

# Air Management Practices Assessment Tool (AMPAT)

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Jacek Koziel, Devin Maurer*

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## Goal

- Provide guidance to livestock producers in order that they might assess mitigation options
  - When addressing:
    - Odor
    - Ammonia emissions
    - Hydrogen sulfide emissions
    - Particulate matter emissions
    - Greenhouse gas emissions
  - Based on:
    - Effectiveness
    - Management
    - Costs

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**Air Management Practices Assessment Tool**

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**Home Page**


The purpose of the Air Management Practices Assessment Tool (AMPAT) is to provide an objective overview of mitigation practices, best suited to address odor, emissions and dust at your livestock operation so that livestock and poultry producers may compare and narrow their options of mitigation techniques. Practices are divided into three categories by source: 1) Animal Housing; 2) Manure Storage & Handling; and 3) Land Application. Each mitigation practice has an individual page which includes a printable fact sheet and a short online slide presentation. There is a conservative estimate of the range in effectiveness for ammonia, hydrogen sulfide, dust, odor, volatile organic compounds, and greenhouse gases, and a relative cost (one, two, or three dollar signs). To obtain more information for any given practice, simply click on that practice.

**Animal Housing**




Practices that mitigate emissions from buildings housing animals.

**Manure Storage & Handling**




Practices that mitigate emissions from the manure storage facility or associated handling areas.

**Land Application**




Practices that mitigate emissions during land application of manure.

AMPAT was developed by [Iowa State University Extension and Outreach](#) and the [College of Agriculture and Life Sciences](#) with funding support from the [National Pork Board](#) through Cooperative Agreement NPB Project #12-006.



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— Web site questions to [Lisa Johnson](#)



The compilation of the literature database to support AMPAT was funded by the Indiana Soybean Alliance.

# AMPAT - 21 total technologies

ISU | ISU Extension & Outreach | College of Ag & Life Sciences | Dept. of Ag & Biosystems Engineering

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**Animal Housing**

Topics >

- > Animal Housing
  - Barriers
  - Biofilters
  - Chimneys
  - Diet Manipulation
  - Electrostatic Precipitation
  - Landscaping
  - Oil Sprinkling
  - Pit Ventilation
  - Scrubber
  - Siting
  - Urine/Feces Segregation
  - UV Light
- Manure Storage & Handling
- Land Application

Other Links >

- Literature Database >
- Photo Gallery >
- Definitions >
- National Pork Board >
- Animal Agriculture & Air Quality >

	Ammonia	H <sub>2</sub> S	Odor	Dust & Particulates	VOC	GHG	Cost
<b>Barriers</b>	Red	Red	Yellow	Green	Red	Red	\$
<b>Biofilters</b>	Yellow	Green	Green	Green	Green	Blank	\$\$
<b>Chimneys</b>	Red	Red	Yellow	Yellow	Red	Red	\$
<b>Diet Manipulation</b>	Yellow	Yellow	Yellow	Green	Blank	Blank	\$
<b>Electrostatic Precipitation</b>	Red	Blank	Yellow	Green	Red	Red	\$\$
<b>Landscaping</b>	Yellow	Blank	Yellow	Yellow	Blank	Blank	\$
<b>Oil Sprinkling</b>	Red	Yellow	Yellow	Green	Blank	Blank	\$
<b>Pit Ventilation</b>	Red	Red	Red	Red	Red	Red	\$\$
<b>Scrubbers</b>	Green	Blank	Green	Green	Green	Blank	\$\$\$
<b>Siting</b>	Red	Red	Green	Red	Red	Blank	\$
<b>Urine/Feces Segregation</b>	Green	Green	Green	Blank	Blank	Green	\$\$-\$\$\$
<b>UV Light</b>	Blank	Red	Yellow	Blank	Green	Blank	\$\$

H<sub>2</sub>S = Hydrogen Sulfide; VOC = Volatile Organic Compounds; GHG = Greenhouse Gases  
 Red - low impact; Yellow - medium impact; Green - high impact; Blank - insufficient data

The table is laid out as a score card. Each technology within the tool is laid out on the vertical axis on the left. The pollutants are laid out on the horizontal axis at the top. A green color indicates a particular technology has a high impact on that particular pollutant. Likewise, yellow and red indicate medium and low impact respectively. As an example, if a person were concerned about a potential odor problem from animal housing, you would scan down the list under the "odor" column at the top. You would find that "Siting", "Scrubbers" and "Biofilters" have green bars, meaning they have high impact on odors. You could then investigate them further or check out some of the yellow bars that have a medium impact. Consequently red bars, would have low impact or would not be suitable for addressing that pollutant.

