



# D-Lab

## Spring

### 2010

#### Design for [x]



# Today's Class

- Logistics
- Design for...
  - Usability
  - Affordability
  - Manufacturability
  - Sustainability
  - Reuse
  - Failure

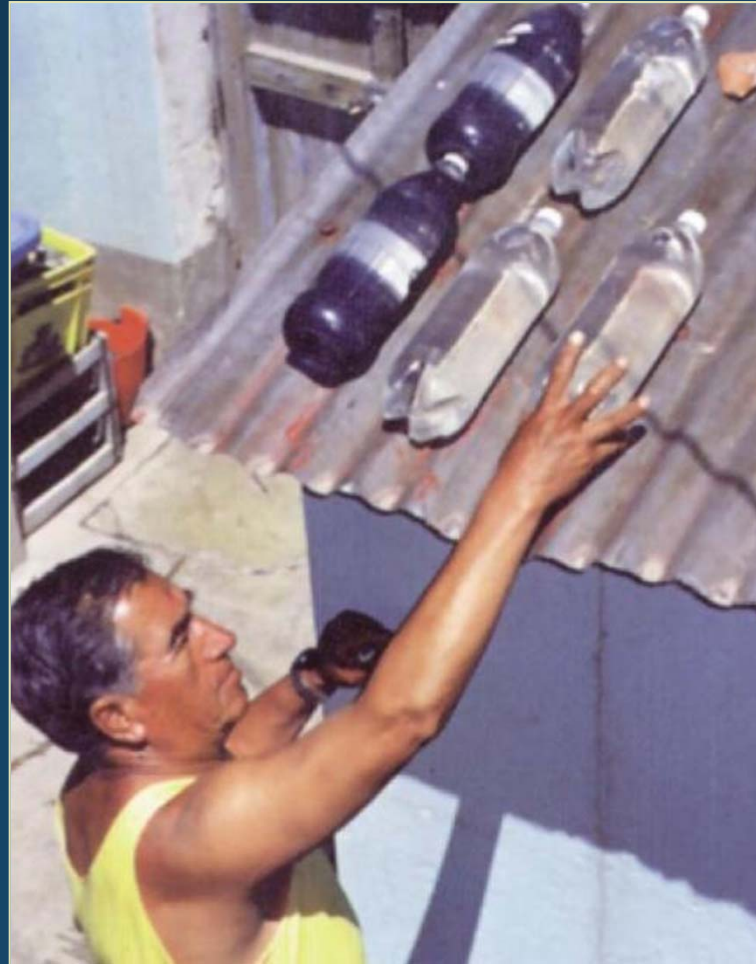
“There are no solutions,  
there are only trade-offs”



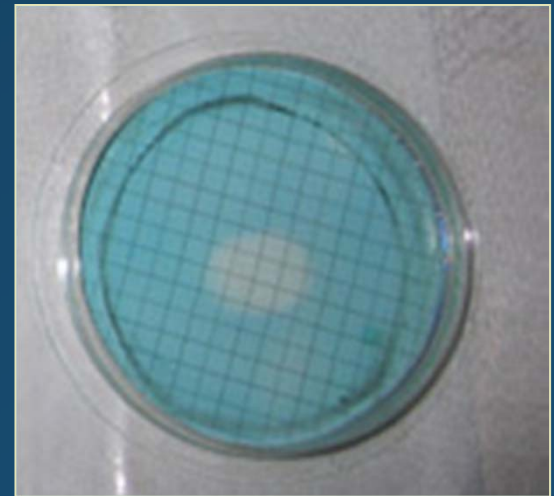
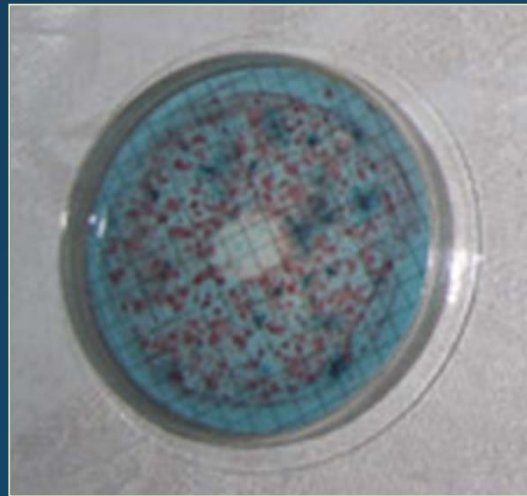
Design for...

