

Sustainability development

Dr.S.Umamaheswari



TREN 1F90

Introduction to Sustainability

◆ Definitions

- environment
- policy
- scale
- jurisdiction

◆ Defining Sustainable Development

◆ About Interdisciplinarity

Environmental effects

3 main ways - through the flows of:

- MATERIALS
- ENERGY
- INFORMATION

-> fundamental 'spheres of influence' for sustainability



Scale

may be:

- **physical / geographical**
 - ranking based upon size, dimension, geographical subunit, etc.
- **ecological**
 - individual, deme, community, population
- **jurisdictional**
 - local, municipal, regional, federal, global



scale



Jurisdiction

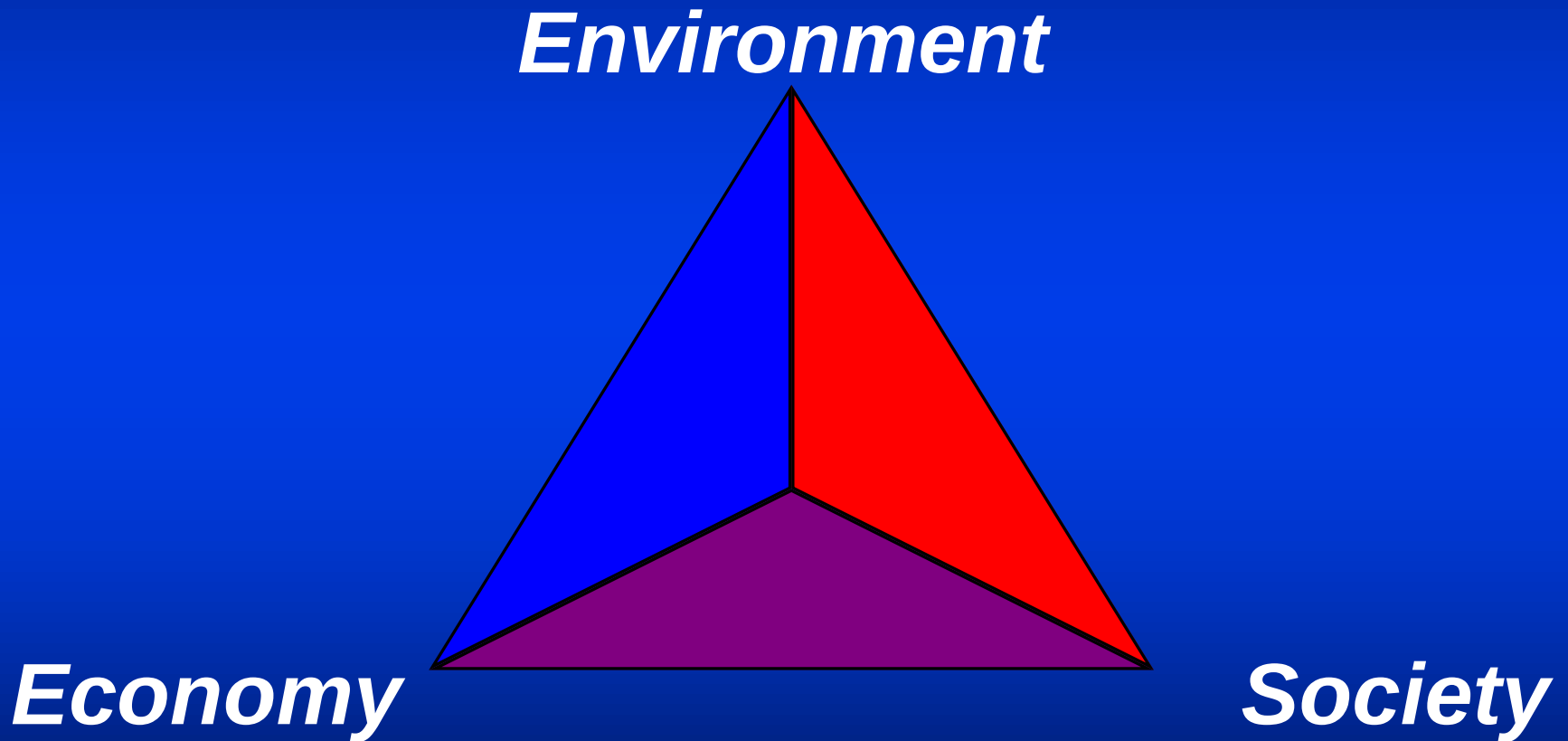
- the legal power to administer and enforce the law
- the exercising of this power
- the region within which this power is valid or in which a person has authority
- authority

