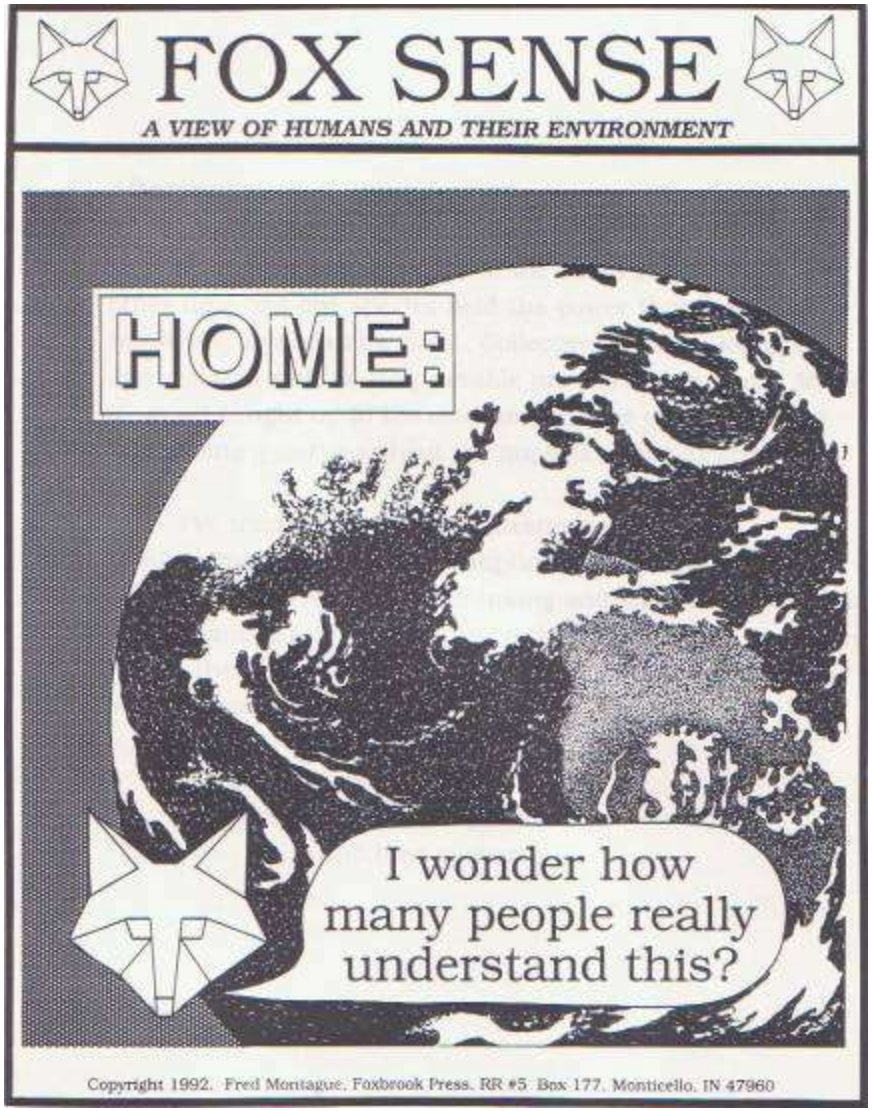

Innovating Ideas to Prevent and Solve Environmental Problems: Ecology, Sustainability, and the Purdue Idea-2-Product Competition

