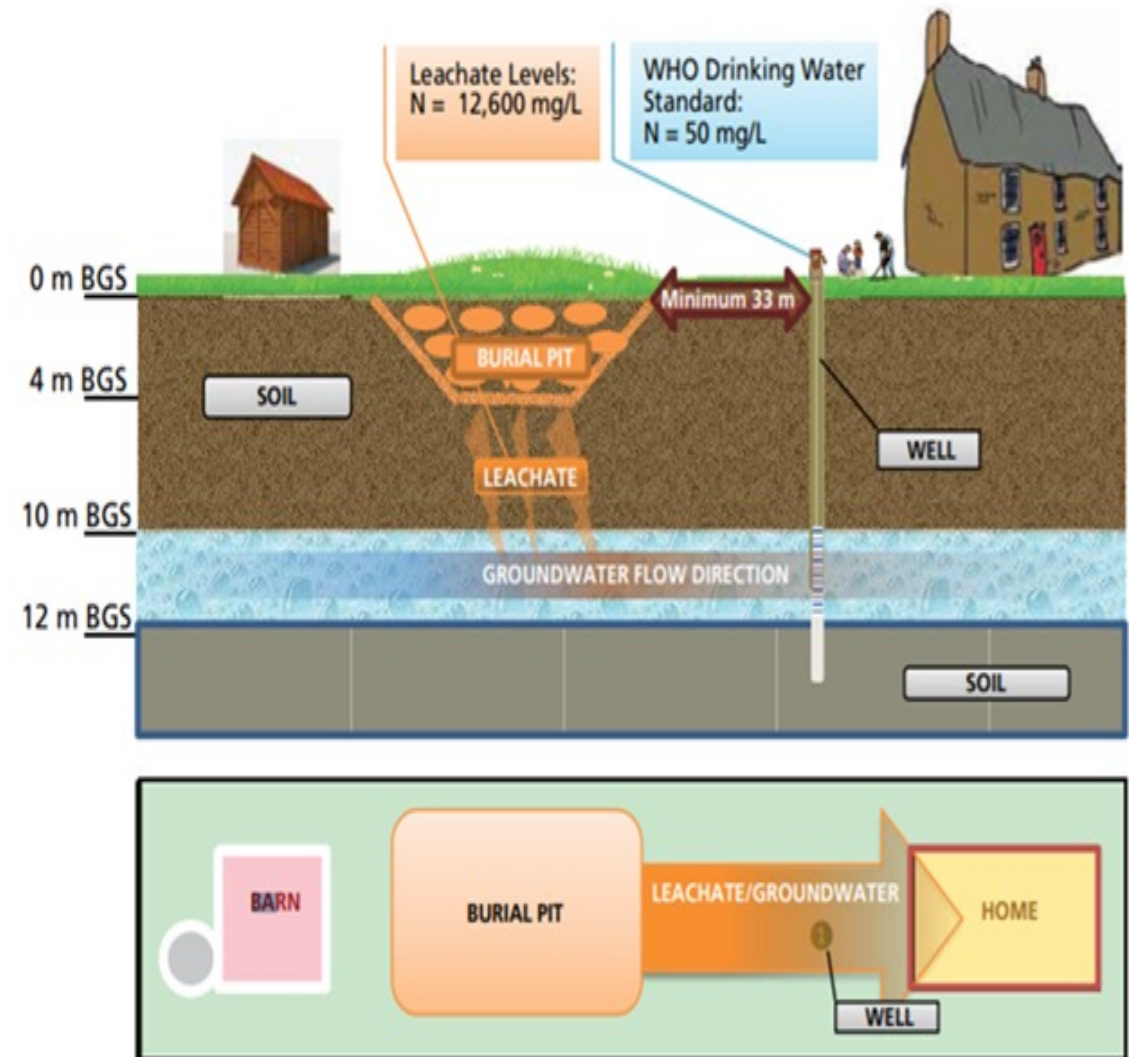
- Selection of disposal site
- Contractors
- Wildlife
- Logistical preparedness and appropriate technology
- Procedures and policies for disposal



Deep burial



Deep burial involves removing soil from the ground to a depth of **three to five meters**, piling the soil nearby for later use, depositing the carcasses into the excavated area, and then covering the carcasses with the soil that had been previously removed. Once buried, carcasses undergo **anaerobic decomposition** and break down into minerals and organic material. This is a slow process and may **take decades**. The anaerobic decomposition process generates body fluids (**leachate**) which will slowly penetrate the native soil beneath the burial site and may **reach groundwater**.