- *Webster's Encyclopedic Dictionary*

Sustainable development:

- ◆ meeting the needs of the present without compromising the ability of future generations to meet their own needs.
 - World Commission on Environment and Development (1987): *Our Common Future*

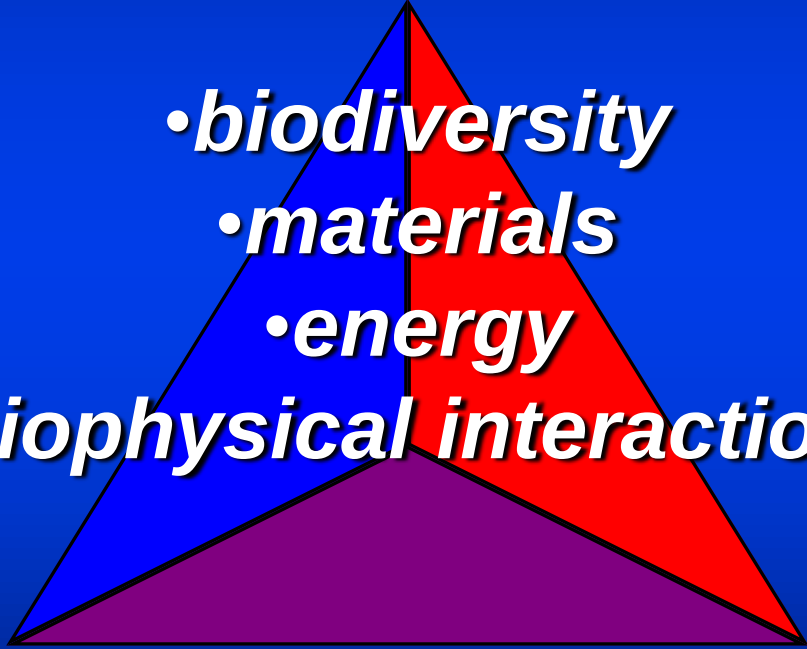
Elements of sustainability



- *World Commission on Environment and Development, 1987*

Elements of sustainability