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Topics ▾

Animal Housing

- Barriers
- Biofilters
- Chimneys
- Diet Manipulation
- Electrostatic Precipitation
- Landscaping
- Oil Sprinkling
- Pit Ventilation
- Scrubber
- > Siting
- Urine/Feces Segregation
- UV Light

Manure Storage & Handling

- Land Application

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## Animal Housing -- Siting

**Application:** used for odors from buildings and manure storage

**Pros**

- Very effective when done prior to construction.
- Modeling can assist with decisions.
- Information can assist with communication with neighbors.

**Cons**

- Not helpful on existing facilities.
- Most models do not account for terrain impacts.
- Does not reduce emission, only odor impact.

**Description**

It may sound like an over-simplification, but properly siting an animal facility and associated manure storage is likely the most important odor control technology that can be implemented. This, however, must be done before the facility is constructed and it only truly addresses odor and no other emittants.

Care in siting a new facility in relation to neighbors, highways, parks and municipalities is important when avoiding the potential for odors. Separation distance, predominate wind direction, exposure angle, and terrain are all important considerations.

*Wind Direction:* Predominate wind direction varies by location and season and is often different than people might perceive to be the predominate direction. For instance, in Iowa

See also

download in pdf format

Siting - AMPAT Talk Series  
ANR Program Services on  
Vimeo


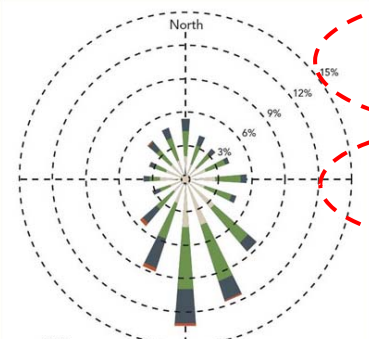


Photo Gallery

Other Resources

Slide Presentation



MPH

- > 24.7
- 19 - 24.7
- 12 - 19
- 7.5 - 12
- 4 - 7.5
- 1.1 - 4

Company Name: USDA ARS  
Modeler: Sara West  
Display: Wind Speed  
Avg. Wind Speed: 9.2 mph  
Orientation: Direction (blowing from)

Date: 10/25/2002  
Unit: m/s  
Calm Winds: 5.01%  
Plot year-date-time: 1961, July 1 - July 31  
Midnight - 11 pm

Figure 1. Wind rose for Des Moines, Iowa, July. (Courtesy of National Pork Board)

Assume the predominate summer wind direction is SW, but weather data indicates S and SSE occur


## Example: Siting

- Web Page
- Fact Sheet: [AMPAT10.pdf](#)
- MP4 Presentation:
- Presentation notes:
  - [Siting - AMPAT.pdf](#)

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### Overview of Siting

Air Management Practices  
Assessment Tool (AMPAT)

Project Team:

- Jay Harmon, Prof of Ag & Biosystems Engineering
- Steve Hoff, Professor of Ag & Biosystems Engineering
- Angie Rieck-Hinz, Extension Program Specialist

### Air Management Practices Assessment Tool

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Topics ▾

- Animal Housing
- Manure Storage & Handling
- Acidification
- Aeration
- Anaerobic Digestion
- Composting
- Diet Manipulation
- Impermeable Covers
- Landscaping
- Manure Additives
- Permeable Covers
- Siting
- Solids Separation
- Urine/Feces Segregation
- Land Application

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## Manure Storage and Handling

	Ammonia	H <sub>2</sub> S	Odor	Dust & Particulates	VOC	GHG	Cost
<b>Acidification</b>							\$
<b>Aeration</b>							\$\$
<b>Anaerobic Digestion</b>							\$\$\$-\$\$\$\$
<b>Composting</b>							\$-\$
<b>Diet Manipulation</b>							\$
<b>Impermeable Covers</b>							\$\$
<b>Landscaping</b>							\$
<b>Manure Additives</b>							\$
<b>Permeable Covers</b>							\$-\$
<b>Siting</b>							\$
<b>Solids Separation</b>							\$\$\$
<b>Urine/Feces Segregation</b>							\$\$-\$\$\$

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red - low impact; 
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  blank - insufficient data

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Topics ▾

- Animal Housing
- Manure Storage & Handling
- Land Application
- Additives
- Application Methods

Other Links >

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- National Pork Board
- Animal Agriculture & Air Quality

## Land Application

	Ammonia	H <sub>2</sub> S	Odor	Dust & Particulates	VOC	GHG	\$\$
<b>Additives</b>							\$
<b>Application Methods</b>							\$-\$

H<sub>2</sub>S = Hydrogen Sulfide; VOC = Volatile Organic Compounds; GHG = Greenhouse Gases

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## AMPAT Summary

- <http://www.agronext.iastate.edu/ampat/>
- 21 technologies
  - Fact Sheets
  - Presentations
  - Comparisons