



Food and Agriculture
Organization of the
United Nations



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Culling and Safe Disposal of Pig Carcasses

Pragmatic approaches to culling and safe disposal of pig
carcasses during outbreaks of African Swine Fever in South East
Asia



WORLD ORGANISATION FOR ANIMAL HEALTH

Protecting animals, preserving our future

Depopulation

OIE Terrestrial Animal Health Code

Chapter 7.6 – Killing of Animals for Disease Control Purposes Swine Procedures

Age Range	Procedure	Restraint Necessary
All, except neonates	Free bullet	No
All, except neonates	Penetrating captive bolt, followed by pithing	Yes
Neonates	Non-penetrating captive bolt	Yes
All	2-stage electrical	Yes
All	Single stage electrical	Yes
Neonates	CO ₂ /nitrogen/inert gas/mixture	Yes
All	Injection with barbiturates	Yes



Figure 4. The optimum shooting position for pigs is just above eye level, with the shot directed down the line of the spinal cord.

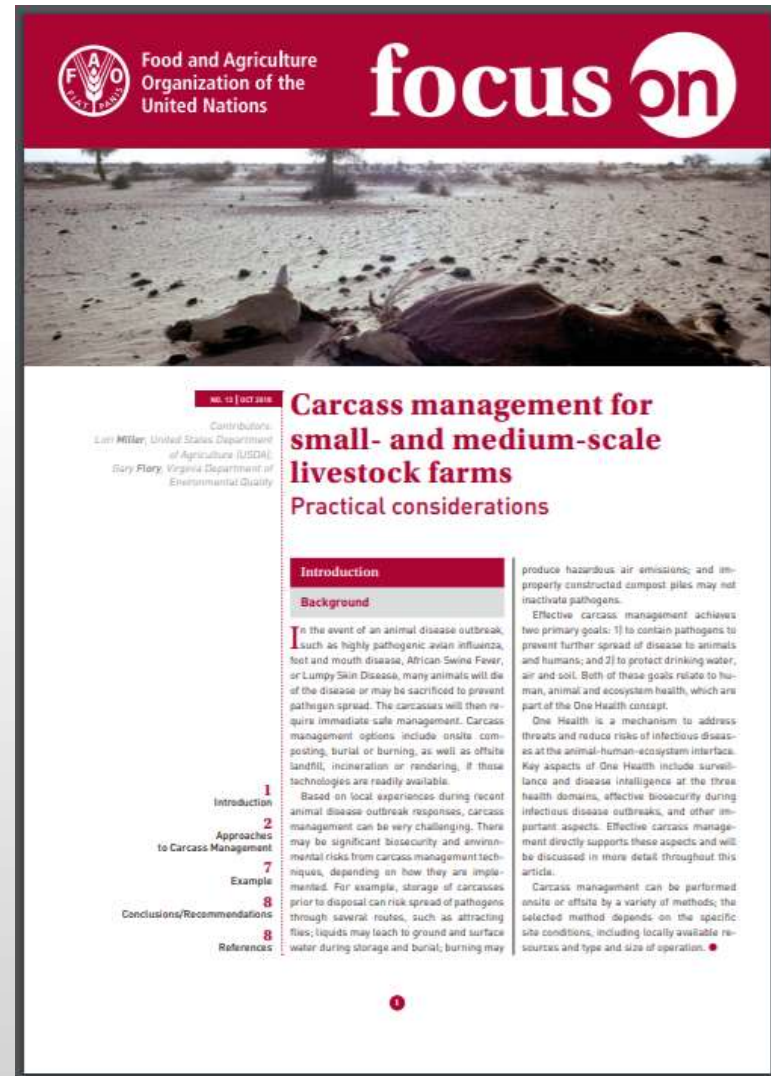


Figure source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom (www.hsa.org.uk).