Environment

- 
- *biodiversity*
 - *materials*
 - *energy*
 - *biophysical interactions*

Elements of sustainability



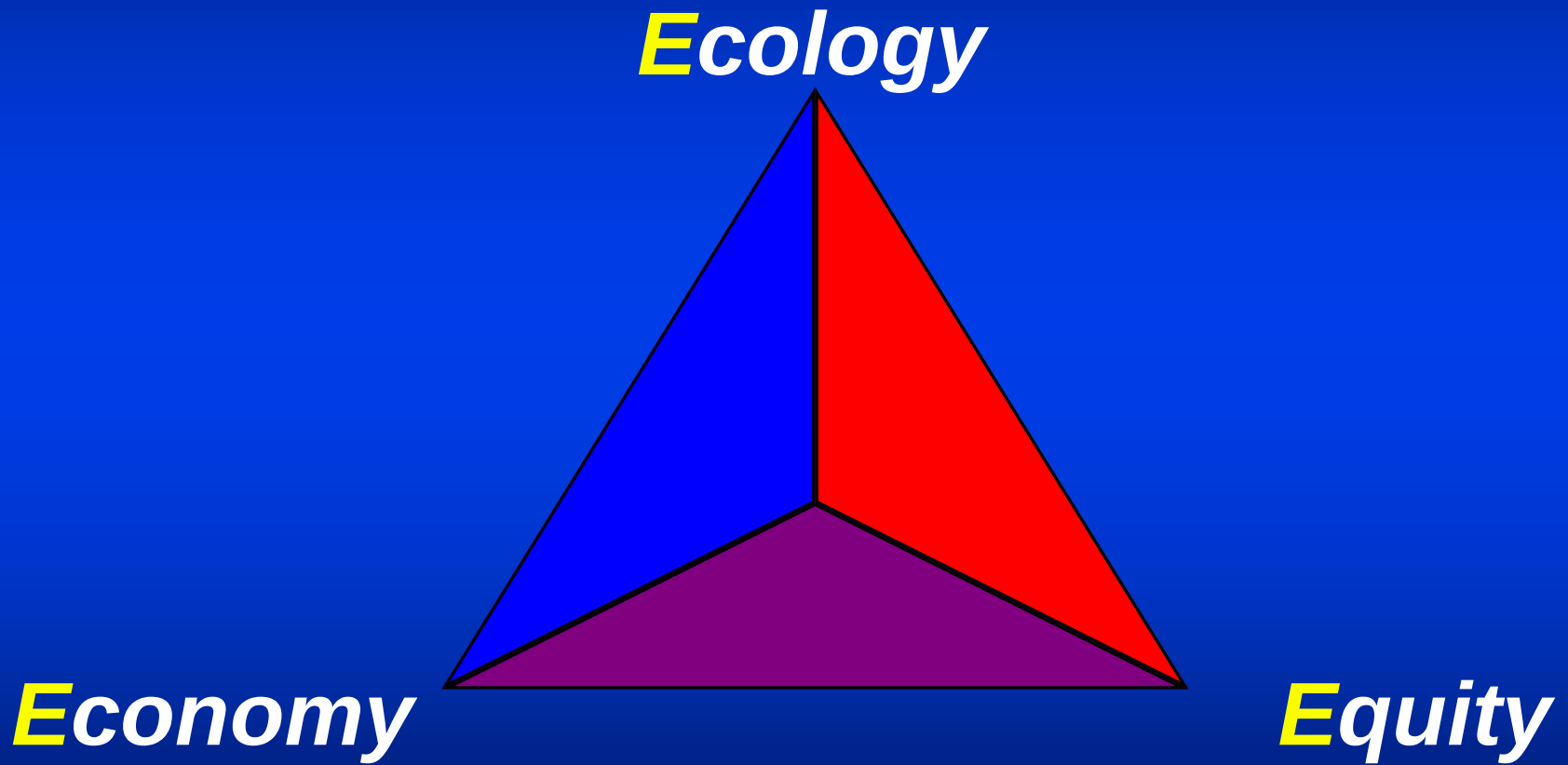
Economy

Elements of sustainability

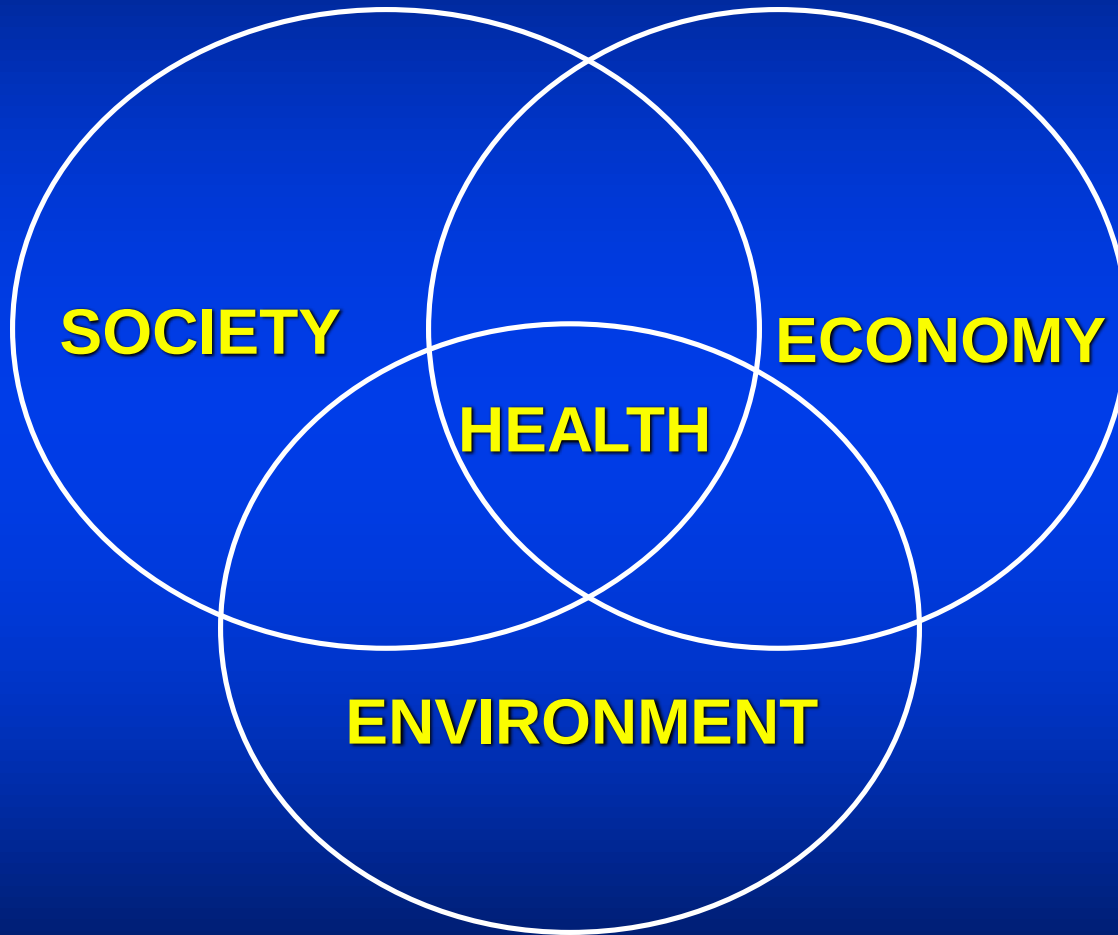
- 
- *human diversity (cultural, linguistic, ethnic)*
 - *equity (dependence / independence)*
 - *quality of life*
 - *institutional structures and organization*
 - *political structures*