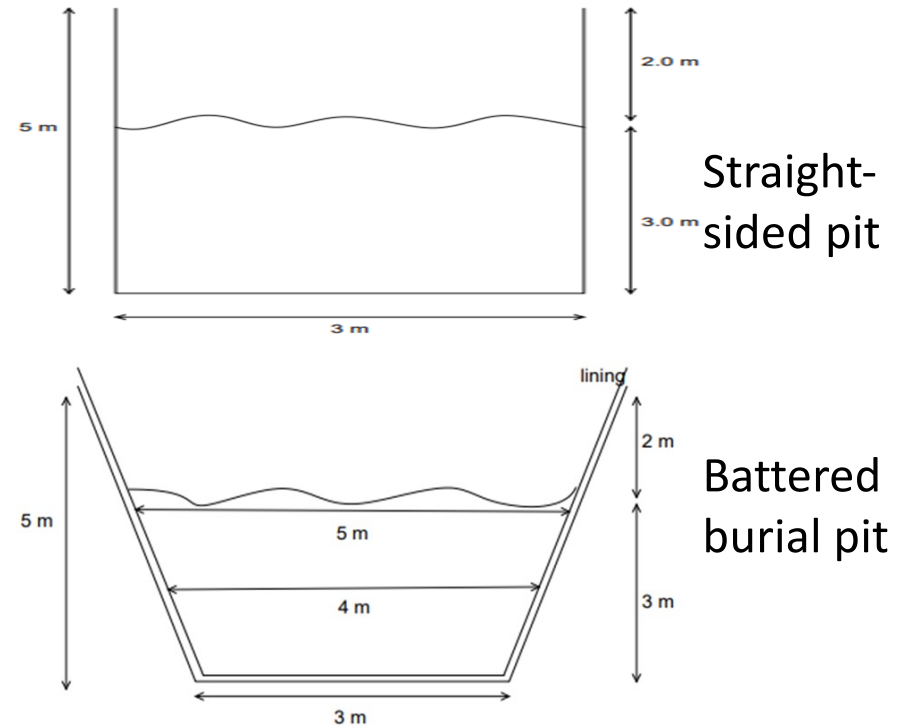


Legend:
BGS = below ground surface; m = metre(s); mg/L = milligrams per litre N = Nitrogen;
WHO = World Health Organization

Burial



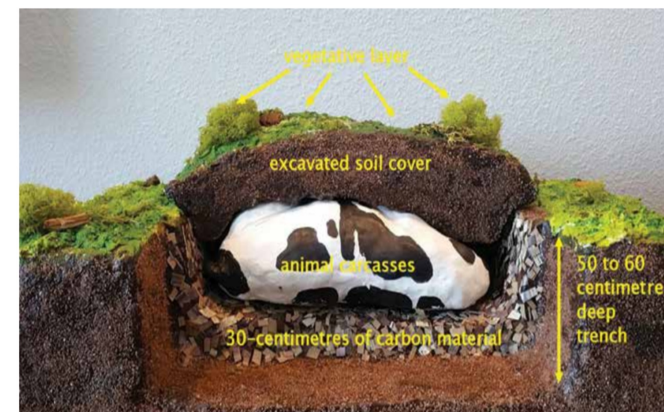
- The volume required will depend on the size of the animals.
- Observed dimensions occupied by the first carcasses deposited in the pit:
 - - 1.5 m³ per mature cow.
 - - 0.3 m³ per mature **pig** or sheep.
 - - 0.005 m³ per grown broiler/commercial layer (200 birds/m³).
 - - Required depth of soil to cover carcasses: 1,5 - 2 m.



