

“As we peer into society's future, we -- you and I, and our government -- must avoid the impulse to live only for today, plundering, for our own ease and convenience, the precious resources of tomorrow. We cannot mortgage the material assets of our grandchildren without risking the loss also of their political and spiritual heritage. We want democracy to survive for all generations to come, not to become the insolvent phantom of tomorrow.”

Farewell address by President Dwight Eisenhower, 1961
(<http://coursesa.matrix.msu.edu/~hst306/documents/indust.html>)

Defining and Measuring Sustainability

Hunting W. Brown
Wright State University
and
Megan Quinn Bachman
The Community Solution

Defining and Measuring Sustainability

University Honors Symposium on
Creating Sustainable Environments
January 29, 2008

Hunting W. Brown
Director of Sustainability, Office of the Provost,
and Lecturer, Depart. of Earth and
Environmental Sciences,
Wright State University

Outline

- Should we be concerned?
- What is sustainability?
- How do we measure progress?
 - Macro-level – economies as a whole
 - Micro-level – institutions or businesses
- Conclusions

Why Care?

- Increasing human populations
- Increasing per capita use of resources
- Finite planet
- Increasing human dominance of world's ecosystems
- Real concerns over long term prospects for both humans and the environment
- Should we merely observe the changes or act to reverse the trend?

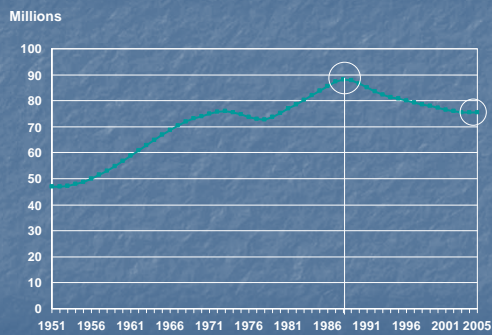
Why Care?

- Increasing human populations

Human Population Levels Throughout History



Annual Increase in World Population



- Finite planet



http://visibleearth.nasa.gov/view_rec.php?id=2429

Increasing human dominance of worlds ecosystems

1. Humans have radically altered ecosystems in last 50 years.
2. Changes have brought gains but at growing costs that threaten achievement of development goals.
 - Degradation of many ecosystem services
 - Increased risk of abrupt changes in ecosystems
 - Growing harm to poor people



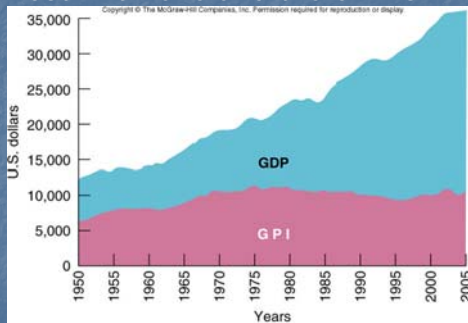
Millennium Assessment Project Main Findings

Millennium Assessment Project Balance Sheet

Enhanced	Degraded	Mixed
Crops	Capture fisheries	Timber
Livestock	Wild foods	Fiber
Aquaculture	Wood fuel	Water regulation
Carbon sequestration	Genetic resources	Disease regulation
	Biochemicals	Recreation & ecotourism
	Fresh Water	
	Air quality regulation	
	Regional & local climate regulation	
	Erosion regulation	
	Water purification	
	Pest regulation	
	Pollination	
	Natural Hazard regulation	
	Spiritual & religious	
	Aesthetic values	

Bottom Line: 60% of Ecosystem Services are Degraded

Real concerns over long term prospects for both humans and the environment



US GDP rises but GPI, a wider indicator that considers natural resource depletion, environmental damage and options for future generations, has not

IPCC Synthesis, Nov. 2007

- Warming of the climate system is **unequivocal**.
- 100 year linear trend shows increase of 0.74 C (1.3 F)
- Most of the observed increase since the mid-20th century is **very likely** due to the observed increase in human caused GHG concentrations.
- Observational evidence from all continents and most oceans shows that **many natural systems** are being affected by regional climate changes.
- There is **high agreement and much evidence** that with current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades.
- There is **high confidence** that neither adaptation nor mitigation alone can avoid all climate change impacts; however, they can complement each other and together can significantly reduce the risks of climate change.

- Should we merely observe and adapt to the changes or act to reverse the trends?



Time for a Change?

What Started It Off ...

(not really but this got everyone's attention)

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The World Commission on Environment and Development, 1987. *Our Common Future*, p. 43.

How Many People Can the Earth Support?

It Depends on

1. How many at what average level of material well-being?
2. How many with what distribution of material well-being?
3. How many with what technology?
4. How many with what domestic and international political institutions?
5. How many with what domestic and international economic arrangements?

