

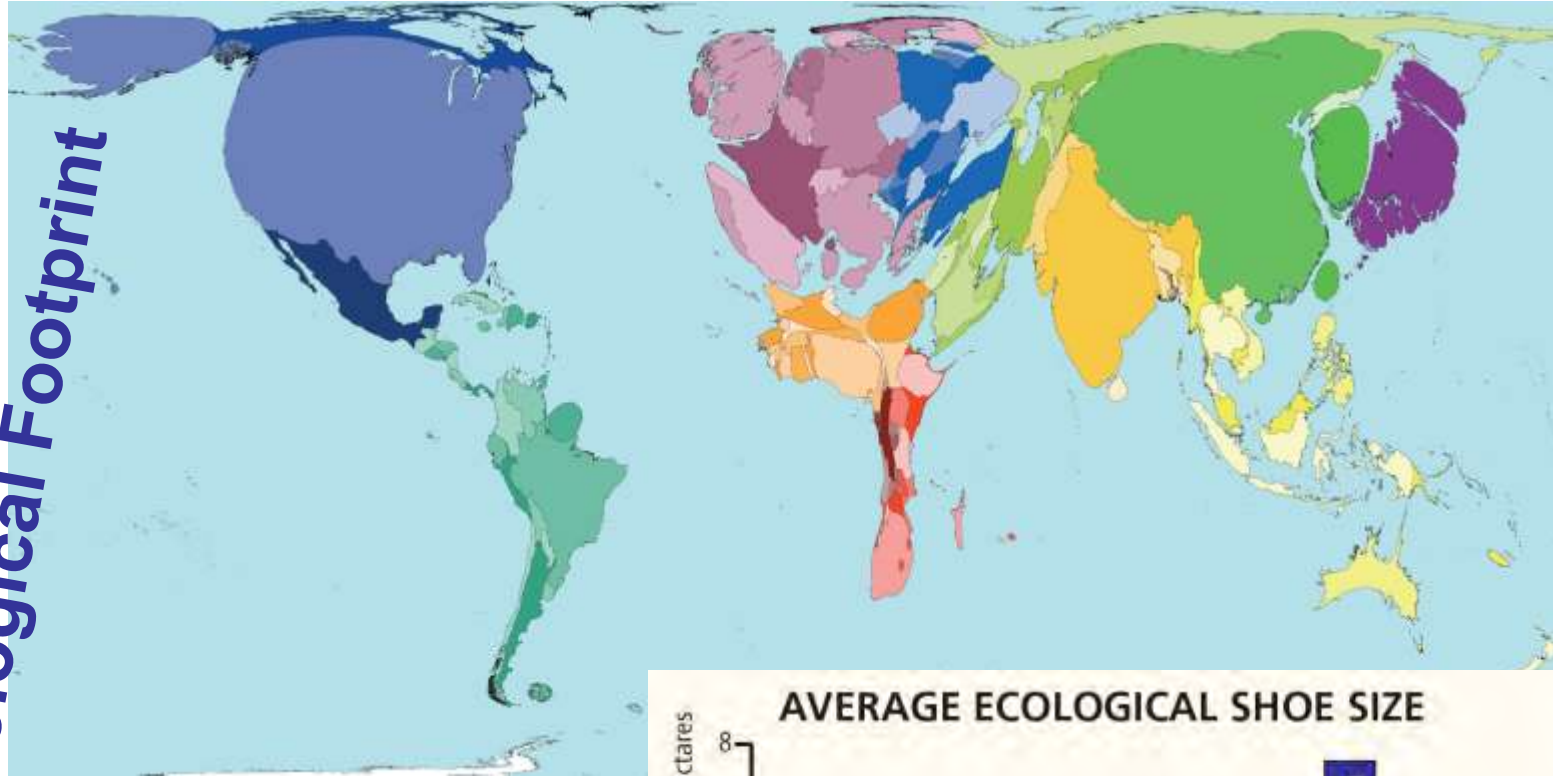
# Innovating Ideas to Prevent and Solve Environmental Problems: Ecology, Sustainability, and the Purdue Idea-2-Product Competition