Society

The '3 Es' Model



The Healthy Community Model



Sustainability: PROBLEMS

- ◆ **Depletion of finite resources**
 - fuels, soil, minerals, species
- ◆ **Over-use of renewable resources**
 - forests, fish & wildlife, fertility, public funds
- ◆ **Pollution**
 - air, water, soil
- ◆ **Inequity**
 - economic, political, social, gender
- ◆ **Species loss**
 - endangered species and spaces

Sustainability: SOLUTIONS

- ◆ **Cyclical material use**
 - emulate natural cycles; 3 R's
- ◆ **Safe reliable energy**
 - conservation, renewable energy, substitution, interim measures
- ◆ **Life-based interests**
 - health, creativity, communication, coordination, appreciation, learning, intellectual and spiritual development

Two key sustainable development concepts:

EQUITY

LIMITS TO GROWTH

Two key sustainable development concepts:

the concept of needs, particularly the essential needs of the world's poor

Contrast with:

EQUALITY

- the state or quality of being equal; correspondence in quantity, degree, value, rank, or ability.
- uniform character, as of motion or surface.

Two key sustainable development concepts:

The idea of limitations (ecological, technological, and social) which affect the environment's ability to meet present and future needs



LIMITS TO GROWTH

- *quantitative and qualitative limits*
- *living within the regenerative and assimilative capacities of the planet*

Sustainable development...

◆ implies limits

Not predefined absolute limits, but limitations imposed by:

- the ability of the biosphere to absorb the effects of human activities
- adaptability of human social and political organization
- technology

Sustainable development and economic growth

Economic growth must be made:

- less material intensive ('dematerialization of the economy')**
- less energy intensive**
- more equitable in its impacts**

◆ Economic growth may be reduced or curtailed to meet limitations imposed by environment, technology, or society

Institutional gaps impeding sustainable development

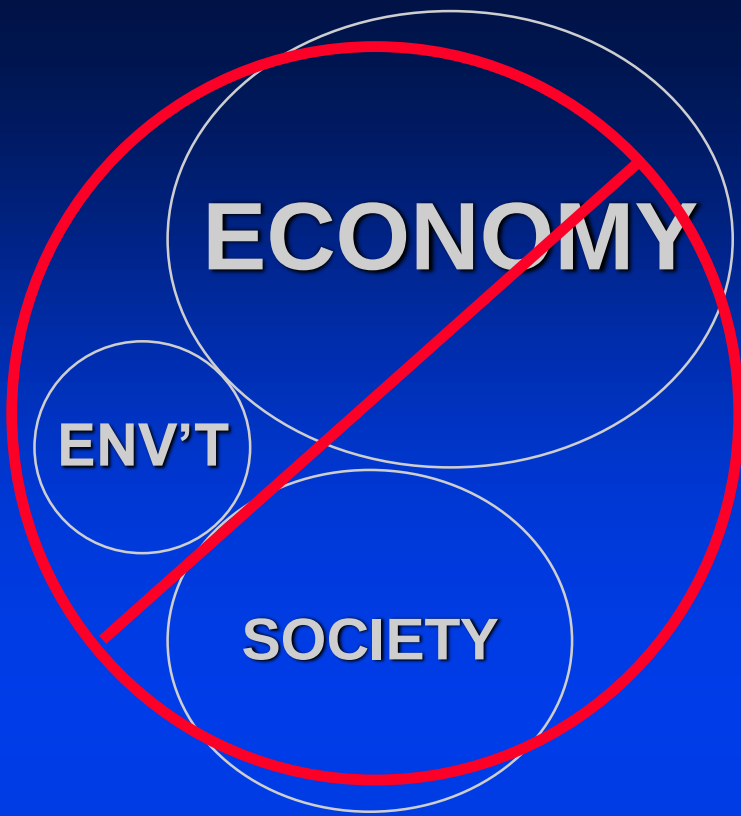
2 major gaps:

