

Center for the Environment (C4E)

environment@purdue.edu

Bernie Engel (Ag. & Biol. Eng.), Interim Director
Linda S. Lee (Agronomy), Interim Assoc. Director
Lesley Oliver, Managing Director
Cindy Taylor, Administrative Assistant

engelb@purdue.edu (4-1162)

lslee@purdue.edu (4-8612)

loliver@purdue.edu (4-6160)

taylorca@purdue.edu (4-5146)

Mission

To enhance environmental integrity, economic development, and the quality of life by enlightened stewardship and innovative monitoring, modeling, and management of natural resources.



Motto: ...protecting environmental integrity is essential to prosperity and the quality of life ...

C4E commitment to faculty: To synergize relationship building and create/identify opportunities

Initial Focus Areas

Sensory Landscape & Intelligent Monitoring (SLIM)

Real-time monitoring for providing data for simulation models and making informed decisions is at the forefront of scientific and engineering research.

Establishment of an ECO-Hub

Advanced cyber infrastructure to provide access to the scientific community, decision makers, and industry of data and models for forecasting climate, land use, water and air quality, and water quantity towards estimating the economic impacts to various industry, and planning for optimal use of natural resources.

Sustainable Indiana Futures (Smart Growth)

Development and execution of spatially land use and climate change explicit models to examine how climate and land use impact land-based industries such as agriculture, forestry, recreation and tourism, and mining.

Technologies for a Cleaner Air, Soil, and Water

Development and implementation of technologies to reduce air pollution from manufacturing, agricultural, industrial, and utility operations, and undesirable constituents in industrial and municipal discharges and contaminated soils.

Environmental Considerations in Scaling Up the Use of Biomass for Energy

Expanded biofuel production and our use of biomass for energy has the potential to enhance U.S. energy independence, security, and reduce energy price volatility by diversifying our energy portfolio. However, the potential environmental or ecological impacts of large-scale biofuel production in the U.S. needs to be considered and is remains largely uninvestigated.

Approach

Cautions

Exemplifying “Foresight” and generating and applying sound science will win socio-political favor and minimize barriers and reduce the chance of bring forth problems to future generations.

