

# Introduction to Sustainability Concepts and Theories

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# Outline

- Historical evolution of sustainability
- Definitions
- Key concepts, theories, and ideas
- PSU's sustainability programs
  - Facilities and operations
  - Academics -- research and instruction

# Historical evolution

- Stockholm Conference on Human Environment (1970)
- World Conservation Strategy (1980)
- Natural Step (1980s)
- World Commission on Environment and Development's 'Our Common Future' (1987)
- UN (Rio) Conference on Environment and Development (UNCED) (1992)
- UN Session on Agenda 21 (1997)
- UN Johannesburg Conference (2002)
- Early focus on environmental issues; now expanding to social and economic concerns.

# Sustainability initiatives

- U.N.
- U.S. Government (DOD, EPA, DOE)
- States (Oregon Sustainability Directives)
- Cities (Portland Office of SD)
- Local communities (watershed groups)
- Non-profit organizations (Natural Step)
- Business groups (trade associations)

# Definitions

- Brundtland Commission – Sustainable development meets the needs of the present without compromising the ability of future generations to meet their needs.
- Reconciliation of society's development goals with its environmental limits over the long term (*Our Common Journey*, National Research Council)
- Simultaneous achievement of economic prosperity, a healthy environment, and social equity for current and future generations.

# What is different?

- Timeframe – inter-generational focus challenges short term planning and “discounting” future values.
- Asks us to think about connection between economic, social, and environmental issues
- Why is this difficult???
  - Think about how we are organized
  - Think about how we are educated!

# Institutional structures

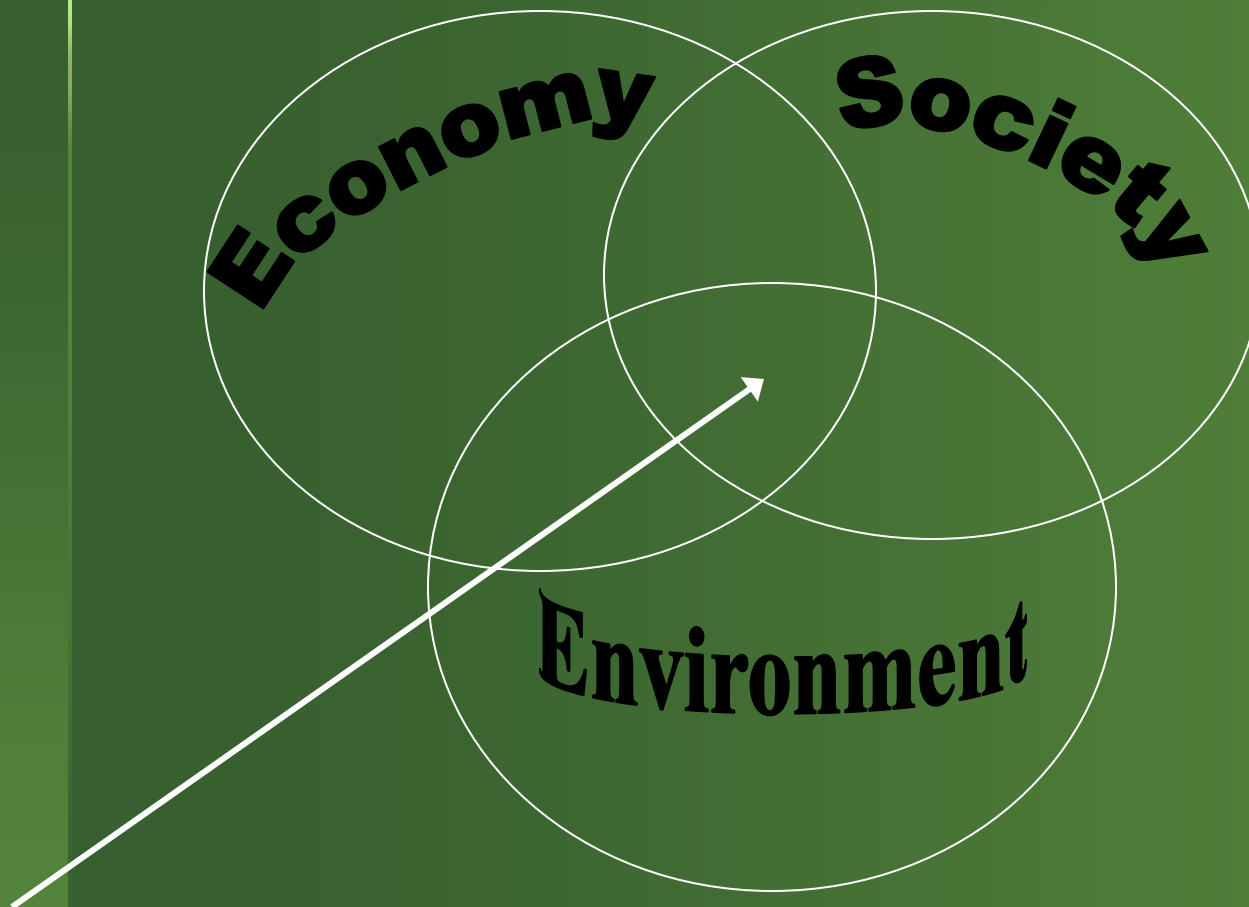
- Government - Agency focus
  - Policies - Air, water, health, food, etc - all addressed separately
  - Universities, schools - Disciplinary focus
  - Businesses – Budgets often fragmented – capital vs. operating
- > Institutional and organizational issues pose major challenges