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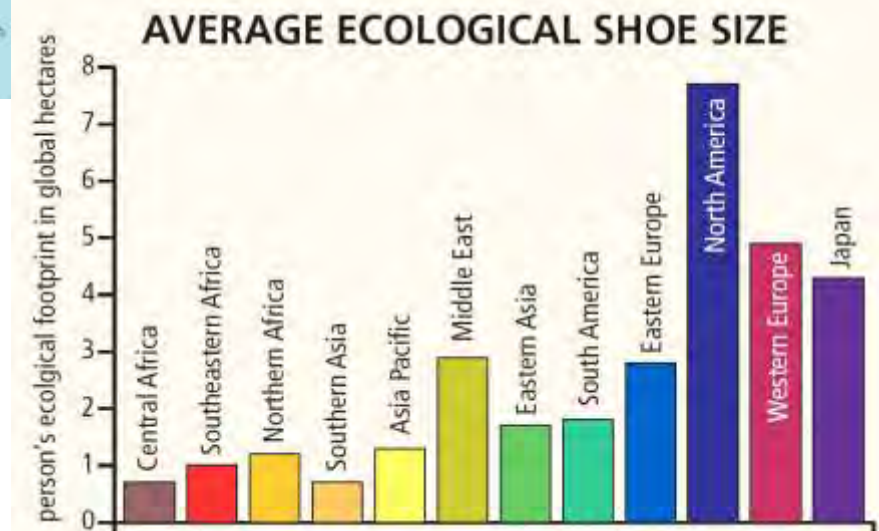
## The Ecological Problem

### Ecological Footprint



The Population Reference Bureau estimates that the average American consumes about 23 times more goods and services than the average world citizen.

[http://www.mnforsustain.org/pimentel\\_d\\_natural\\_resources\\_and\\_optimum\\_population.htm](http://www.mnforsustain.org/pimentel_d_natural_resources_and_optimum_population.htm)