Usability

# Solar Water Disinfection



# Solar Water Disinfection





# Design for Usability

- Ergonomics
- User interface
- User interaction and understanding
- Feedback
  
- Trade-offs
  - Cost
  - Performance



*Design for...*

Affordability



# Charcoal Press



# IDE Drip Irrigation

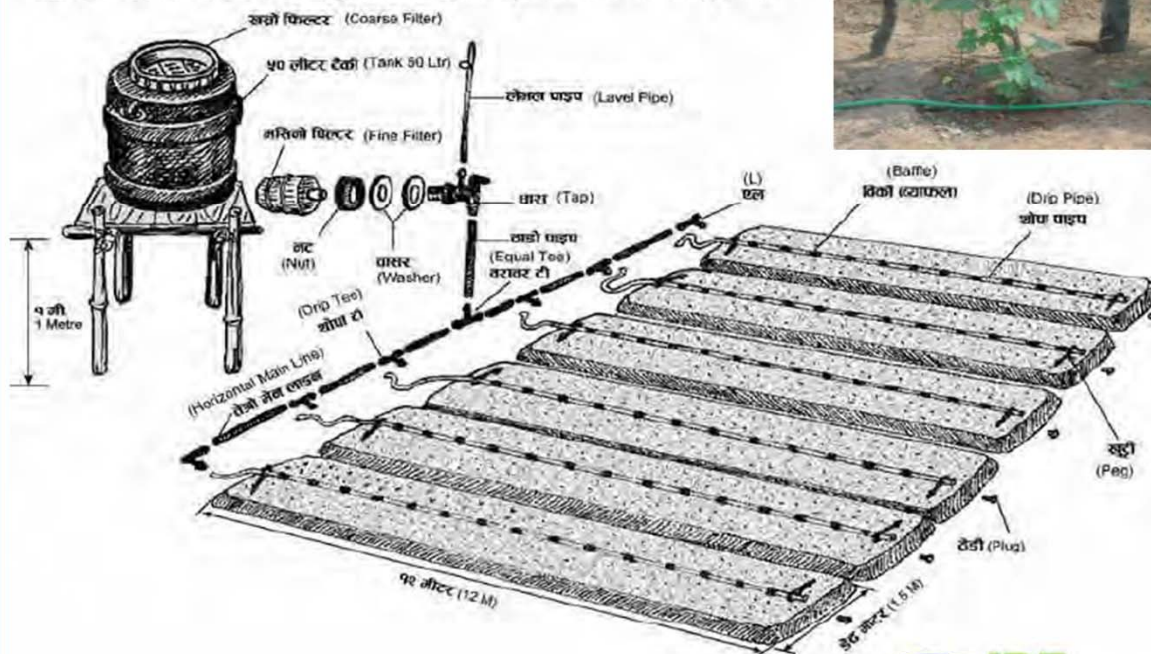


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# IDE Drip Irrigation



सरल थोपा सिंचाई सिंचाई (Simple Drip Irrigation System)  
 क्षमता: सानो (४ आना) (Irrigation Capacity= Small 1/4 Ropani)





# Design for Affordability

- Remove material
- Material selection
- Reduce part count
- Increase scale of production
  
- Trade-offs
  - Product life
  - Flexibility
  - “Quality”