Carcass Disposal

- Deep Burial
- Open Burning
- Above Ground Burial
- Composting



The image shows the cover of a publication titled "Carcass management for small- and medium-scale livestock farms" from the FAO Focus On series. The cover features a photograph of animal carcasses on a dry, sandy ground. The FAO logo and the text "Food and Agriculture Organization of the United Nations" are in the top left. The "focus on" logo is in the top right. Below the photo, the title "Carcass management for small- and medium-scale livestock farms" is prominently displayed, followed by the subtitle "Practical considerations". The cover also lists contributors: Leah Miller from the United States Department of Agriculture (USDA) and Gary Flory from the Virginia Department of Environmental Quality. A table of contents is visible on the left side of the cover, listing sections such as Introduction, Background, and References with corresponding page numbers.

FAO Food and Agriculture Organization of the United Nations

focus on

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Carcass management for small- and medium-scale livestock farms
Practical considerations

Contributors:
Leah Miller, United States Department of Agriculture (USDA)
Gary Flory, Virginia Department of Environmental Quality

1 Introduction
2 Approaches to Carcass Management
7 Example
8 Conclusions/Recommendations
8 References

Introduction

Background

In the event of an animal disease outbreak, such as highly pathogenic avian influenza, foot and mouth disease, African Swine Fever, or Lumpy Skin Disease, many animals will die of the disease or may be sacrificed to prevent pathogen spread. The carcasses will then require immediate safe management. Carcass management options include onsite composting, burial or burning, as well as offsite landfill, incineration or rendering, if these technologies are readily available.

Based on local experiences during recent animal disease outbreak responses, carcass management can be very challenging. There may be significant biosecurity and environmental risks from carcass management techniques, depending on how they are implemented. For example, storage of carcasses prior to disposal can risk spread of pathogens through several routes, such as attracting flies; liquids may leach to ground and surface water during storage and burial; burning may produce hazardous air emissions; and improperly constructed compost piles may not inactivate pathogens.

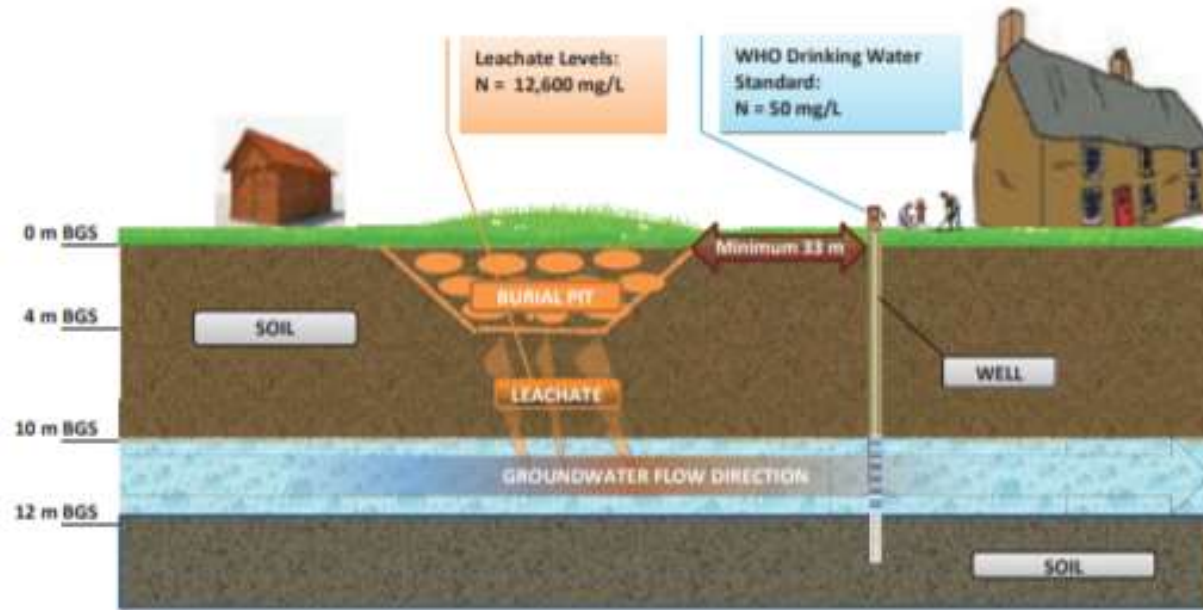
Effective carcass management achieves two primary goals: 1) to contain pathogens to prevent further spread of disease to animals and humans; and 2) to protect drinking water, air and soil. Both of these goals relate to human, animal and ecosystem health, which are part of the One Health concept.