Above ground burial



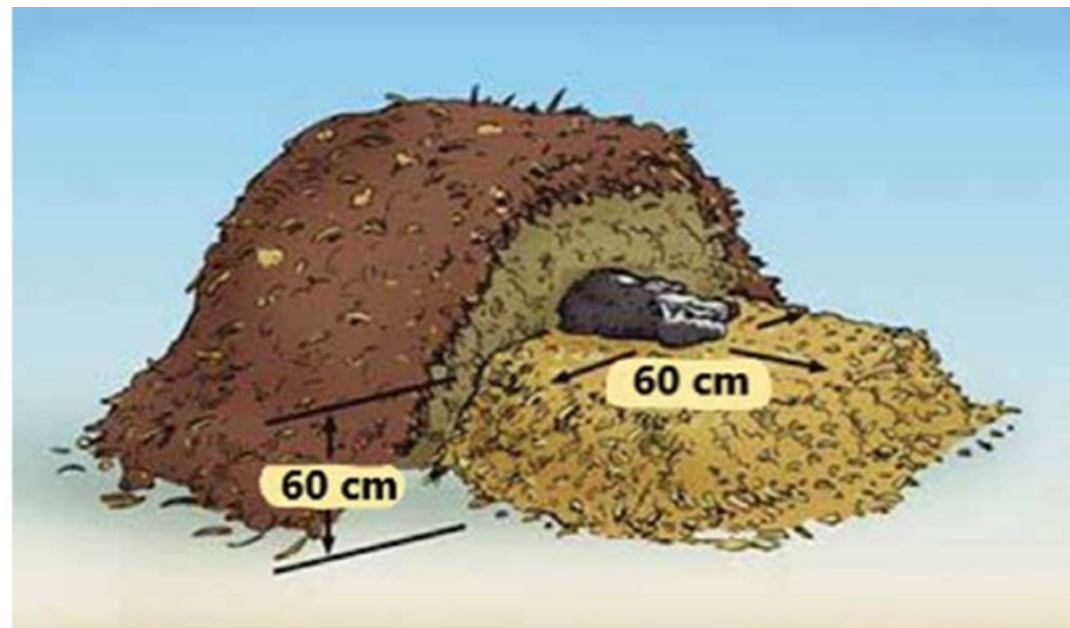
- Above-ground burial is a hybrid of deep burial and composting, which includes a shallow trench excavated into native soil to a depth of **60 centimeters**. **Thirty cm of carbonaceous** material is placed at the bottom of the trench, followed by a single layer of animal carcasses. Excavated soils are subsequently placed back in the trench, forming a mound on which the **vegetative cap** is established. Finally, the perimeter of the mound is **trenched** to prevent the intrusion of surface water into the system. In most environments, this will take between **9 and 12 months**. Have less risk than deep burial due to the increased **separation** of the carcasses from the **groundwater** table. Preliminary studies suggest that pathogens are inactivated during above-ground burial, as they are during composting.



Composting



- Carcass composting is a process that involves **constructing a porous base layer of carbon material** such as wood chips, **mixing or layering carcasses with carbon material** for the core of the windrow, and capping the mixture with a **blanket of carbon material** to **promote decomposition of carcasses at elevated temperatures.**



