Sustainable Greenhouse Practices

Basic principles of sustainability

- Reduce environmental degradation
- **Resource & energy conservation**
- Maintain productivity & economic viability
- **Maintain quality of life**

-'Growers look at operating a sustainable greenhouse'
Krug et al. GMPro October 2008

Reduce environmental degradation

- Reduce excess synthetic inputs
  - Fertilizers & pesticides
  - Alternatives: Composting & IPM
- Reduce waste
  - Recycle containers & film
  - Biodegradable containers

Composting

- What to do with end of season waste?
- How to increase nutrients and organic matter?
- Avoid excessive animal waste usage
  - Why?
- What to compost?
  - Balance C:N ratio
  - 30:1 is good

Compost recipes

- Many different recipes
- Carbon sources (the browns)
  - Woody materials, leaves,
- Nitrogen sources (the greens)
  - Grass clippings, vegetable wastes
- Moisture management important
  - ‘Feel’ test
- Temperature management
- Aeration

Composting Options

- Vermicomposting
- Restaurant green waste
- City green waste
- Compost tea production

Composting Resources

- Rocky Mountain Compost School
  - 4 days (classroom and field)
  - CSU and national experts
  - April (14-19th this year)
  - $500
- Books & internet resources
- ATTRA
  - http://attra.ncat.org/soils.html

Integrated Pest Management

- Holistic approach to dealing with insect, diseases, weeds and other pests
- We will discuss in more detail in a bit!

Greenhouse films

- Polymer films break down over time
- What to do with them?
- Alternatives:
  - Research on biodegradable films-not at production level yet
- NJ has been recycling film since ’96
- Colorado does not have a recycling program for film or nursery pots

Reusing pots and growing flats

- Sanitation is important!
- Stops spread of disease & insects
- Wash thoroughly to remove solids
- Sanitize in commericial hydrogen peroxide solution
- Example: Sanidate (OMRI listed)

Types of Pots

- Plastic
  - Least expensive
  - Recyclable?
- Biodegradable materials
  - More expensive
  - Cowpots
  - Peat
  - Corn gluten
  - Coir (coconut husks)

Photo: The Liquid Fence Company

Resource & energy conservation

- Reduce fuel & electricity consumption
  - Chose correct crop for season
  - Passive heating & cooling techniques
- Conserve water
  - Drip irrigation

Don’t fight the seasons…too much

- Plant cool weather crops when it’s cool
- Plant heat loving crops when it’s hot
- Hoophouses and cold frames extend the season, but heating/cooling costs can rapidly escalate during the off-season
- Excessive heating/cool costs will eat at your profits!

Energy efficient heating

- Water barrels
- Pipe warm air into soil
- Grass pellet stove
  - Higher ash content
  - More corrosive than wood
- Other alternative fuel
  - Shelled corn
- Heated water or soil system
- Insulation on north side

Efficient water use

- Drip irrigation vs. overhead
  - Is it efficient?
- Water based on need, not on calendar
- No rain barrels

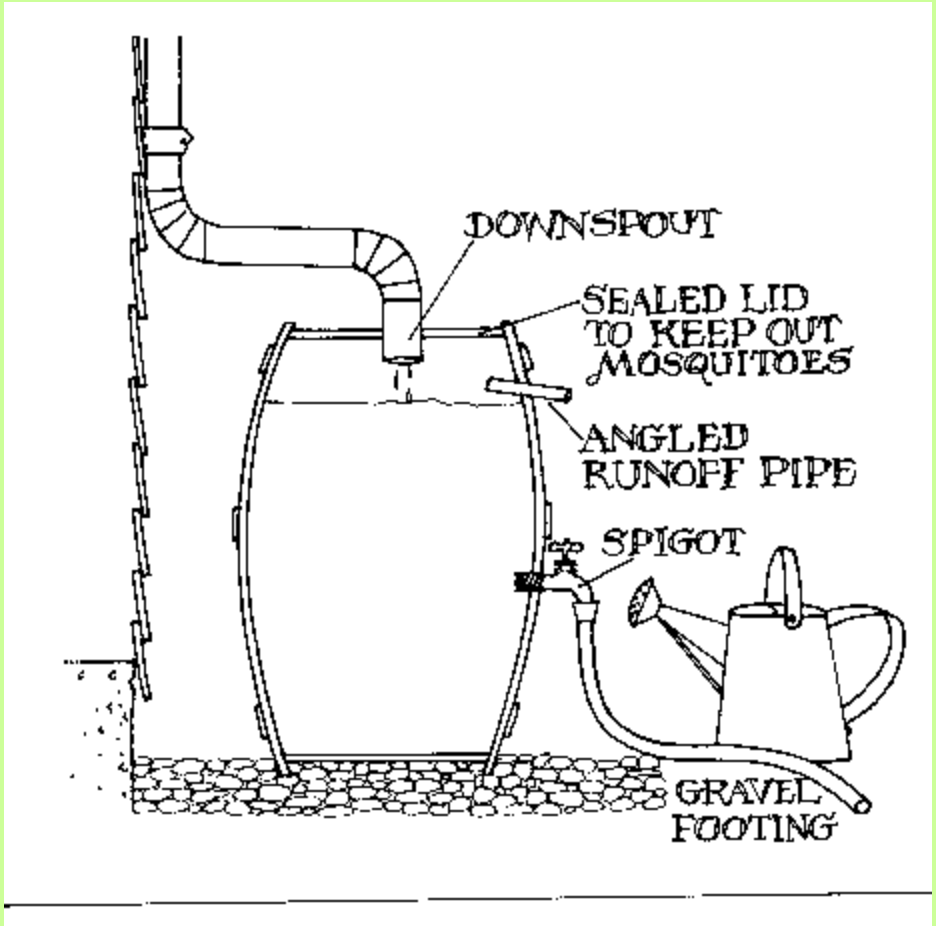

Diagram: www.lowimpactdevelopment.org

Maintain productivity & economic viability

- Marketing your product as sustainable
  - Does it cost more? Why?
  - Is it still high quality?
  - Who is your target customer?
- Marketing your business as sustainable

Maintain quality of life

- If you’re not having fun, is it worth doing?
  - Vacations?
- Effect on greater community/social sustainability