- ◆ **fragmented decision making**

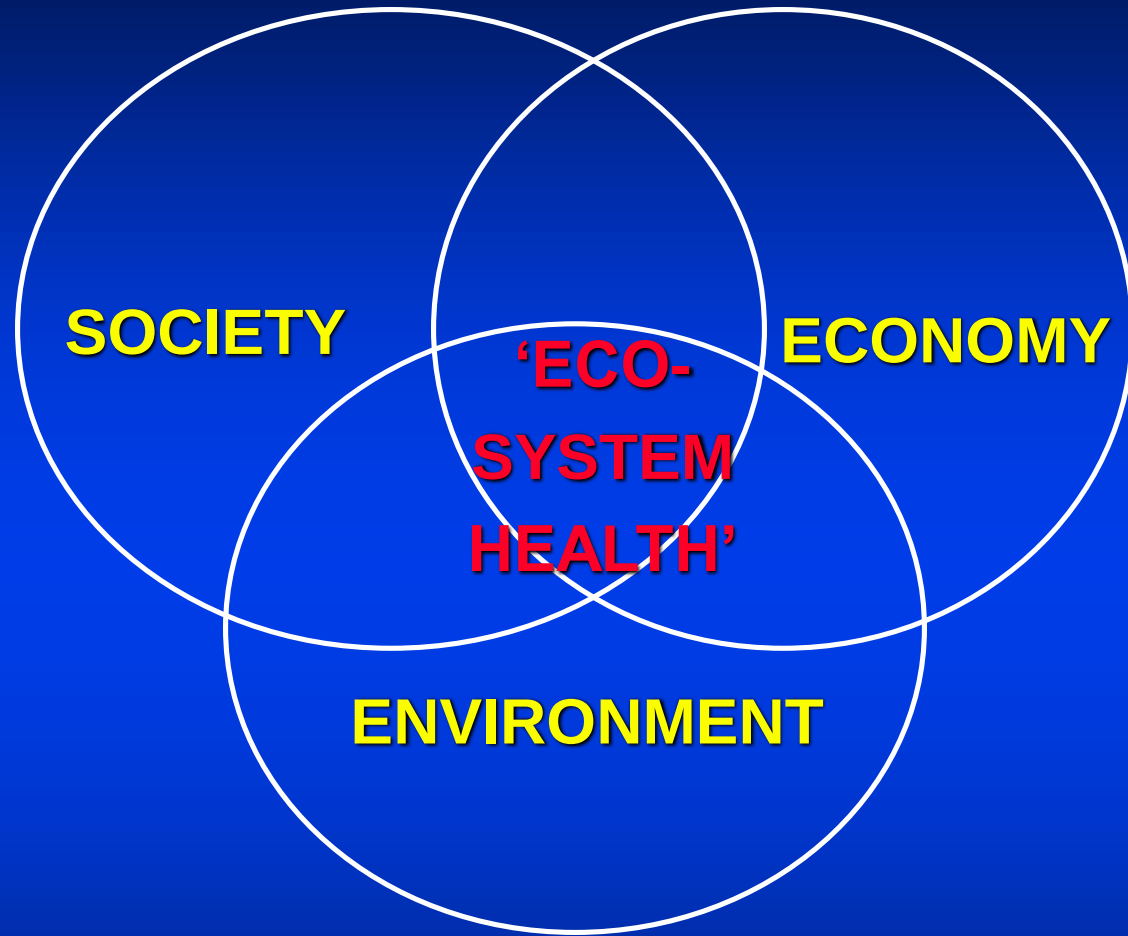
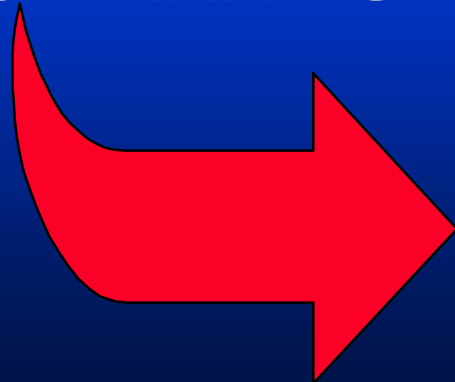
- narrow mandates, jurisdictional rigidity, lack of communication and coordination

- ◆ **lack of accountability**

- failure to make the bodies whose policy actions degrade the environment responsible for their actions