6. How many with what domestic and international demographic arrangements?
7. How many in what physical, chemical and biological environments?
8. How many with what variability or stability?
9. How many with what risk or robustness?
10. How many for how long?
11. How many with what values, tastes and fashions.

From Cohen, 1995. *How Many People Can the World Support?*

Sustainability

- Hundreds of definitions ...
- Many complicating issues, but
- A common theme is emerging

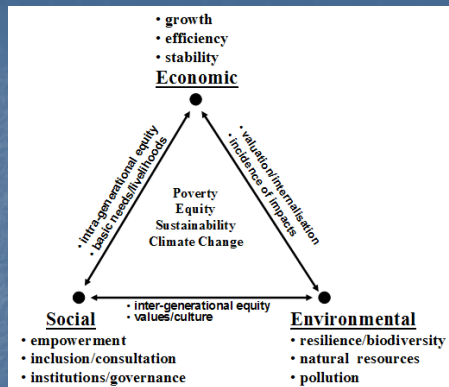


Figure 1. Sustainable development triangle – key elements and links
 Source: : Munasinghe, 2007. Adapted from Munasinghe, 1992, 1994.
http://www.eoearth.org/article/Sustainomics_and_sustainable_development.

Widespread Interest

- World, e.g., UN (2005-14 Decade for Education for Sustainable Development)
- National Governments, e.g., US President's Council on Sustainable Development (under President Clinton)
- Businesses, e.g., World Business Council for Sustainable Development
- Universities, e.g., aashe.org
- NGO's, e.g., World Wildlife Fund
- Communities
- Citizens

WORLD ECONOMIC FORUM
COMMITTED TO IMPROVING THE FUTURE OF THE WORLD.

Global Risks 2008
A Global Risk Network Report

“Food security, at the nexus of a number of issues from energy security to climate change and water scarcity, may be emerging as one of the major risks of the 21st century. Long- and short-term drivers - population growth, changing lifestyles, climate change and the growing use of food crops for biofuels - may be shifting the world into a period of more volatile and sustained high prices. The consequences, particularly for the most vulnerable communities, may be harsh.” (p. 6)

UNIVERSITY OF
Wharton School Risk Center
Zürich Financial Services



THE APPSI INSTITUTE
Beyond Grey Pinstripes
2007-2008

Preparing MBAs
for Social and
Environmental
Stewardship

Rankings:

- Stanford
- Michigan
- York (Canada)
- UC Berkeley
- Notre Dame
- Columbia
- Cornell
- Duquesne
- Yale
- IE Business School (Spain)

Metrics

If it doesn't get measured, it doesn't get done.

- Countries
- Businesses
- Universities
- NGO's
- Communities
- Citizens

Metrics Overview

Macro-level indicators for economies as a whole

STATE OF THE WORLD 2008

A New Bottom Line for Progress

Table 2-1. Sustainable Development Objectives and Macroeconomic Indicators

Economic Objective	Sample Indicators and Desired Direction of Effect	Description
Genuine human progress	Genuine progress indicator (+)	Aggregate index of sustainable economic welfare
	Happy planet index (+)	Aggregate index of well-being based on life satisfaction, life expectancy, and ecological footprint
	Well-being index (+)	Aggregate index of well-being based on health, wealth, knowledge, community, and equity
	Human development index (+)	Aggregate index of well-being based on income, life expectancy, and education
Renewable energy platform	Carbon footprint (-)	Provides spatial and intensity measures of life cycle carbon emissions
	Energy return on investment (+)	Ratio between energy a resource provides and the amount of energy required to produce it
	Energy intensity (-)	Energy used per unit of economic output

From: Talberth. 2008. in: *State of the World 2008*

Social equity	Index of representational equity (-)	Measures consistency between ethnic composition of elected officials and that of the general population; zero indicates "perfect" consistency
	GINI coefficient (-)	Measures extent to which an income distribution deviates from an equitable distribution; zero indicating "perfect" equity
	Legal rights index (+)	Measures degree to which collateral and bankruptcy laws protect rights of borrowers and lenders, scale of 0 to 10.
	Access to improved water and sanitation (+)	Percent of population with access to improved water and sanitation services
Protect and restore natural capital	Ecological footprint (-)	Ecologically productive land and ocean area appropriated by consumption activities
	Genuine savings (+)	Net investment in human-built and natural capital stocks adjusted for environmental quality changes
	Environmental sustainability index (+)	Weighted average of 21 separate environmental sustainability indicators
Economic localization	Local employment and income multiplier effect (+)	Direct, indirect, and induced local economic activity generated by a given expenditure
	Ogive index of economic diversity (-)	Measures how well actual industrial structure matches an ideal structure; zero indicates "perfect" diversity
	Miles to market (-)	Average distance a group of products travels before final sale