# Three components of sustainability

- 1. Environment** – maintaining the earth's life support system (e.g., ecosystem services such as pollution filtering).
- 2. Social** – maintaining community (civic) capacity that fosters effective participation and 'equitable' treatment of all stakeholders.
- 3. Economic** – maintaining an economic system that provides a non-declining standard of living for this and future generations.



# Integration as Key Sustainability Principle



Source: Axis Performance Advisers

Environmentalist View



Humanist View



# Evolving sustainability theories

- **Early community development model** – study environment, society and economy as separate disciplines (circles of influence)
- **Popular sustainability theory** – emphasize links between environment, society and economy
- **'Ideal' scientific model** – three circles: largest is 'environment', second 'social' circle lies within largest, and 'economy' lies within social; use systems approach to incorporate linkages (dependencies) and feedback effects between all three spheres

# Key concepts

- **Ecosystem stability and resilience** – magnitude of disturbance that can be absorbed before the system changes structure.
- **Systems theory** -- suggests that ecological, social, and economic systems are a group of interrelated, interacting or interdependent constituents forming a complex whole.
- **Scale and place matter.** Why?

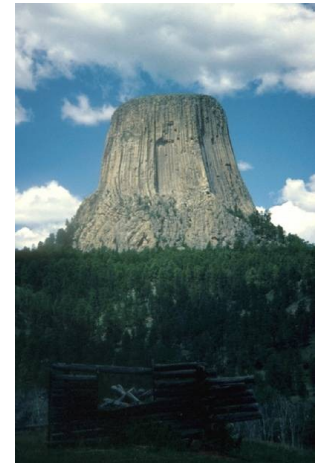
# Natural Systems are diverse and complex...



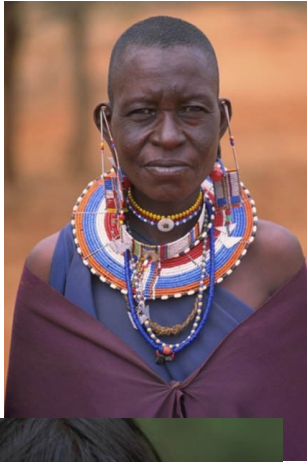
...evolving and adaptive....



# The integrity of these systems is key to their resilience



# Social systems are also diverse....





...complex...



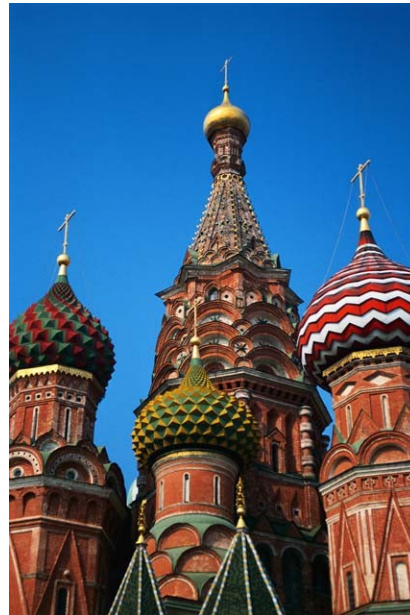
...and maintaining their integrity and diversity is key.....



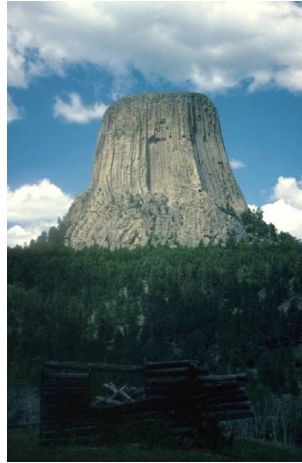
...to allow them to evolve and adapt.....