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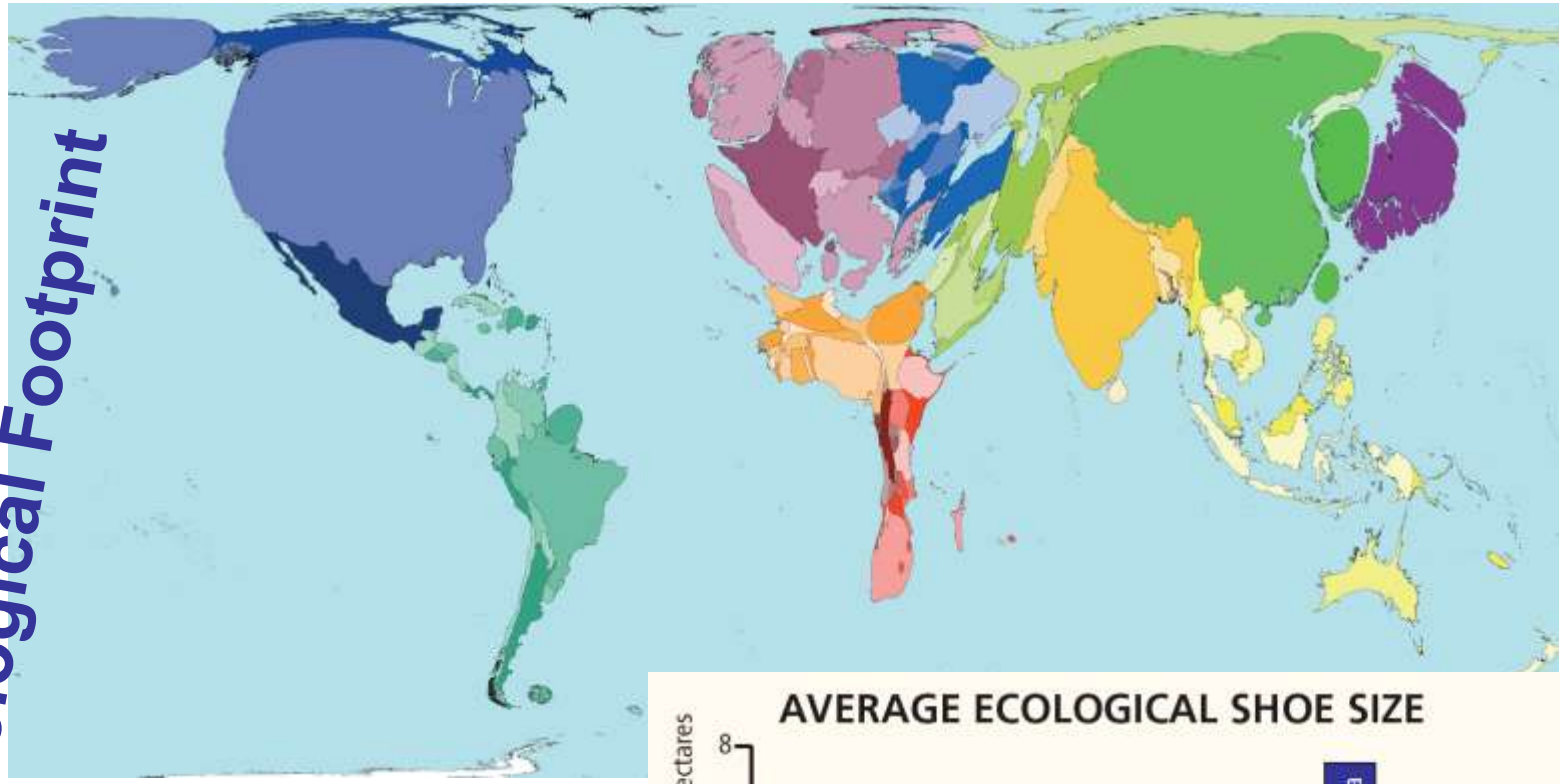
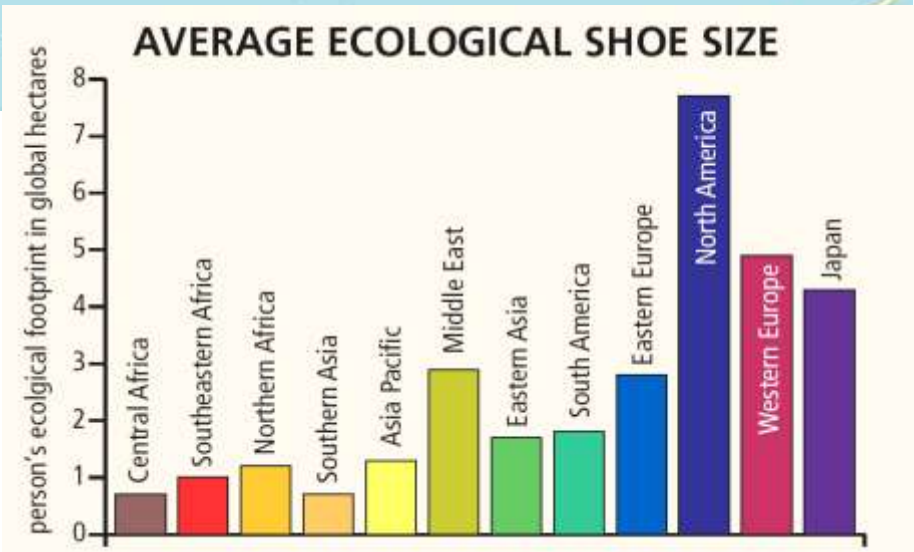
PURDUE UNIVERSITY