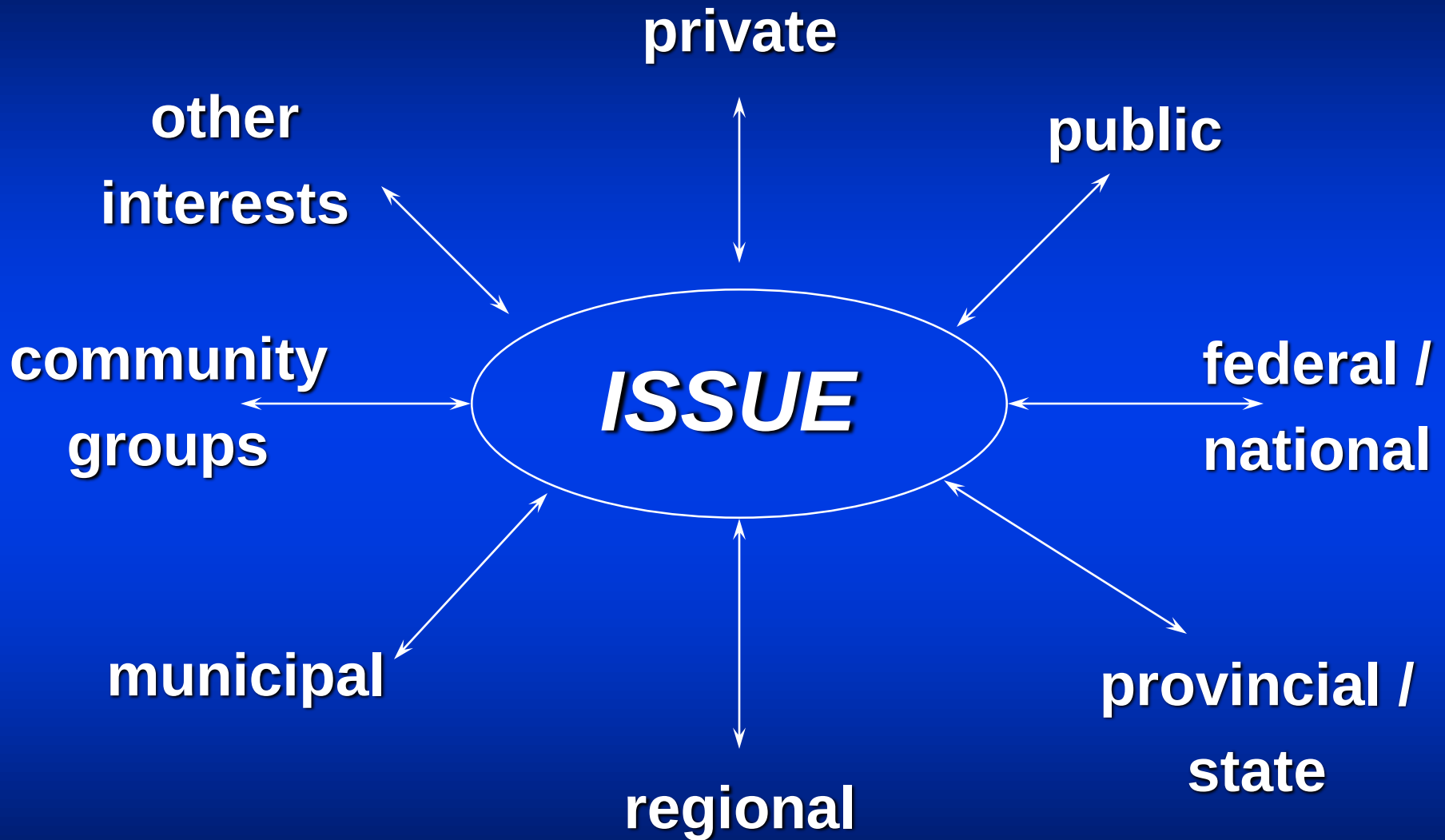


**TRADITIONAL
DECISION MAKING**



**ECOSYSTEM-BASED
DECISION MAKING**

Fragmented decision-making

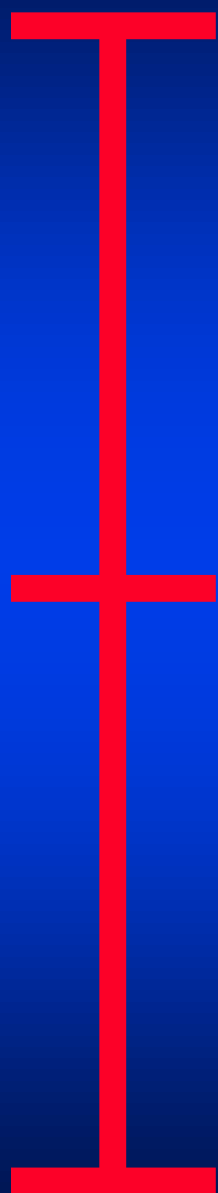


Integrated decision-making



Environment AND Economy

- ◆ \$1 million to develop new process
- ◆ \$4 million savings in first year (no CFCs)
- ◆ \$50 million savings to year 2000
- ◆ international environmental prize -> great publicity
- ◆ contract with Mexico for industrial innovation (very lucrative)