*Design for...*

**Manufacturability**

# Manufacturing in Ghana



# Manufacturing in Ghana



# Manufacturing in Ghana

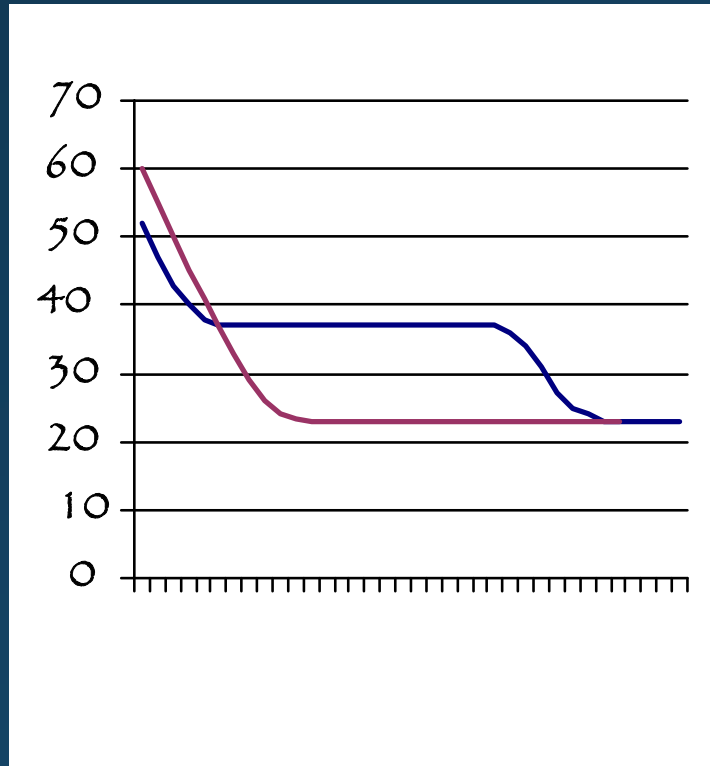




# Manufacturing in Ghana



# Phase Change Incubator







# Design for Manufacturability

- Ease of manufacture
- Scale of production
- Processes and material selection
- Tooling, jigs and fixtures
  
- Trade-offs
  - Economic benefits
  - Environmental impact
  - Capital investment