The Ecological Problem



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

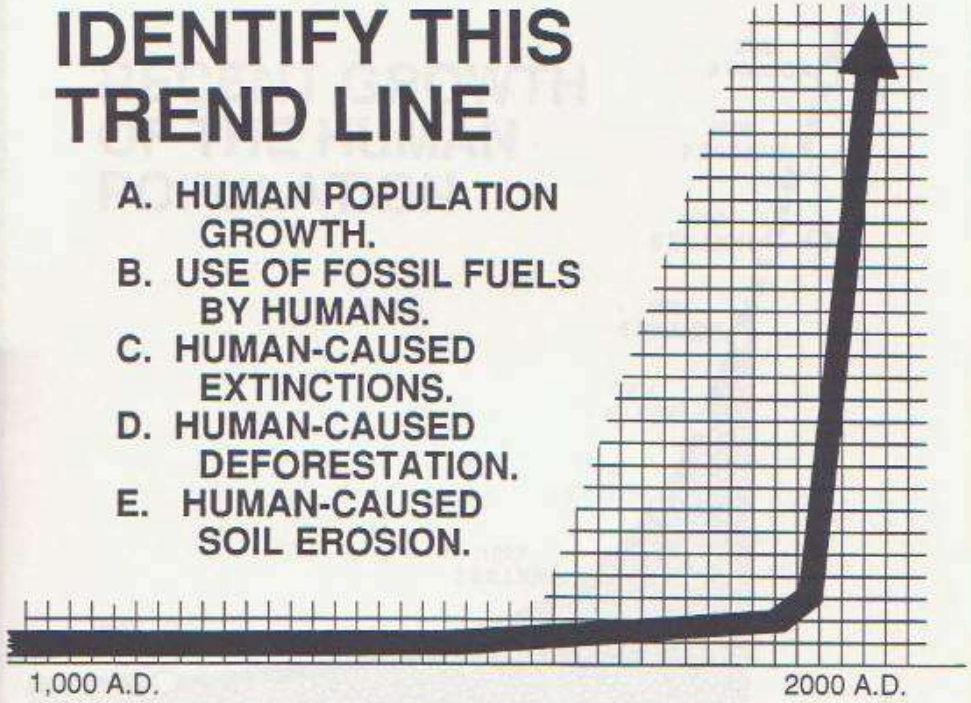


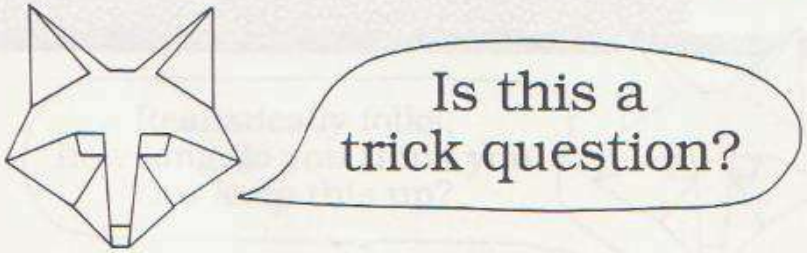
FOX SENSE

A VIEW OF HUMANS AND THEIR ENVIRONMENT

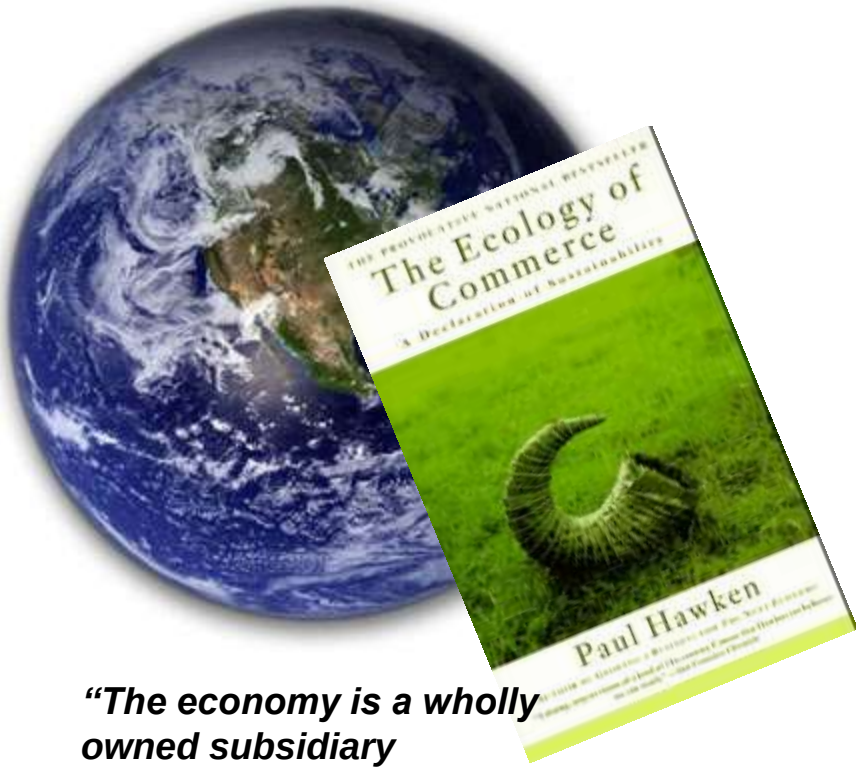
IDENTIFY THIS TREND LINE

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





Innovating Ideas through Environmental Entrepreneurship



"The economy is a wholly owned subsidiary of the environment."

–Robert F. Kennedy Jr.