• *radical*

• *anticipatory*

• *reactive*

Industry

• ***change in demand for product***

• ***change in industrial process***

• ***sewage treatment plant for wastes***

Biodiversity

• ***apply landscape ecology principles to human activity***

• ***establish national parks (12%) to protect habitats***

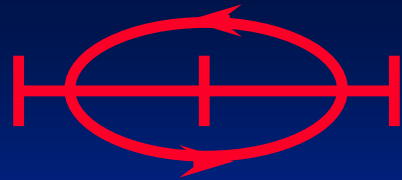
• ***zoo / seed bank for endangered species***

Transportation

• ***complete redesign of our cities***

• ***alternative fuels for cars***

• ***catalytic converters***



interactions amongst **values / ideologies / strategies**

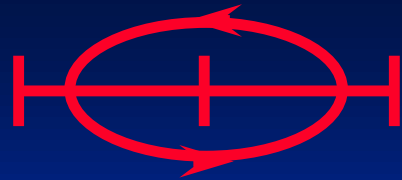
values

individual, cultural, social, spiritual, moral

Definable sets of values constitute

ideologies

*Short form summary of basic values that
eliminates the need to engage in deep
philosophical investigations every time action is
required*



interactions amongst **values / ideologies / strategies**

values

individual, cultural, social, spiritual, moral

Definable sets of values constitute

ideologies

*(e.g. Industrial Capitalism, Marxism, Christianity,
Liberalism, Socialism, Conservatism, Judaism)*

...which give rise to

strategies

*practical applications of ideologically consistent
ideas, actions, policies and programs*

Environmental values

- *holistic perspective*
 - *everything is connected to everything else*
 - *parts can only be understood in the context of the whole*
 - *nature as a living organism or system*
- values ideology strategies

(after Macdonald, D. 1991. *The Politics of Pollution*.
McClelland and Stewart, Toronto: p.33)

Environmental values

- ***humans living within nature***
 - > *inherent value of other organisms and inanimate objects*

- ***limits to growth***

values

ideology

strategies

(after Macdonald, D. 1991. *The Politics of Pollution*.
McClelland and Stewart, Toronto: p.33)

Environmental values

- *appropriate technology*
 - *matching the scope and scale of technology to the task at hand*
 - *principles of durability and efficiency*
values ideology strategies
 - *recognition that new technology brings both benefits and problems*

