Practical Adaptations

Manure Management and Climate Change

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Warmer & Wetter
Climate Change and Indiana Agriculture

- Spring rainfall is projected to increase 13-16% by 2050
- Rainfall during growing season will stay about the same
- Growing season temperatures will increase by 6 to 7 degrees F
- Longer frost-free period
- Increased frequency and magnitude of extreme heat
- Increased variability in winter temperature resulting in more freeze/thaw cycles
- Increased frequency of heavy precipitation events
- Increased soil saturation early in the growing season
- Reduced plant-available water due to longer periods between rain events coupled with increased water demand due to higher temperatures
Effects of Climate Change on Manure Management

- “It used to be they had a six- to seven-week window in the spring and two and a half months in the fall to travel around and apply manure. Due to weather conditions the last two years, those windows have shrunk to three to four weeks in the spring and one and a half months in the fall with the same amount of work to be done in that time frame.”
  -- Progressive Dairyman Feb 27 2019

- Higher rainfall results in more water in lagoons changing capacity to handle manure
- Wet falls have caused later harvests providing less time to land apply for winter storage capacity
- Wet springs with increasing extremes reduce the time for emptying winter storage
- Existing equipment can’t get on the fields
Regulations For Manure Management
IDEM Guidance

- Each farm is encouraged to manage their manure storage capacity in a manner that prevents the need for removal of manure during the winter months.

- Manure handling technology is advancing with more affordable systems that improve dewatering and treatment or generate energy. These systems may allow for immediate processing and disposal of the manure, justifying a reduced storage capacity for the farm.

- Manure Management Plan must be submitted with application - includes soil sampling, acreage requirements for land application, manure testing or an alternative structure.
Biodigestion is an alternative to open pit lagoons and land application
What Biodigesters Can and Can’t Do

- Less odor - methane is used for energy production and the liquid and solids products are less noxious
- Won’t eliminate phosphorus and nitrogen, but makes them more known and manageable. Caution about runoff still needed
- Can kill some pathogens - need additional heat sources but this costs more
- Can generate revenue - dependent on electric and natural gas prices, credits, and may require hiring
Things that would help

- Designing less complex digesters that are easier to use and maintain and lower cost.
- Adding technologies such as nutrient separation to provide nutrient management benefits and possibly fertilizer products that could be sold.
- Increasing income from electricity sales (e.g., tariffs for biogas) or other types of energy sales.
- Providing direct financial assistance for feasibility studies and/or up-front costs, as well as more creative financing mechanisms such as tax credits and low interest program investment loans.
- Finding a business model that works with third party build/own/operate models.
The Goal(s) Determines the Strategy

- **Goals**
  - Adapting to changing weather that is making the current system difficult
  - Reducing nuisance and environmental dangers
  - Generating income for farms
  - Reducing carbon emissions

- **Strategy**
  - Regulatory command and control
  - Market place voluntary actions
  - Financial grants and tax incentives
Thanks

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