*Design for...*

**Sustainability**



# Design for Sustainability

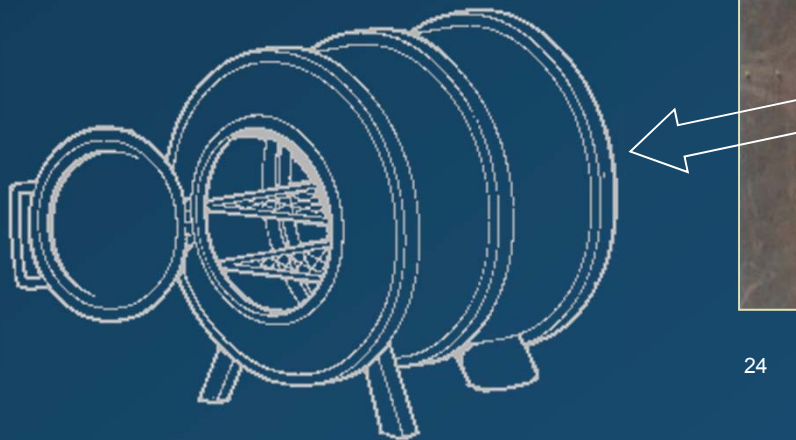
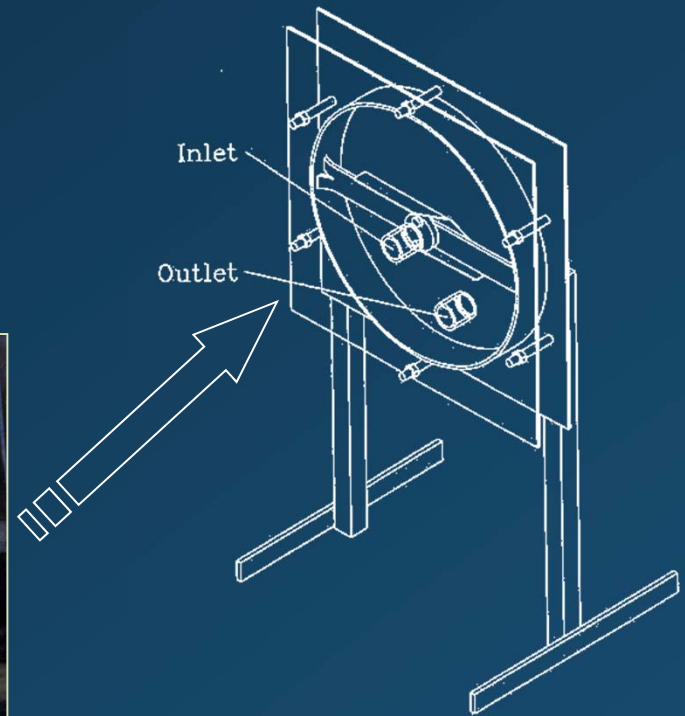
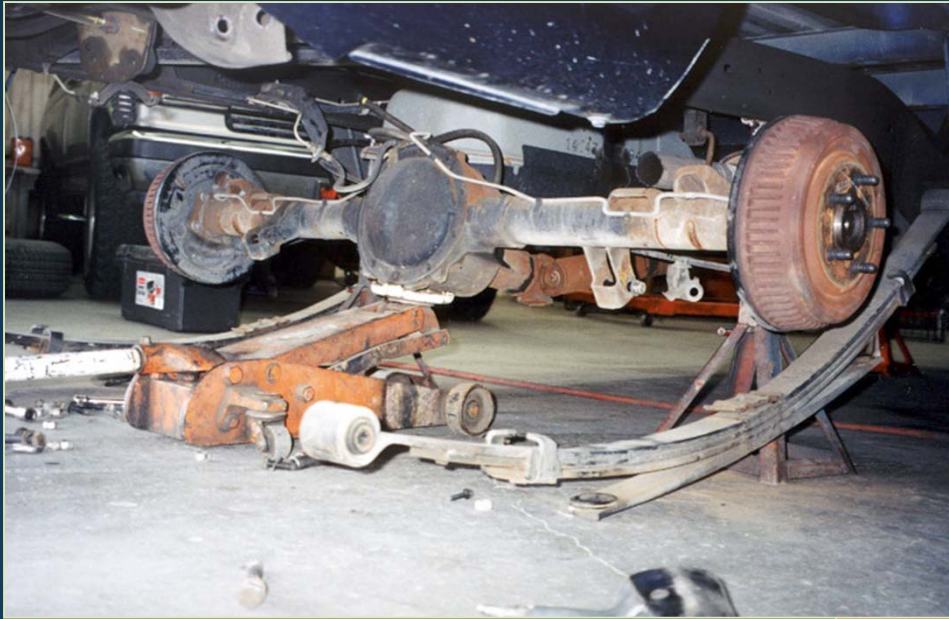
- Material choice
- Manufacturing processes
- Systems design
- Life cycle analysis
  
- Trade-offs
  - Cost
  - Performance



Design for...

Re-Use

# Car Parts





# Emergency Shelters



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# Design Trade-Offs

- Which “design-fors” will dominate the design of your project?
- What are the trade-offs?



