

Breakout Session - Andy Cole/Karamat Sistani/Rober Eigenburg

## **Breakout #6**

### **Component: Management, Enhancement, and Utilization of Manure Resources**

**Problem Area 1. Animal Nutrition, and Management**

**Problem Area 2. Collection, Storage, Treatment, and Utilization of manure**

**Problem Area 3. Utilization of manure in an integrated farming system to improve soil, water, and air quality.**

**Problem Area 4. Manure as a renewable energy resource.**

## **Breakout #6 edits & additions**

### **Component: Management, Enhancement, and Utilization of Manure Resources**

**Problem Area 1. Animal Nutrition and Management Effects on Manure Quantity and Quality.**

**Problem Statement: Modifying the diet of livestock and poultry affects nutrient retention in the animal as well as the quantity and nutrient content of manure. Through diet modification it may be possible to improve production efficiency while decreasing nutrient losses to the environment.**

**Objectives/Outputs:**

- 1. Evaluate the nutrient availability of co-products from the bio-fuels industry**
- 2. Feed processing and diet formulation recommendations that balance animal production and environmental outcomes.**

**Locations: Ames, Iowa; Bushland, TX. Clay Center, NE; Mississippi State, Miss.**

## **Problem Area 2. Collection, Storage, Treatment, and Utilization of Manure**

**Problem Statement:** Significant losses of nutrients often occur during collection, storage, and application of manure. Best management practices and new technologies are needed to efficiently utilize manure and protect soil, water and air quality. Treatment can be enhanced with the combined use of biological, chemical and physical methodologies, especially as part of holistic systems.

### **Objectives/Outputs:**

- 1. Alternative technology to control runoff and improve water reuse in feedlots.**
- 2. Develop improved treatment technologies for managing nutrients, conserving water, and reducing odor, pathogens, PM<sub>fine</sub> and GHG emissions (Cross-cutting).**
- 3. Develop separation technology to concentrate and recover phosphorus and nitrogen from manure.**
- 4. Develop improved methods for lagoon clean out and restoration.**
- 5. Assessment of environmental credits from implementation of alternative manure treatment technologies.**
- 6. Develop tools to locate manure build up in beef feedlots to mitigate pathogens and EDCs (Cross-cutting).**
- 7. Improved constructed wetlands to prevent off-farm release of manure nutrients.**

**Locations:** Florence, SC, Clay Center, NE, Bushland, TX; Bowling Green, KY.

### **Products:**

- 1. Reduction of runoff and improved water reuse for feedlots**
- 2. Improved treatment technology to manage nutrients, reduce odors, pathogens, PM<sub>fine</sub>, and GHG from manure.**
- 3. Concentrated phosphorus and nitrogen fertilizers.**
- 4. Improved methods for lagoon cleanup.**
- 5. Approaches for assessment of environmental credits (carbon and nutrients).**
- 6. Precision management techniques for control of pathogens and EDCs.**

### **Product Users**

**Livestock producers, NRCS, EPA, state and federal regulators, general public, consulting engineering industry, other researchers, and Livestock and Poultry Environmental Learning Center. Information will be provided to users through scientific publications, patents and licenses. ASABE standards, NRCS practices and ARS websites.**

**Problem Area 3. Utilization of manure in integrated farming systems to improve soil, water, and air quality.**

Problem Statement: Increasing complexity in production systems are requiring integrated farming systems to efficiently utilize manure resources and protect soil, water, and air resources.

Objectives:

- 1.) Application practices to utilize manure and protect the environment: i.e. application rates, timing, techniques

Products:

Decision aids for determining application rates, and timing for various manure products.

Locations:

Auburn, AL

Bowling Green, KY

Madison, WI

Miss. State, MS

Orona, ME

- 2.) Field management to utilize manure and protect the environment: i.e. tillage practices, cropping systems, cover crops.

Products: Crop and tillage practices to minimize leaching and runoff losses of nutrients applied as manure.

Locations:

Auburn, AL

Bowling Green, KY

Miss. State, MS

Watkinsville, GA

- 3.) Practices to minimize off-site impacts: i.e. buffer strips, grass hedges, riparian filter strips.

Products: BMP's to minimize off-site impacts.

Locations:

Lincoln, NE

Ames, IA

Bowling Green, KY

Clay Center, NE

Bushland, TX

Coshocton, OH

Miss. State, MS

Temple, TX

Tifton, GA  
University Park, PA  
West Lafayette, IN  
Florence, SC

**Problem Area 4. Manure as a renewable energy resource.**

**Problem Statement: Develop integrated biological and thermo-chemical technologies and systems to produce renewable energy from manure.**

**Objectives/Outcomes:**

**4AA Biological methods**

- **Microbial sources of Hydrogen from manure**
- **Generate electricity using microbial fuel cells powered by manure**
- **Anaerobic co-/ digestion to produce combined heat and power from manure**
- **Development of alternative anaerobic digestion to produce heat and power from manure**
- **Development of nutrients for algal systems to sequester carbon and produce renewable energy from manures**

**4AB Thermo-chemical / biological methods**

- **Development of on site farm-scale pyrolysis/gasification systems to produce heat, power, and biofuels from manure for treatment and use.**
- **Characterization of manures feedstock for their suitability for existing and emerging energy conversion systems.**
- **Develop precision manure harvesting approaches to provide high quality product for thermo-chemical conversion processes**

**4AC Co-products use and carbon credit protocols**

- **Evaluation of bioenergy coproducts as soil amendments for enhanced production and carbon credits.**

**Products from Problem Area 4:**

- **Working microbial fuel cells for electricity from manures**

- **Working bioreactors for hydrogen production from manures**
- **Working more economical alternative and/or co-/anaerobic digestion systems for combined heat and power**
- **Specific cooperative agreement with thermo-chemical conversion technology companies for implementing farm-scale energy production system**
- **Establishment of protocols to quantify carbon credit from utilizing manures as feedstock for biological and thermo-chemical conversion systems**

**Locations for Problem Area 4: Beltsville, MD; Clay Center, NE; Florence, SC; Bushland, TX; Bowling Green, KY**