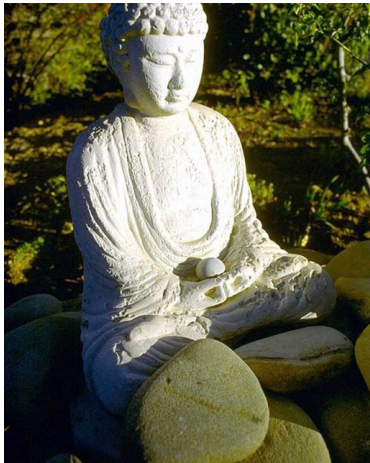
...to the changing world we live in



# Different systems have different requirements...



# One size does not fit all....



## Key concepts cont'd.

- **Capital** – natural, manmade, financial, human, and social assets that deliver services into the future.
- **Equity** – intra-generational, i.e., current groups, and inter-generational, i.e., over generations
- **Economic viability** – maintaining firm profitability and government solvency.

# Guiding principles

1. Maintain sufficient stocks of capital (natural, manmade, human and social) through use and investment such that future generations can achieve at least the same quality of life as current generations.
2. Assure equitable distributions of capital forms across contemporary groups and countries and across generations.



# Key questions

1. To what degree can manmade and human capital substitute for forms of natural capital? (strong vs. weak sustainability)
2. Will we encounter irreversible thresholds for certain 'critical' natural capital?
3. How do we engage relevant groups to identify the values that define sustainability goals and equity?
4. How can nonmarket environmental and human services be counted in market-based economy?
5. Do we have adequate science and data to assess progress?

# Roles in Pursuing Sustainability

1. What roles can/should the business sector play in moving toward sustainability?
2. What changes in government programs & policy are necessary to pursue sustainability goals?
3. What roles can/should non-profit organizations play?
4. What roles can/should universities play in fostering sound decisions about sustainability?

# Take away ideas

- Environmental, social and economic systems must work in complementary ways, not at odds.
- Pursuing sustainability is a continuing process, not an end state.
- Uncertainty in science and politics pervades the process.
- 'Learning by doing' and adaptive management are necessary.
- Partnerships and integration are essential.
- One size does not fit all.

## Bottom line

- Sustainability is increasingly accepted as a goal by developed and developing countries, businesses, and non-profits.
- There is a need for more rigorous scholarship and innovative practices.
- Portland and Oregon are seen as national and international leaders in sustainability.
- PSU has a unique opportunity and responsibility in sustainability research, education and practice.

# PSU Motto

Doctrina Urbi  
Serviat

“Let Knowledge  
Serve the City”



# PSU Sustainability Vision & Mission

**VISION:** To be an internationally recognized university known for excellence in student learning, innovative research, and community engagement that simultaneously advance economic vitality, environmental health, and quality of life.

**MISSION:** Serve as a leading academic laboratory for developing sustainable processes and practices using multi-disciplinary approaches in partnership with business, government, and other organizations.

# Sustainability Declaration(2005)

1. Infuse sustainability into all colleges, schools and programs.
2. Develop a sustainable physical campus that is an example to other institutions.
3. Make Portland State a demonstration model of sustainable processes and practices.
4. Develop core multidisciplinary research competencies in key sustainability areas related to pressing real world problems.

## Innovate sustainable practices as demonstration models

- Transportation alternatives (2005 Portland BEST Award)
- Green buildings – Epler Hall and Broadway Housing (2005 Portland BEST Award)
- Waste management and recycling
- Sustainable food services (2006 BEST Award)
- Solar energy array on Cramer Hall



# Infuse sustainability into curriculum

- Undergraduate minors
  - Sustainability (Environmental Science and Resources)
  - Sustainable Urban Development (Urban Studies and Planning)
- Graduate certificate (university-wide)
  - Four core courses (environmental, social, economic, and systems integration)
  - Two approved electives

## Develop core multidisciplinary research competencies

- Center for Sustainable Processes & Practices (CSP2)
  - Place for rigorous, cross-disciplinary research with integrated environmental, social and economic components
  - Locus for collaborative research and dialogue with academic and community participants
  - Institutional support for building a resource base

# What's on the horizon?

- PSU, in collaboration with OSU, U of O, and OIT is helping to develop a signature research center on clean energy, bio-based products green buildings and development (Bio-economy and Sustainable Technologies or BEST).
- Developing research and education collaborations with foreign universities, e.g., Tongji (China).
- 'Focus the Nation' educational initiative on global warming and clean energy
- Climate change research and education

*Portland State University –  
Sustainable by Nature*