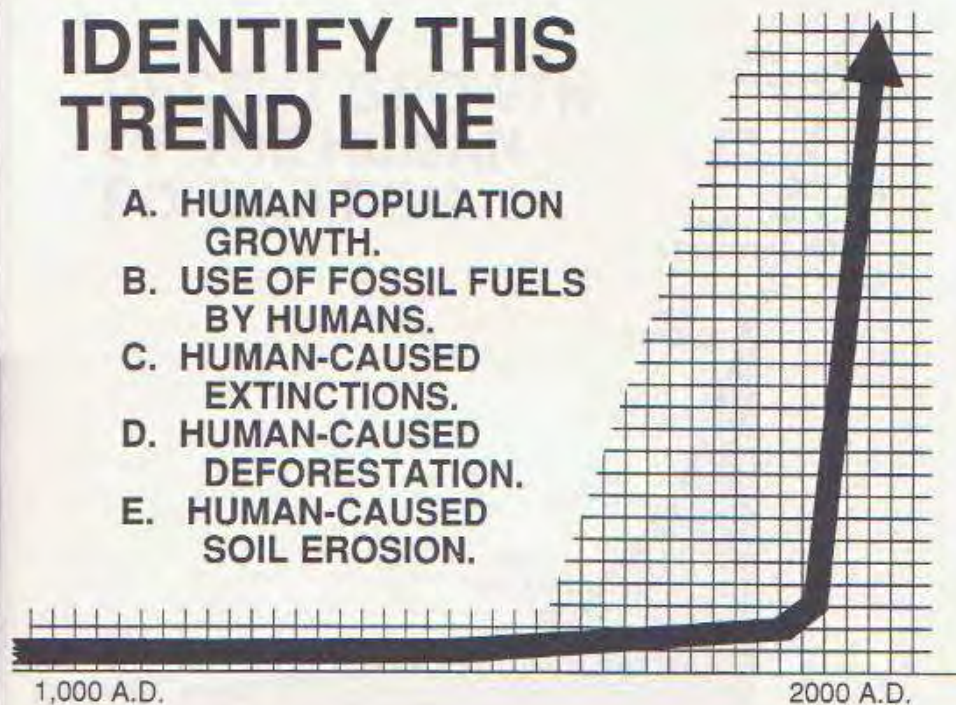
## FOX SENSE

A VIEW OF HUMANS AND THEIR ENVIRONMENT



### IDENTIFY THIS TREND LINE

- A. HUMAN POPULATION GROWTH.
- B. USE OF FOSSIL FUELS BY HUMANS.
- C. HUMAN-CAUSED EXTINCTIONS.
- D. HUMAN-CAUSED DEFORESTATION.
- E. HUMAN-CAUSED SOIL EROSION.

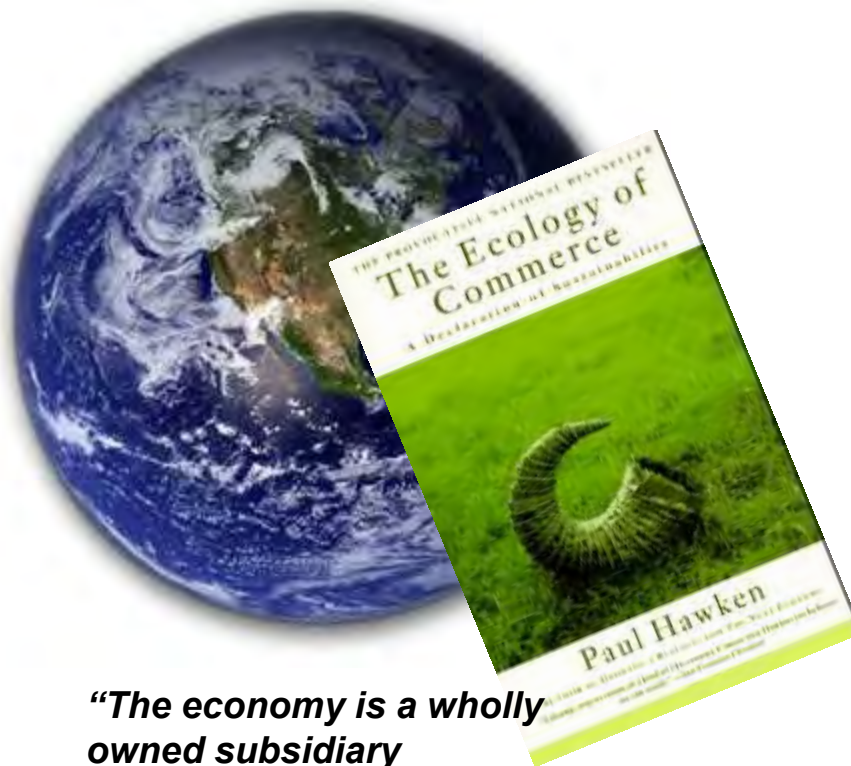


Is this a  
trick question?

# Innovating Ideas through Environmental Entrepreneurship

2008 EEI Teams:

1. Biodegradable and flexible furniture systems
2. Engineering design improvements to air-pump technology for off-grid communities to access clean drinking water
3. Carbon footprint software tool for institution scale assessment
4. Life-cycle environmental assessment services/tools for universities/businesses
5. Recycled Knowledge: An E-Waste Solutions Service/Business
6. Communicating Climate Change – Quality of Life Survey System for Universities
7. Industrial design of portable emergency shelter for displaced people



***“The economy is a wholly owned subsidiary of the environment.”***

**–Robert F. Kennedy Jr.**

## Entrepreneurship Informed by Basic Ecological Truths



**Ecosystems underwrite human existence (estimated value at \$33 Trillion globally - twice the gross world product)**

**Laws of Thermodynamics – There is no free lunch!**

(Industrial Ag example– takes 10 calories of energy to produce 1 calorie of food)