Burning



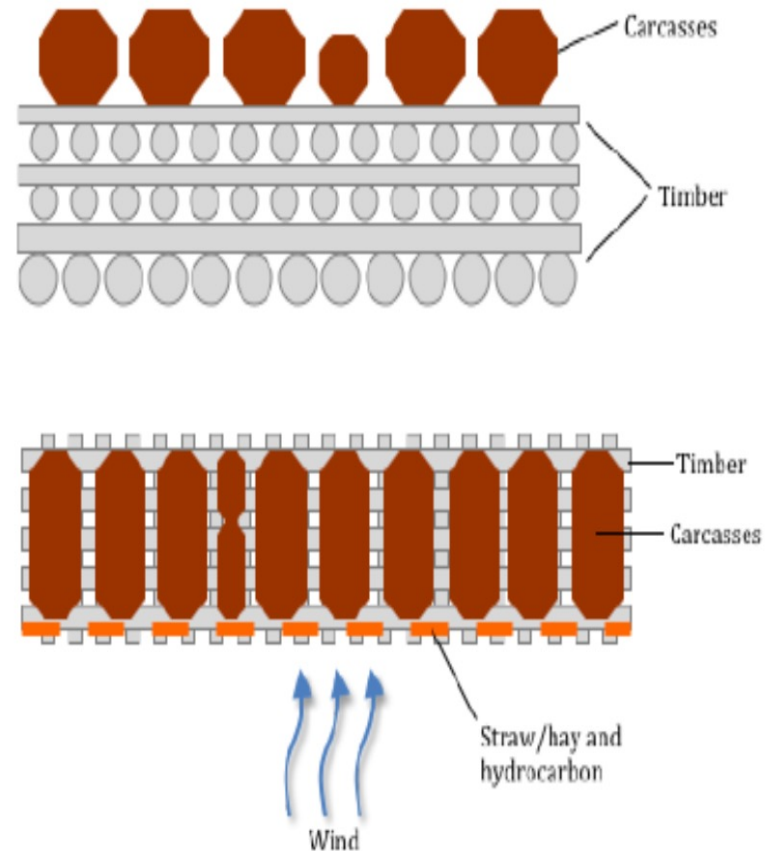
- Is a process which involves constructing a **bed** of **combustible materials** such as wooden timbers, placing the **carcasses** on the bed, adding **more combustible material** over the carcasses, and igniting the pile. There is waste left after this process and the following should also be considered:
 - - **chemical air inhalation**, deposition on crops and deposition on surface water to fish consumed by humans;
 - - **chemical leaching** from ash burial to groundwater ingested by humans/livestock;



Burning



- Assume one adult bovine carcass is equivalent to five finishing pigs, five adult sheep or 200 chickens.
- One adult bovine carcass will require:
 - 3 bales of dry straw or hay
 - 3 pieces of untreated timber
 - 23 kg of kindling wood (dry with low moisture content; not green from vegetation)
 - 46 kg of coal pieces that are 15-20 cm in diameter
 - 4 liters of liquid fuel such as diesel fuel.
- Do not use gasoline!
- <http://www.fao.org/publications/card/en/c/CB2464EN>



<https://www.animalhealthaustralia.com.au/wp-content/uploads/2015/09/DISP-08-FINAL24Aug15.pdf>

Evaluation of methods



Method	Advantages	Disadvantages
Burial	Inexpensive, Easy, Biosecure, Environmentally sound with exception of ground waters	Critical site selection, non appropriate in area with shallow waters, aesthetics improperly performed, future stigma for land
Burning	Biosecure, inexpensive	Fuel/ labor intensive, odor, potential waste
Incineration	Biosecure, Environmentally sound	Fuel intensive, technically difficult when debris included,
Compositing	Environmentally sound, inexpensive	Not biosecure, volume constrains, slow process
Rendering	Environmentally sound, biosecure, usable end product	Capacity constrains, biosecurity constrains during transport

Summary



- The disposal of large numbers of dead animals will be expensive. As well, fixed and variable **costs** will vary with the choice of the disposal method. Each method used will result in indirect costs on the environment, local economies, producers, and the livestock industry. In addition to biosecurity **considerations, decision** makers need to understand the economic, social, environmental protection and aesthetic impact of various disposal technologies.
- Timely slaughter, maintenance of biosecurity and prevention of further spread of disease, are the **essential considerations** in terms of disease control.



Summary

The disposal of large numbers of dead animals will be expensive. As well, fixed and variable **costs** will vary with the choice of the disposal method. Each method used will result in indirect costs on the environment, local economies, producers, and the livestock industry. In addition to biosecurity **considerations**, **decision** makers need to understand the economic, social, environmental protection and aesthetic impact of various disposal technologies.

Timely slaughter, maintenance of biosecurity and prevention of further spread of disease, are the **essential considerations** in terms of disease control.



Project e-mail: foodsafetyprojectTCc@gmail.com

THANK YOU FOR YOUR ATTENTION



École Nationale des Services Vétérinaires
France Vétérinaire International

*Project funded by the European Union within the scope of the Aid Programme for the Turkish Cypriot community,
implemented by the NSF Euro Consultants Consortium*