One Health is a mechanism to address threats and reduce risks of infectious diseases at the animal-human-ecosystem interface. Key aspects of One Health include surveillance and disease intelligence at the three health domains, effective biosecurity during infectious disease outbreaks, and other important aspects. Effective carcass management directly supports these aspects and will be discussed in more detail throughout this article.

Carcass management can be performed onsite or offsite by a variety of methods; the selected method depends on the specific site conditions, including locally available resources and type and size of operation. ●

Deep Burial

DEEP BURIAL SCHEMATIC



BGS - below ground surface; m - meter(s); mg/L - milligrams per liter; N - Nitrogen; WHO - World Health Organization



Source: Lori Miller, USDA, 2018

Deep Burial-Advantages and Disadvantages

DEEP BURIAL ADVANTAGES AND DISADVANTAGES

Advantages	Disadvantages	Time/Cost	Considerations
<ul style="list-style-type: none">• On-farm• Easy to implement	<ul style="list-style-type: none">• Public health risk• Biosecurity risk• Pathogens may survive• Not sustainable• Regulatory limitations• Limits future land use• Requires heavy equipment or excessive labour	<ul style="list-style-type: none">• Fast• Low cost	<ul style="list-style-type: none">• Burial may be viable for small numbers of animals in suitable soils, but it is site-specific

Deep Burial-Operational Considerations

- Soil type and depth
- Depth to groundwater
- Community impacts
- Environmental Impacts
- Fate of disease organism



Open Burning



Open Burning-Advantages and Disadvantages

OPEN BURNING ADVANTAGES AND DISADVANTAGES

Advantages	Disadvantages	Time/Cost	Considerations
<ul style="list-style-type: none">• On-farm• Inactivates pathogens• Reduces volume	<ul style="list-style-type: none">• Biosecurity risk• Not sustainable• Public opposition• Inefficient• Difficult to operate• Regulatory limitations	<ul style="list-style-type: none">• Slow• Expensive	<ul style="list-style-type: none">• Open burning poses risk of creating wildfires• Air quality• Smell

Open Burning-Operational Consideration



- Availability of fuel
- Disease transmission
- Environmental impacts
- Neighbor complaints
- Equipment availability