**Natural ecosystems run on unlimited solar energy – give rise to complexity, biodiversity, and stability.**

**Modern human ecosystems degrade order and complexity, depend heavily on finite fossil fuels for energy, recycle only partially and produce toxic wastes.**





## Biodiversity

**Only 20 species of plants and 5 animals account for over 90% of all human sustenance and international commerce in foodstuffs, and three cereal plants (wheat, rice and maize) provide 49% of human calorie intake (Solbrig 1992).**



**Greetings from Iowa...or IL, or IN or OH, or...**



## FOX SENSE



A VIEW OF HUMANS AND THEIR ENVIRONMENT

### THE INDUSTRIAL PLAN

#### MONOCULTURES IN FORESTRY & AGRICULTURE

Simplification; single-species systems for convenience and short-term economic expediency; vulnerable to pests and disease.



### NATURE'S PLAN

**POLYCULTURES** Many species for disease and pest resistance, nutrient cycling, and mutualistic relationships; a model for sustainable human land-use activities)



DIVERSITY PROMOTES STABILITY.

Perhaps Nature  
knows best.



# Carrying Capacity

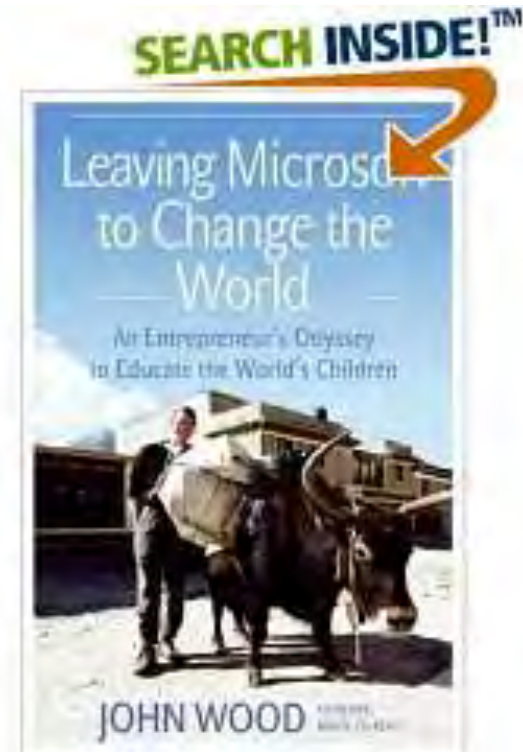




**Entrepreneur = derived from French,  
meaning  
someone who undertakes a “business”  
task assuming the risks of doing so.**

**Today: + innovator – someone turning  
novel ideas into reality  
for solving problems.**

**Environmental Entrepreneur =  
innovative ideas by mimicking  
ecosystem processes, solve problems  
without creating new “unintended”  
consequences.**



The  
Philosophical  
Problem

# Don't Solve One Problem While Creating More In Its Place!

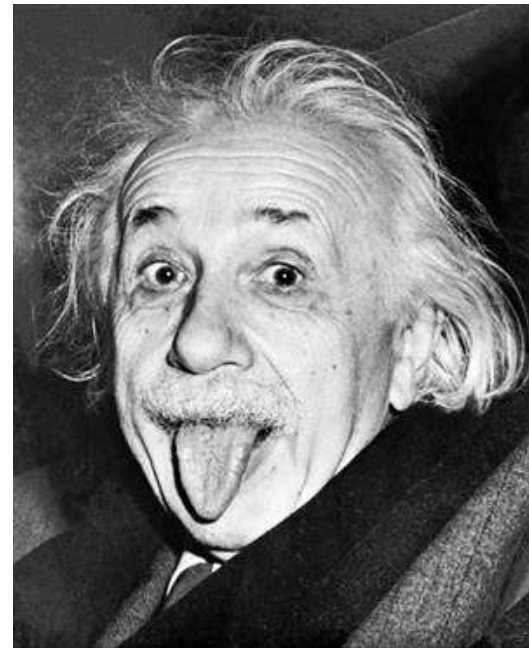
Jeavons's Paradox!