Micro-Level Indicators for Institutions/Businesses

Table 2-3. Sustainable Development Objectives and Microeconomic Indicators

Economic Objective	Sample Indicators and Desired Direction of Effect	Description
Sustainability certification	Percent certified (+)	Percent of goods, services, and materials procured from certified sources
	Sustainability reporting compliance (+)	Degree of consistency with Global Reporting Initiative (GRI) or similar standards
	Pacific sustainability index score (+)	PSI score based on environmental, economic, and social criteria for relevant sector
Zero waste	Recycling rate (+)	Percent of waste stream recycled
	Emissions (-)	Air and water emissions including greenhouse gases total and per unit output
	Longevity (+)	Useful product life
Eco-efficiency	Recycled content (+)	Percent of materials used as inputs that are recycled
	Intensity (-)	Energy, water, and materials use per unit output
	Facility rating (+)	Level of LEED certification for buildings and facilities
Workplace well-being	Job satisfaction (+)	Average scores from employee satisfaction surveys
	Turnover rate (-)	Percent of employees voluntarily or involuntarily leaving organization each year by category
	Commuting (-)	Employee vehicle miles traveled
Community vitality	Local procurement (+)	Proportion of spending on goods and services provided by locally owned businesses
	Local economic impact (+)	Direct, indirect, and induced economic impact of local expenditures
	Community support (+)	Value of cash and in-kind goods and services donated for public benefit
	Living wage ratio (+)	Ratio of wage rate paid to living wage for relevant employment categories

What's Up at the University Level?

aashe.org



Association for the Advancement of Sustainability in Higher Education

Serving the Campus Sustainability Community

Member Spotlight



Home

Welcome!

About AASHE

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Professional Development

Resource Center

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FAQs

AASHE, the Association for the Advancement of Sustainability in Higher Education, is a member organization of colleges and universities working to advance sustainability in higher education. We work in partnership with businesses, nonprofit organizations and government agencies that support our mission.

Visit our [Resource Center](#) for information to support your campus sustainability work. Some resources are only available to people at [member institutions](#). If your institution is a member, you can use your email address to [ask AASHE](#).

To see how your campus, nonprofit or business can join AASHE, visit our [membership page](#).

The [AASHE Bulletin](#) is a free weekly e-newsletter with campus sustainability news, events, and opportunities.

University of New Hampshire is our member

Sustainability in Higher Education Assessment Framework

From: <http://www.aashe.org/resources/sheaf.php>

1. Institutional Commitment
2. Academics
3. Buildings
4. Campus Culture
5. Community Service and Civic Engagement
6. Dining Services
7. Diversity and Social Justice

Sustainability in Higher Education Assessment Framework

8. Employee Well-being
9. Energy and Climate Change
10. Grounds
11. Investment
12. Purchasing
13. Transportation
14. Waste
15. Water

Sustainability in Higher Education Assessment Framework Data Submission Form

- Excel spreadsheet seeks details and citations
- Separate sheets on data form cover all 15 aspects of sustainability

Buildings

Metrics

Space utilization (total area of conditioned buildings per FTCU)

Percentage of square footage of new construction planned for the next 5 years that will be built to at least LEED Silver standards

Strategies

Which of the following sustainable building strategies are currently in place at the institution?

Green building policy for all new construction

To what standard:

URL:

Elaborate:

Green building policy for major renovations

To what standard:

URL:

Elaborate:

Energy

Metrics

Total MBTU (electricity plus temperature control) per FTCU

Percentage of electricity consumption derived from "new" renewables (e.g. wind, solar, low impact hydro, geothermal etc.; may include purchase of renewable energy credits)

Percentage of greenhouse gas emissions offset through purchase of carbon offsets

Total BTU (electricity plus temperature control) per conditioned square foot over the last 5 years:

2001-02

02-03

03-04

04-05

05-06

Academics

Metrics

None for this section

Strategies

Which of the following strategies are currently in place at the institution to make sustainability a focus of curriculum and research?

Students are required to take a course on sustainability in order to graduate

Elaborate:

Course on sustainability is an option to meet general education requirements

Elaborate:

Conclusions

- There is increasing concern over long term prospects for human health and the environment
- Sustainability seeks to address imbalances
- Efforts are being undertaken at multiple levels by diverse constituencies.
- To succeed sustainable development will require commitment at all levels – but what is the alternative?
- Many are already on the journey. Join in.

Contact me for references or other information:

hunt.brown@wright.edu