Above Ground Burial



Above Ground Burial-Advantages and Disadvantages

ABOVE-GROUND BURIAL ADVANTAGES AND DISADVANTAGES

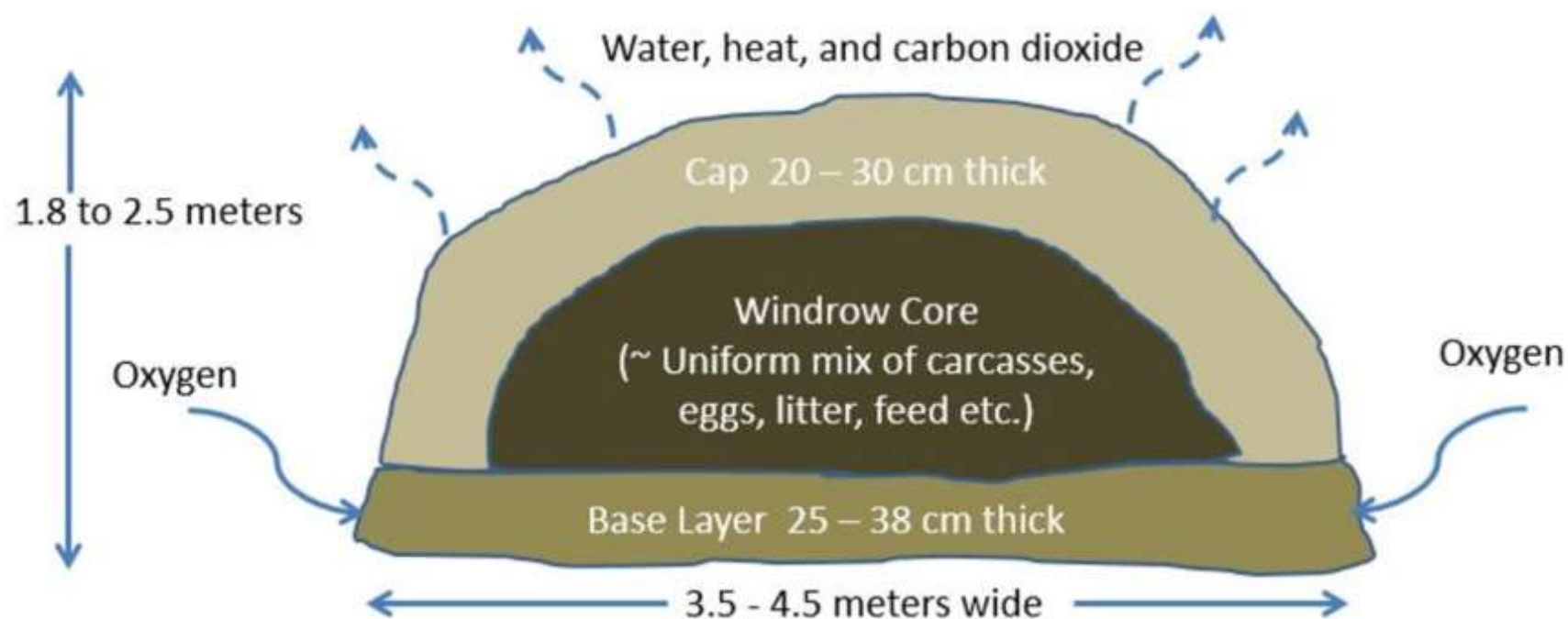
Advantages	Disadvantages	Time/Cost	Considerations
<ul style="list-style-type: none">• Safe• On-farm• Readily available• Fast to implement• Public acceptance• Efficient	<ul style="list-style-type: none">• Pathogens may survive• Scavengers may unearth carcasses	<ul style="list-style-type: none">• Fast• Low cost	<ul style="list-style-type: none">• Innovative technology undergoing field trials and validation testing

Above Ground Burial-Operational Considerations



- Availability of carbon material
- Depth to groundwater
- Access control

Composting



Cross Section of Compost Windrow

Composting-Advantages and Disadvantages

COMPOSTING ADVANTAGES AND DISADVANTAGES

Advantages	Disadvantages	Time/Cost	Considerations
<ul style="list-style-type: none">• Safe• Sustainable• On-farm• Easy to implement	<ul style="list-style-type: none">• Time to complete	<ul style="list-style-type: none">SlowExpensive	<ul style="list-style-type: none">• Requires knowledgable/experienced operator to ensure proper construction

Composting-Operational Considerations

- Availability of carbon material
- Time
- Need for experienced operator



DISPOSAL OPTIONS MATRIX

Weighting	Criteria	Composting	Above-ground Burial	Deep Burial	Open Burning
Most Important (x3)	1. Public health risk	9	6	3	6
	2. Biosecurity	6	6	3	3
	3. Pathogen inactivation	9	3	3	6
Important (x2)	4. Environmentally sustainable	9	6	3	3
	5. Volume reduction	4	4	4	6
	6. Availability	4	4	6	2
	7. Throughput	6	6	6	4
	8. Speed to implement	6	6	4	6
	9. Public acceptance	4	4	4	2
Less Important (x1)	10. Cost-effectiveness	2	3	3	1
	11. Efficiency	1	2	2	1
	12. Operability	1	2	3	2
Total Points		61	52	44	42
Average Score		5	4	4	4



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