*“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”*

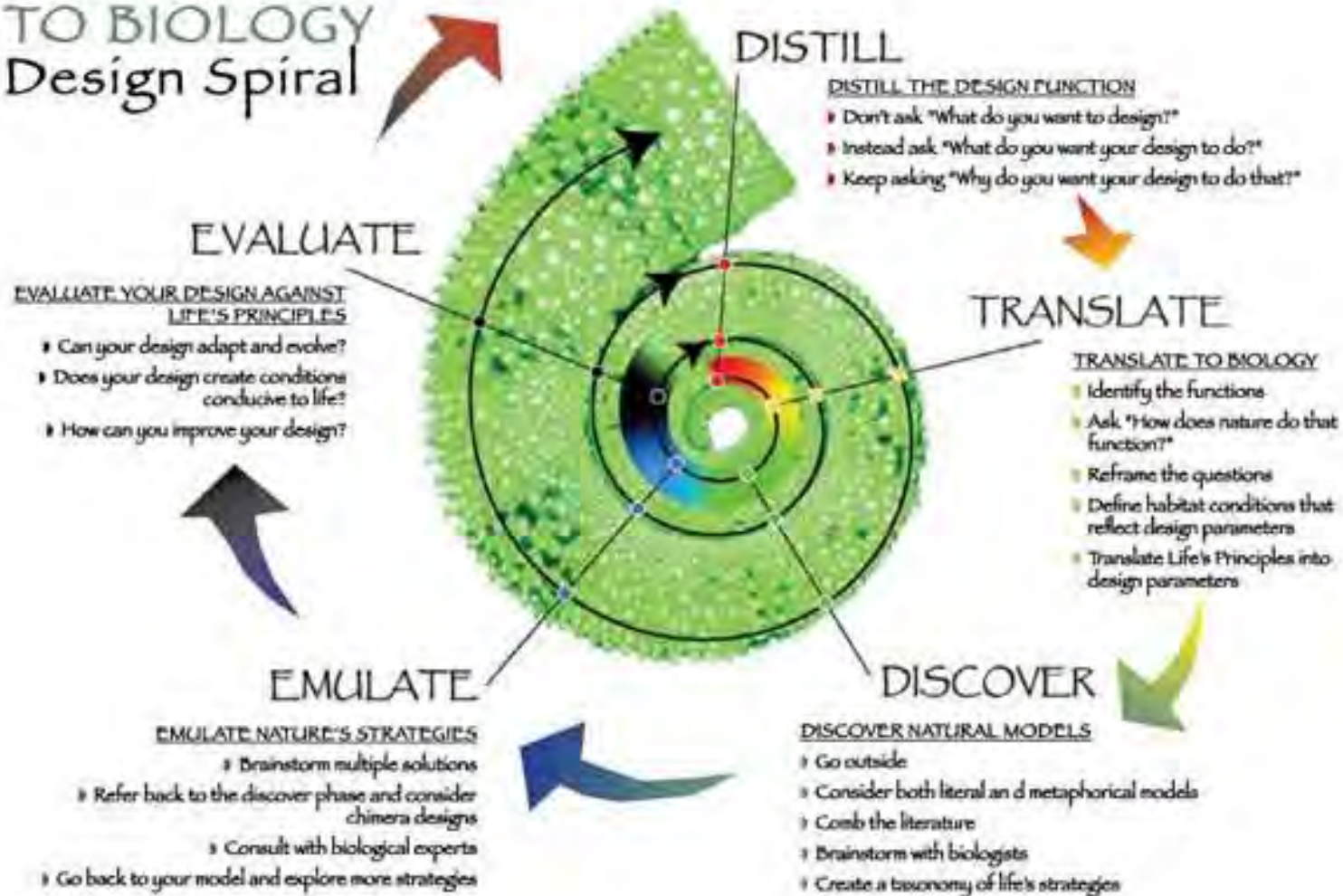
Aldo Leopold, The Land Ethic in A Sand County Almanac