# Design for...

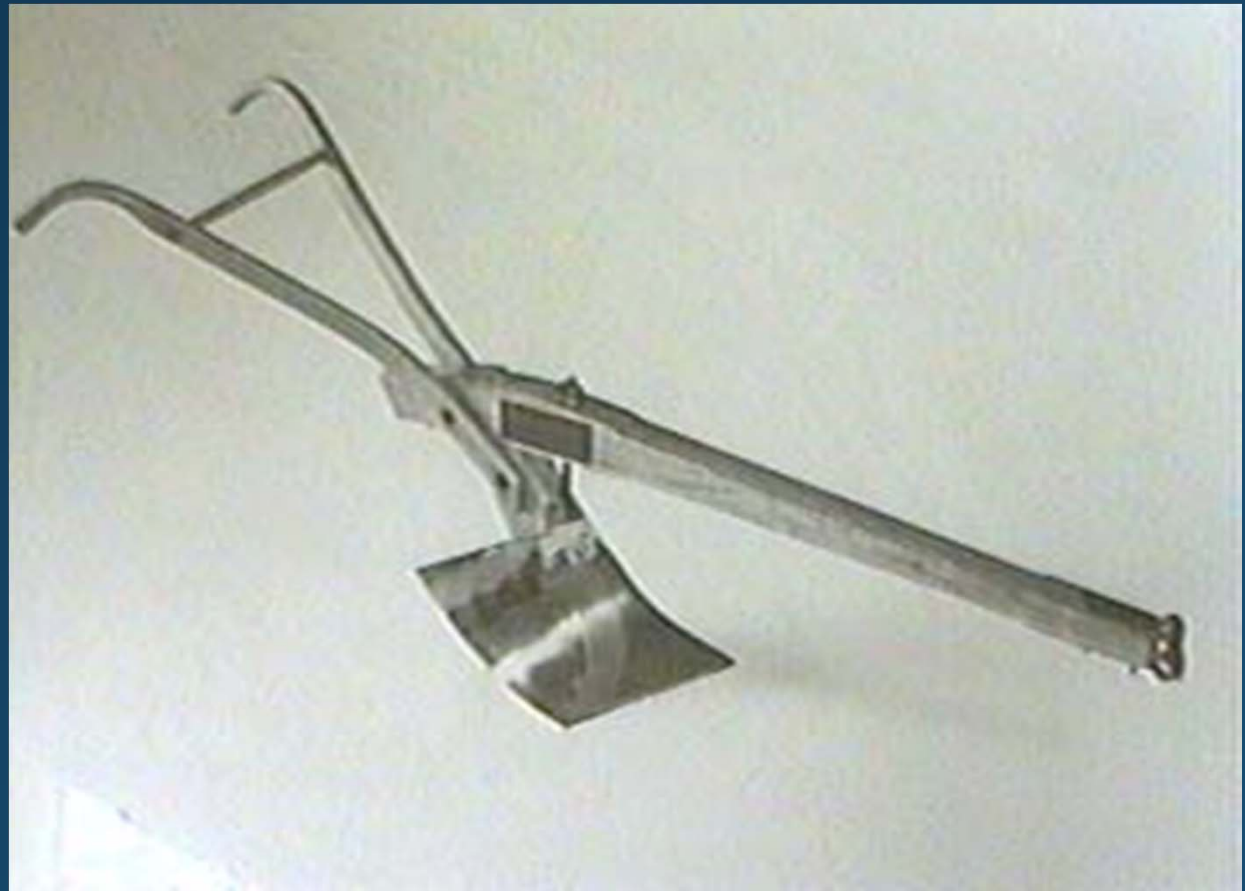
- Usability
- Affordability
- Manufacturability
- Sustainability
- Re-Use
- Failure



Design for...

Failure

# Flow



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# Design for Failure

- How will your device fail\*?
- How will it fail first?
- What is the best failure mode?
- What is the worst failure mode?

\* it will fail



# Where are we now?

- If you haven't chosen your final concept, do so soon!
  - Finish experimenting
  - Run through a selection matrix
  - Run it by your design mentors and instructors
- Next week's design review
  - How exactly will you go about your project
    - Think of ideas
    - Experiment
    - Choose the best one
    - Work out the details
    - Test...



# Coming up...

- Paul Polak
  - Discussion Questions
- Wheelchair and Stove Homework
- Design Reviews (April 7)
- ID Night at the Museum (April 9)
- Save the date for Awesomeness (April 21)



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EC.720J / 2.722J D-Lab II: Design  
Spring 2010

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