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

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…

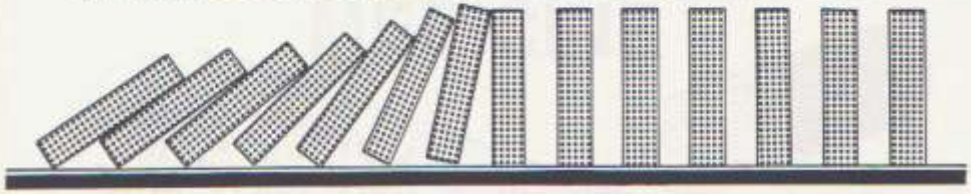
FOX SENSE

A VIEW OF HUMANS AND THEIR ENVIRONMENT

THE INDUSTRIAL PLAN

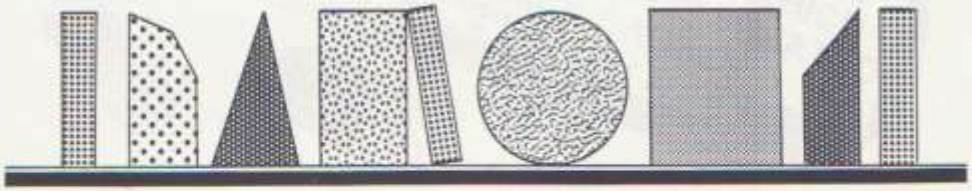
MONOCUTLURES IN FORESTRY & AGRICULTURE

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



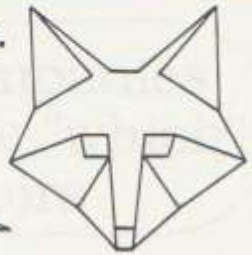
NATURE'S PLAN

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.