- “We can’t solve a problem by using the same kind of thinking that created the problem in the first place.” – Albert Einstein





## THE CHALLENGE TO BIOLOGY Design Spiral



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# Solving Problems in the Environment Through Entrepreneurship: Idea-2-Product

## Departments represented in 2008

Earth & Atmospheric Sciences

History

Agricultural & Biological Engineering

Civil Engineering

Agronomy

Krannert School of Management

Organizational Leadership & Supervision

Political Science

Industrial Design

Aerospace Engineering

Biomedical Engineering

Forestry & Natural Resources

Computer Graphics Technology



2009 Purdue Competition  
March 7

National Competition  
April 3-4, at Purdue!

# Criteria for EE-I2P

- Identify and describe how your team's idea (a service, process, technology, or product) helps to solve or prevent an environment problem, and how you will minimize any "unintended environmental consequences"\* of implementing your idea. Additionally describe any clear social, or economic benefits.
  - Clearly describe the service, process, technology, or product and its current status (are there similar existing concepts?).
  - Identify and describe your target audience.
  - Identify opportunities for developing your idea for use by the target audience.
  - Demonstrate the completion of an initial prior search to insure your team's new service or product does not infringe on other protected Intellectual Property (IP).
  - Identify the potential to protect your team's intellectual property (IP) embodied in the services or products your team intends to create. (both traditional IP pathways, and alternative creative commons and open source pathways are all encouraged)
  - Identify any barriers to delivering or marketing the service, process, technology, or product.
- \*\*Partnership with a local, national or international non-profit organization.**

*\*unintended consequences refers to not solving one problem while creating more problems in its place. [Life-cycle analysis](#) is helpful in this regard.*



**Team collaboration to develop ideas into services, products, processes, or technologies that will help solve or prevent environmental problems.**



## **How it works:**

- **Students form teams by December to develop ideas that address an environmental issue.**
- **Teams learn about development and marketing issues and submit a 3-5 page feasibility plan by February 1.**
- **Approximately 6 teams with the best feasibility plans will be selected to present their ideas to a panel of judges on March 7, 2009.**
- **Awards totaling \$10,000 will be given to the best teams.**

### Über EMERGENCY SHELTER

The Über Shelter is a new concept in emergency shelter design. It is a portable, self-contained, and easy to use shelter that can be deployed in minutes. It is designed to provide a safe and secure environment for people in need, and it is easy to transport and store. The shelter is made of high-quality materials and is built to last. It is also easy to use and can be deployed in minutes. The shelter is made of high-quality materials and is built to last. It is also easy to use and can be deployed in minutes.



1. Quick deployment of 10 ft by 10 ft shelter in 10 minutes.

### Features



2. Built-in sleeping area (bunk beds) and storage compartments for personal belongings.



3. Built-in sleeping area (bunk beds) and storage compartments for personal belongings.



4. Built-in sleeping area (bunk beds) and storage compartments for personal belongings.



5. Built-in sleeping area (bunk beds) and storage compartments for personal belongings.

### Assembly



1



2



3



4



5



6



7



8



## **Ecosphere To Do List**

- **Reduce the industrialized world's carbon footprint 80 percent by 2050. Reduce our U.S. eco-footprint from a size 10 to a 4.**
- **Reduce human population 80 percent from its current level without famine, war, viruses or the loss of human dignity by 2110.**
- **Devise viable models of happiness and success that do not require economic growth and increased consumption.**
- **Eliminate the automobile as a form of personal transportation.**
- **Create political and social systems that run on a solar economy.**
- **Revise the scientific method so that it more accurately balances the goal of discovery with moral considerations and precaution.**