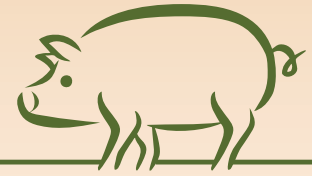
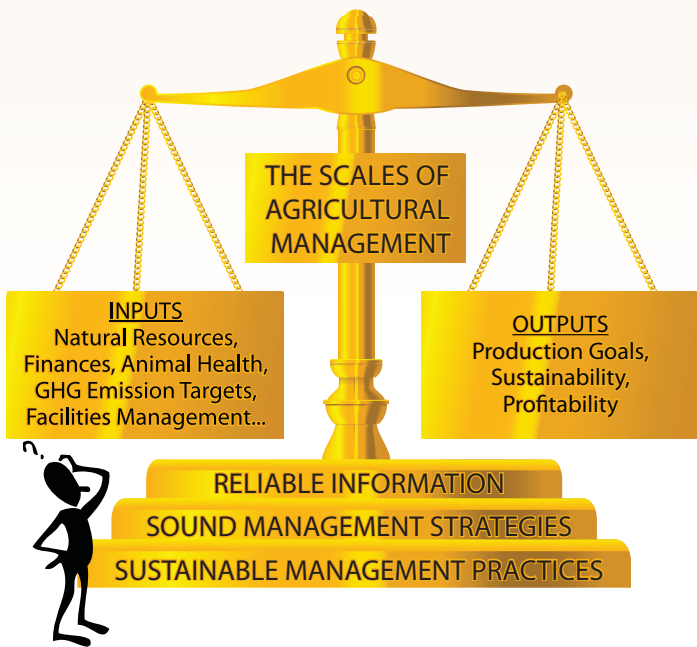
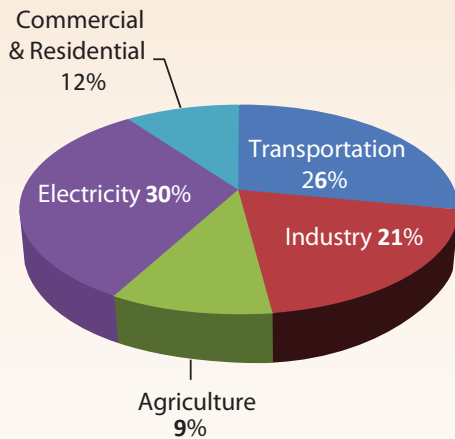


# Exploring Interactions Between Agricultural Decisions and Greenhouse Gas Emissions Using Swine Production



**Total U.S. Greenhouse Gas Emissions by Economic Sector (2014)**

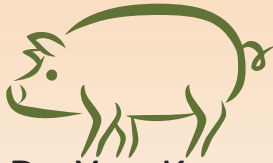


## Common Swine Terminology

- Boar** – An uncastrated male swine.
- Sow** – An adult female swine that has farrowed at least one litter.
- Gilt** – A female swine, up to and including the birthing of her first litter.
- Estrus** – The period during which ovulation occurs and the sow/gilt is fertile.
- Gestation** – Pregnancy, lasting 112-114 days in length, in swine
- Farrowing** – The act of giving birth; an average of 10-12 pigs are born per litter.
- Nursery** – The area in which the litter is held after weaning.

## Greenhouse Gas Facts

- **What are Greenhouse Gases (GHGs)?** Gasses that contribute to the greenhouse effect by absorbing solar radiation. Once captured, the solar radiation is re-emitted into the atmosphere and warms the Earth's surface.
- Sources of Common Greenhouse Gasses from Swine Operations:
  - o Manure Storage and Treatment
    - Carbon Dioxide (CO<sub>2</sub>)
  - o Enteric Fermentation (Digestion)
    - Methane (CH<sub>4</sub>)
  - o Land Application of Manure
    - Nitrous Oxide (N<sub>2</sub>O)
- According to the U.S. EPA; in 2011, U.S. Swine Production accounted for 0.35 % of all U.S. Greenhouse gas emissions.
- Some GHGs are more effective global warmers due to differences in atmospheric residence times, atmospheric concentrations, and how strongly each GHG absorbs energy. This phenomena is accounted for by assigning each GHG a Global Warming Potential (GWP), where a GHGs ability to warm the earth is standardized through comparison to the global warming potential of CO<sub>2</sub>. The higher the number, the more efficient the GHG is at emitting solar radiation.
  - Carbon Dioxide has a GWP of 1
  - Methane has a GWP of 21
  - Nitrous Oxide has a GWP of 270



## What Do You Know About **SWINE & GHGs?**

1. The area in which their litter is held after weaning is called the \_\_\_\_\_.
  - a) Piggy recovery unit
  - b) Nursery
  - c) Estrus
  - d) Oink locker
2. Carbon Dioxide is emitted from the manure storage and treatment processes of swine production.
  - a) True
  - b) False
3. Nitrous Oxide is emitted from the land application of manure.
  - a) True
  - b) False
4. The foundation of a balanced Agricultural operation consists of Sustainable Management practices, Reliable Information and \_\_\_\_\_.
  - a) Large injections of capitol
  - b) Complex equations
  - c) Luck
  - d) Sound Management Strategies
5. Methane is emitted from which process
  - a) Transportation of equipment
  - b) Enteric Fermentation
  - c) The Phosphorous cycle
  - d) The Nitrogen cycle
6. Which of the GHGs associated with swine production has the highest GWP
  - a) CO<sub>2</sub>
  - b) N<sub>2</sub>O
  - c) Water vapor
  - d) CH<sub>4</sub>
7. How long is the Gestation period for a Sow?
  - a) 90 days
  - b) 112-114 days
  - c) 9 months
  - d) 365 days
8. In 2011, what percentage of the total GHG emissions came from U.S. Swine production?
  - a) 35%
  - b) 3%
  - c) 0.35%
  - d) 13%
9. In 2014, which economic sector had the largest amount of GHG emissions?
  - a) Transportation
  - b) Agriculture
  - c) Electricity
  - d) Industry
10. Which of the GHGs associated with Swine production has the lowest Global Warming Potential (GWP)?
  - a) CO<sub>2</sub>
  - b) N<sub>2</sub>O
  - c) CH<sub>4</sub>
  - d) Water vapor

Answers: 1b,2a,3a,4d,5b,6b,7b,8d,9c,10a

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### Additional information of interest:

1. U.S. Greenhouse Gas Inventory Report: 1990-2014,  
[www3.epa.gov/climatechange/ghgemissions/usinventoryreport.html](http://www3.epa.gov/climatechange/ghgemissions/usinventoryreport.html)
2. National Pork Board, <http://porkcdn.s3.amazonaws.com/sites/all/files/documents/carbonfacts%200511.pdf>
3. Reproducible self-contained hands on activity packets "Exploring Interactions Between Agricultural Decisions & Greenhouse Gas Emissions Using Swine Production" parts 1 and 2,  
<http://www.uaex.edu/farm-ranch/animals-forages/manure-management/swineagintheclassroom.aspx>