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Section G: Potential Solutions

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Animal Waste Disposal in the Netherlands

- Lots of food animals and very little land
  - 10,000,000 hogs; 81,000,000 chickens; and 2,400,000 dairy cows

- Two-year moratorium

- Mineral accounting system
  - Similar to a nutrient management plan
  - Large operations with less land were affected
  - Minimal costs to small farmers

- Livestock buyout program

- Results indicate that voluntary programs don’t work
Problems with industrial food animal production (IFAP) are not limited to the United States.

As the U.S. tightens regulations and enforcement of clean air and water laws, companies are moving their operations overseas to countries with little or no environmental or labor oversight.

Example: Smithfield Foods/Premium Standards
- 1990: Operated only in the United States
- 2000: Expanded to seven countries, with hog operations in Mexico, Poland, and Romania
Interventions: Feed Inputs

- Remove inputs to animal feed, such as antimicrobials and arsenicals used for growth promotion

- Non-therapeutic use of antimicrobials important for human medicine has been banned in Europe
  - Has resulted in better hygiene and better living conditions for the animals and improved animal welfare
Interventions: Controlling Stocking Density

- Increase per-animal density allotment
  - Currently ¾ square feet per chicken
  - Currently a few square feet per hog

- Alternative system: hoop housing (versus current non-bedded confinement)
  - Waste handled in dry form
  - Improved infrastructure for raising food animals

Photo by friendsoffamilyfarmers. Creative Commons BY-SA. Retrieved from flickr.com
Interventions: Decrease Geographic Concentration

- Control geographic concentration
- Integrators responsible for environmental and community hazards

- Chicken processing plants, 1949
- Major chicken production areas, 1982

Source: USDA.
Interventions: Dry Waste Handling

- Handle waste in dry form
  - Prevents spills and controls odor
  - Allows controlled composting
    - Raising temperature kills off enteric pathogens

- Move toward pastured operations
  - Some land not suited for crops
  - Beneficial for land and the animals
Interventions: Control Global Spread

- Control global transformation of the livestock sector in countries where public health and environmental regulations are weaker.

- Possible model: Environmental impact statements required of oil companies going into other countries.

- Hopefully, other countries will recognize the negative impacts of current IFAP practices.
Interventions: Treating Animal Waste

- Treat animal waste prior to land application

- Necessary because there is so little land available per animal unit

- **Methods**
  - Methane digesters—convert waste to energy; very expensive
  - Pelletization of animal waste—heated and dried
  - Composting—most feasible option
    - *Must be controlled and regulated and done correctly*
    - Carbon needs to be added—in poultry sawdust
    - Aerate the pile, proper moisture to get high temperatures that kill off enteric pathogens
Interventions: Limiting CAFOs

- **Moratorium on operations in vulnerable watersheds**
  - Land cannot assimilate any more nutrients on animal waste
  - Limit number of animals produced in certain watersheds

- Develop economic incentives to improve management (e.g., fines)

- Establish a moratorium on all new CAFOs
Levels of Control

Feed inputs

1°

Change feed inputs:

- Remove antibiotics, arsenicals, hormones used for growth promotion
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Production

2°

Improve food animal production:
• Decrease animal crowding
• Increase facilities cleaning
• Limit regional concentration
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Land application of waste

3°
Apply appropriate treatment:
• Composting
• Heat drying/pelletization
• Incineration
• Dewatering
• Storage

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Environmental and health effects

4° Monitor and remediate impacts:
- Nutrients
- Indicators/pathogens
- Pharmaceuticals
- Antimicrobial resistance

Improve food animal production:

Limit regional concentration

Apply appropriate treatment:

Land application of waste

Feed inputs

Production

Environmental and health effects

Change feed inputs:

Improve food animal production:

Apply appropriate treatment:

Monitor and remediate impacts:
Discussion

- Sanitation voted greatest medical advance since 1840
  - 11,300 readers of the *British Medical Journal* chose the introduction of sewage disposal (the sanitary revolution) as the most important medical milestone since 1840
Thank You!

- For questions/comments: jgraham@jhsph.edu