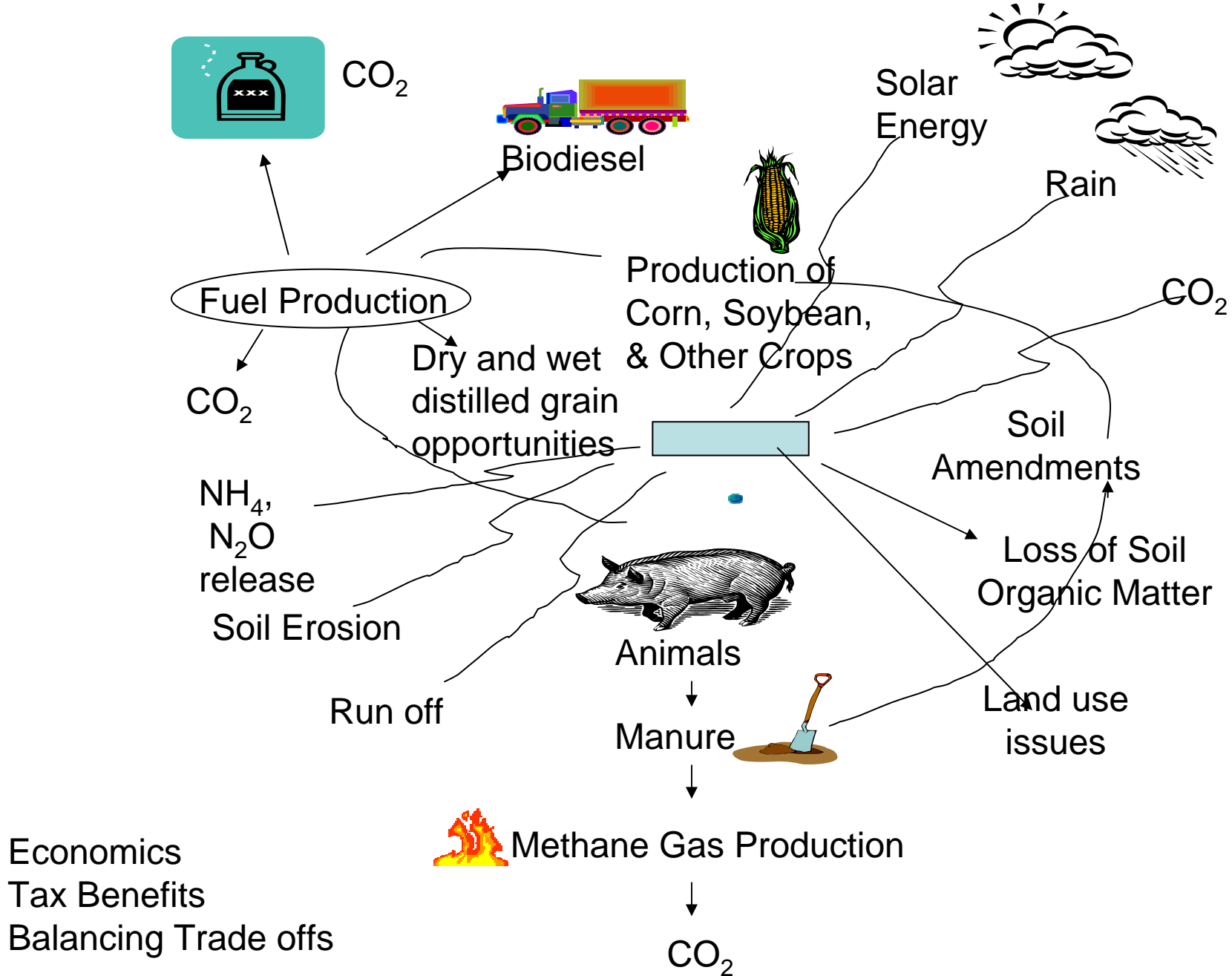
Benefits

Identify win-win scenarios

Environmental Considerations

- Scale
- Land-Use
- Air Emissions – GHG (CO₂, CH₄, N₂O)
- Water Quality – increased nutrient discharge
- Soil Quality – Carbon sequestration, erosion
- Water Use
- Monocultures versus biodiversity

Optimizing Opportunities and Finding a Balance



Opportunities

- Balance between energy crops (e.g., corn, soybean, rape), grasses, and intercropping for environmental gain
- Co-combustion and co-gasification of coal and bioresidues
- Enhancing microbes to generate energy or energy component (H_2 , CH_4)
- Use of microbes for removal of undesirables (S, Ca, N, Hg)
- Increased use of Anaerobic Digestion Process towards CH_4 -enriched fuels
- Reduce open burning or wastes and land filling
- Improved technology for reducing air emissions

Examples of Win-Win Scenario Opportunities with Waste Reuse

- Waste Water Utilities – biosolids applied to land for growing energy crop with conversion to biodiesel and receipt of carbon credits
- Wood Scrap to Pellets Energy Reduction Concept
- CAFOs and CH₄-enriched fuels
- Co-processing of coal, coal refuse, and biomass wastes for synfuel production

Opportunities

We have the opportunity to take what we have learned from other environment-industry experiences and apply them now to the needs, development, and planning for expansion of biofuels use.

A research program that includes bio-based residues and waste products-to-energy technology development will enhance the acceptance and benefit of biomass fuel systems from multiple perspectives including cost, employment opportunities, soil and water quality, health, energy independence and technology development.

Forming nontraditional partnerships for enhanced economics and environmental stewardship!

Current C4E Efforts

- Building DP Center-Center Relationships
- Building Synergistic Relationships between Environment, Business, and Academia
- Seeding Research
- Paired Industry Needs/Response Workshops
- “Environmental Entrepreneurship” Competition