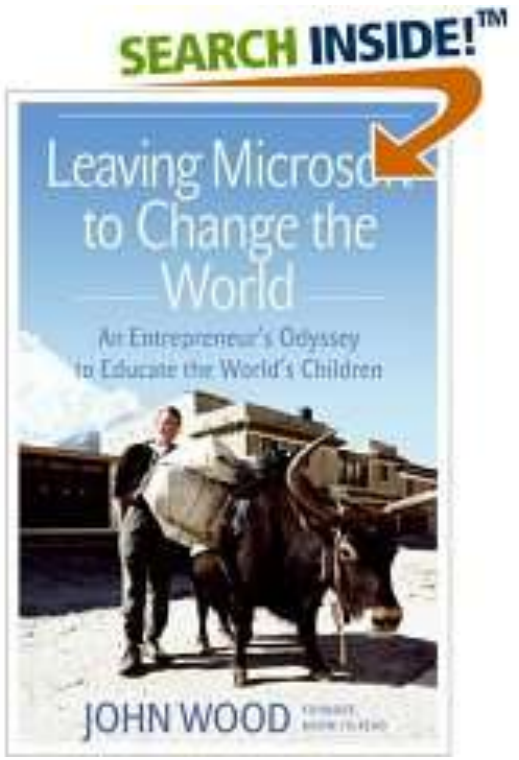


Carrying Capacity

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

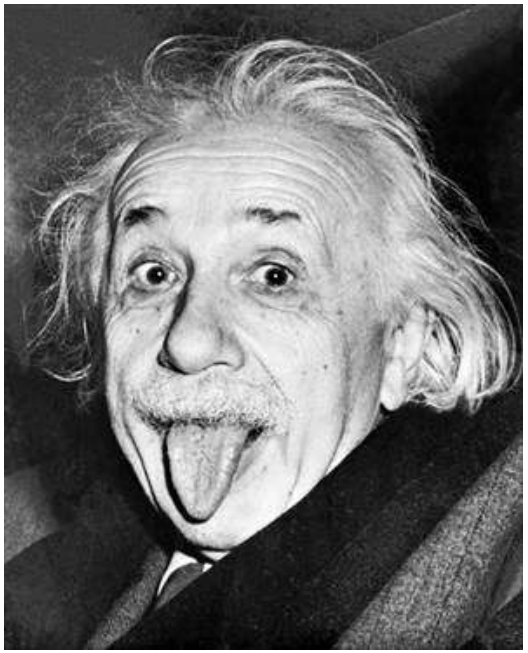
Don't Solve One Problem While Creating More In Its Place!

Jeavon'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
DISTILL
DISTILL THE DESIGN FUNCTION
Don't ask "What do you want to design?"
Instead ask "What do you want your design to do?"
Keep asking "Why do you want your design to do that?"
TRANSLATE
TRANSLATE TO BIOLOGY
Identify the functions
Ask "How does nature do that function?"
Reframe the questions
Define habitat conditions that reflect design parameters
Translate Life's Principles into design parameters
DISCOVER
DISCOVER NATURAL MODELS
Go outside
Consider both literal an d metaphorical models
Comb the literature
Brainstorm with biologists
Create a taxonomy of life's strategies
EMULATE
EMULATE NATURE'S STRATEGIES
Brainstorm multiple solutions
Refer back to the discover phase and consider chimera designs
Consult with biological experts
Go back to your model and explore more strategies
EVALUATE
EVALUATE YOUR DESIGN AGAINST LIFE'S PRINCIPLES
Can your design adapt and evolve?
Does your design create conditions conducive to life?
How can you improve your design?
© Biomimicry Guild 2007

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-cyle 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
Features
Assembly
1
2
3
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5
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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.**