Why Biomass & Biofuels for Hawaii?

Andrew Hashimoto

Hawaii Biomass & Bioenergy Workshop

September 24, 2010

Hawaii's Situation

- More than 90% of energy consumed is fossil fuels (88% petroleum, 5% coal).
- Geographic isolation compounds the carbon footprint of importing fossil fuels.
- Year-round growing season.
- Excellent growing conditions for desired crops <u>and</u> associated pests and diseases.
- Most of the world's microenvironments (10 of 14 climatic zones, and 10 of 12 soil orders of the world)

Hawaii's Challenges

- Unlikely that one crop will be the best for every microenvironment.
  - What are the best crops for different environments?
  - How do these crops perform under less than ideal conditions?
- Many good candidate crops have not be been extensively studied for its bioenergy potential in the tropics.
  - Energy cane, banagrass, guinea grass, sorghum, etc.
- Suitability of crops as feedstocks for biofuels.
  - Composition
  - Fermentability
  - Presence of impurities

UH Biofuels Program

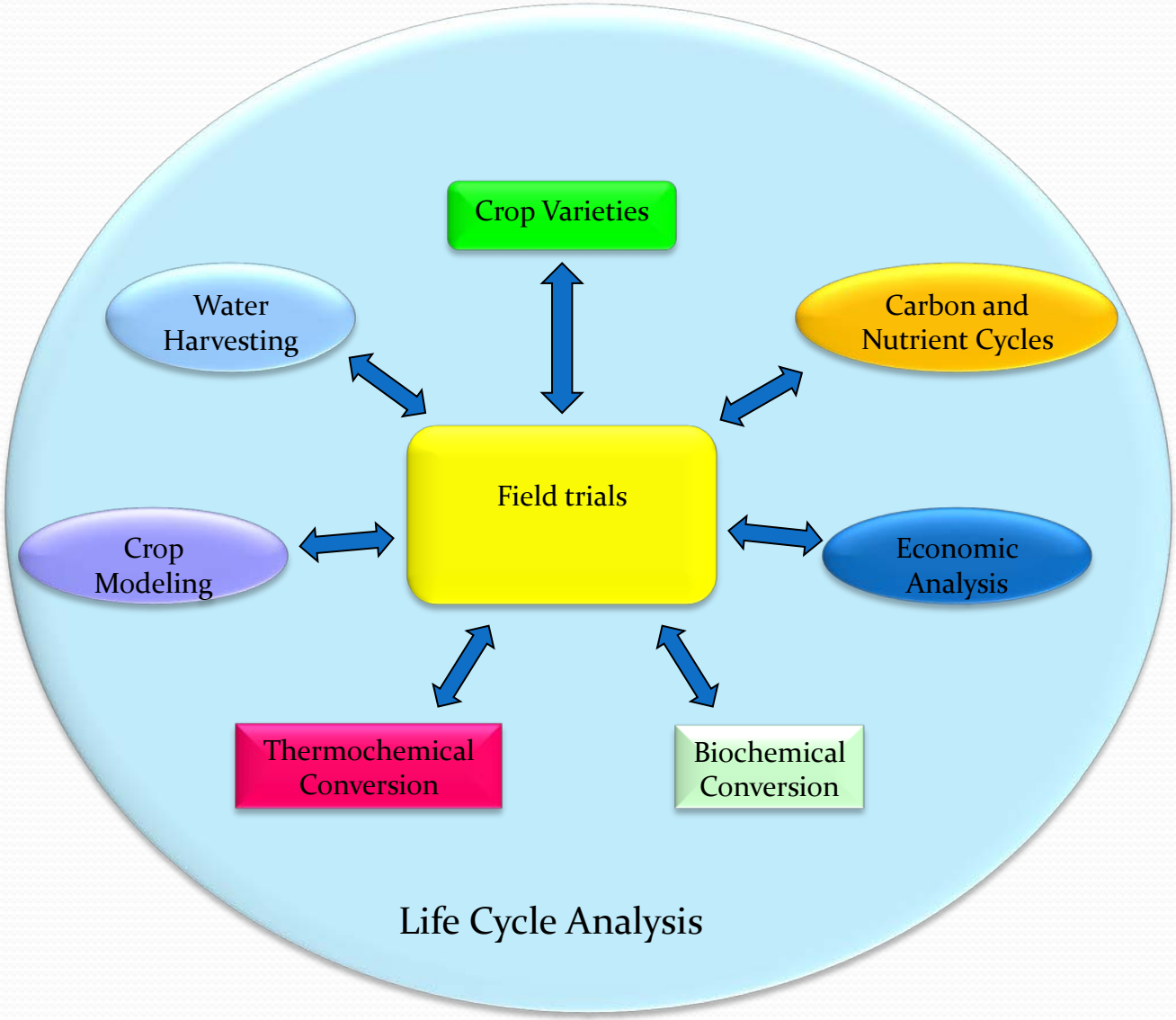
Goal

Develop high-yield tropical feedstocks that are economically viable and sustainable, and assess renewable energy as a catalyst for economic development.

Objectives

- ***Research "best" bioenergy feedstocks for Hawaii and the tropics.***
- ***Quickly apply information on commercial scale.***
- ***Document impacts of renewable energy systems on community and economic development.***

UH Biofuels Research Overview



HC&S Project: Are large-scale renewable energy production systems sustainable?

- ***Partners: HC&S, USDON/USDA/ARS, and HARC: assist HC&C assess transition from commodity sugar to renewable energy***
- ***HC&S has: land (35,000 acres), work force (800), infrastructure (mill, equipment, irrigation systems)***
- ***Suitable, site-specific energy crops (sugarcane, energy cane, banagrass, guinea grass, sorghum; 3 varieties/crop; 3 elevations; 2 water regimes)***
- ***Process efficiencies (evaporation processes, burn vs. trash harvest, coal to wood chips)***
- ***Input requirements, costs and impacts (land, water, nutrients, machinery, air and water quality, carbon sequestration)***

Hamakua Springs Project: Are Renewable Energy Systems Sustainable?

- ***Install hydroelectric plant***
- ***Measure financials, revenue, employment (Hamakua Springs and 5 cooperating farmers) annually***
- ***Measure Quality of Life Index of two communities (target and control)***
- ***Measure carbon footprint***

Project Outcomes

- Projects serve as models and results are transferable
- Ability to predict biomass feedstock productivity in the tropics and subtropics
- Life cycle analyses and sustainability of bioenergy crops
- Side by side comparison of crops
- Publically accessible, “unbiased” information