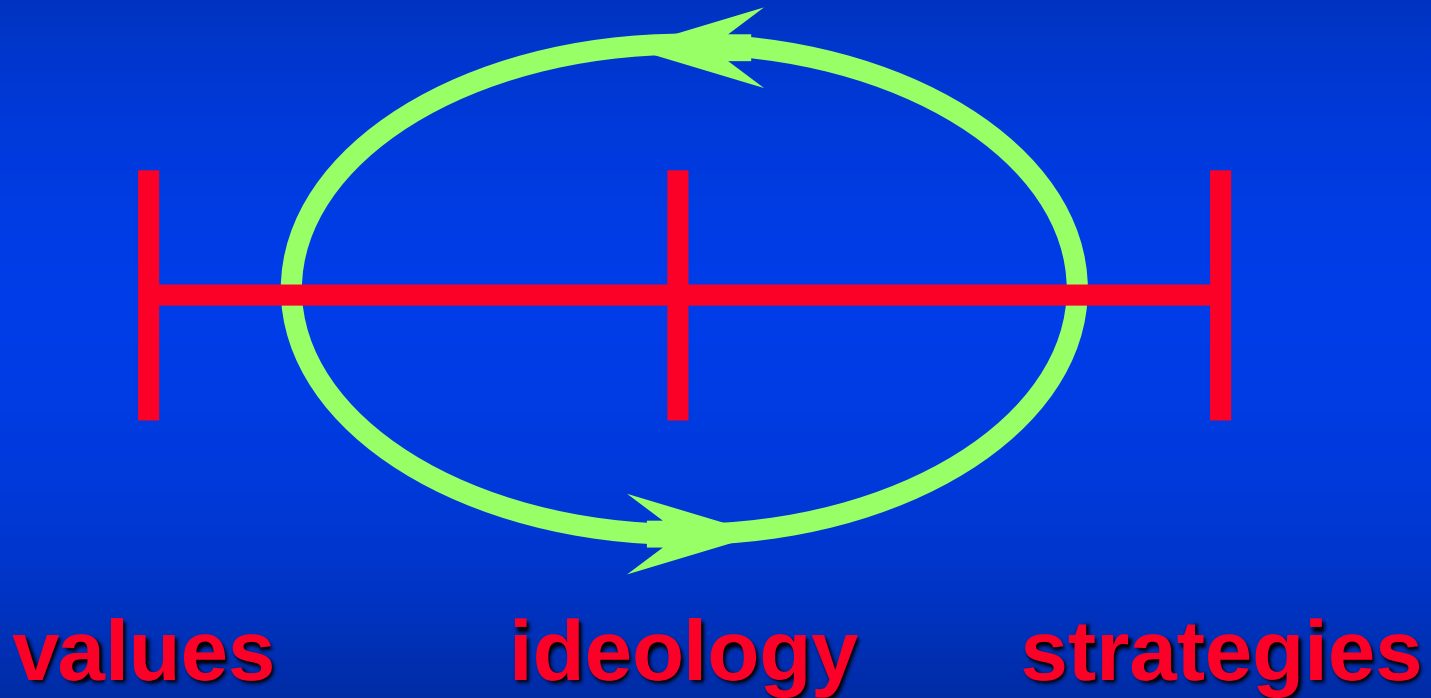
Environmental values

- ***appropriate scale***

- *appropriate sizes for institutions, social organizations, communities*

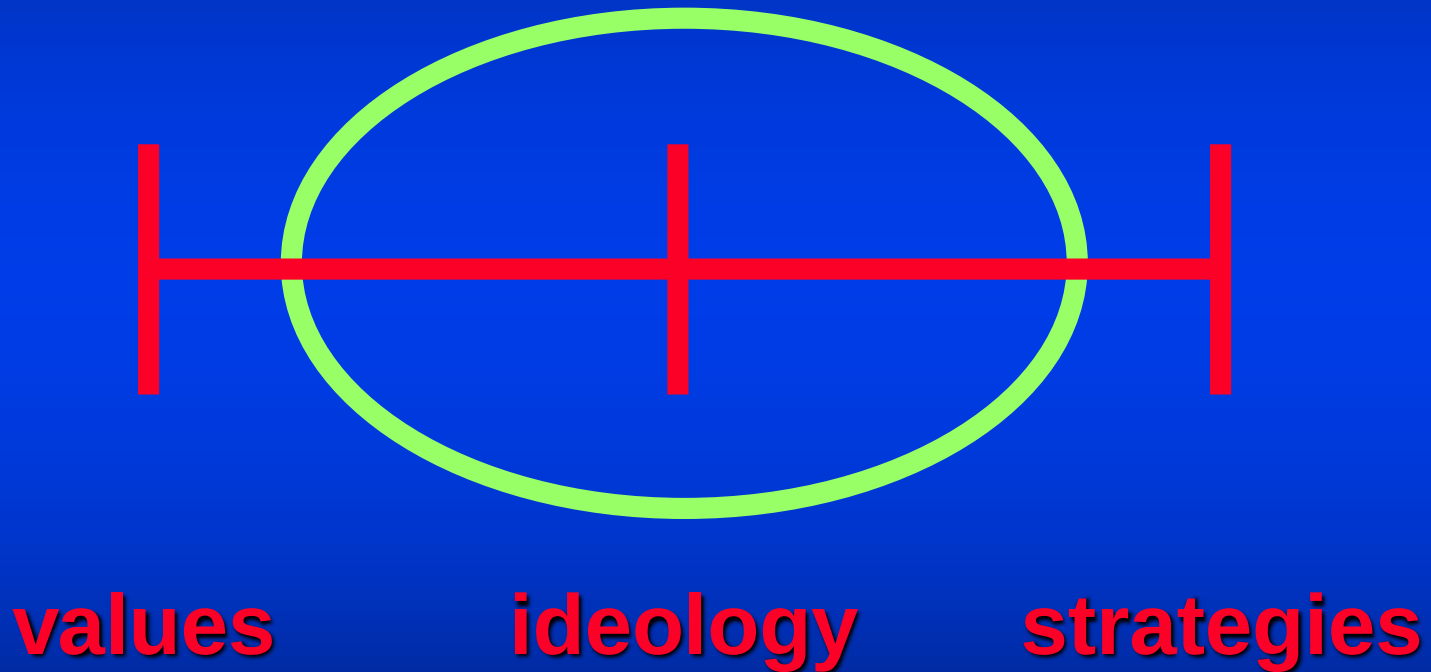
- ***accessible and accountable decision-making***
values ideology strategies
in public and private sectors

interactions amongst **values / ideologies / strategies**



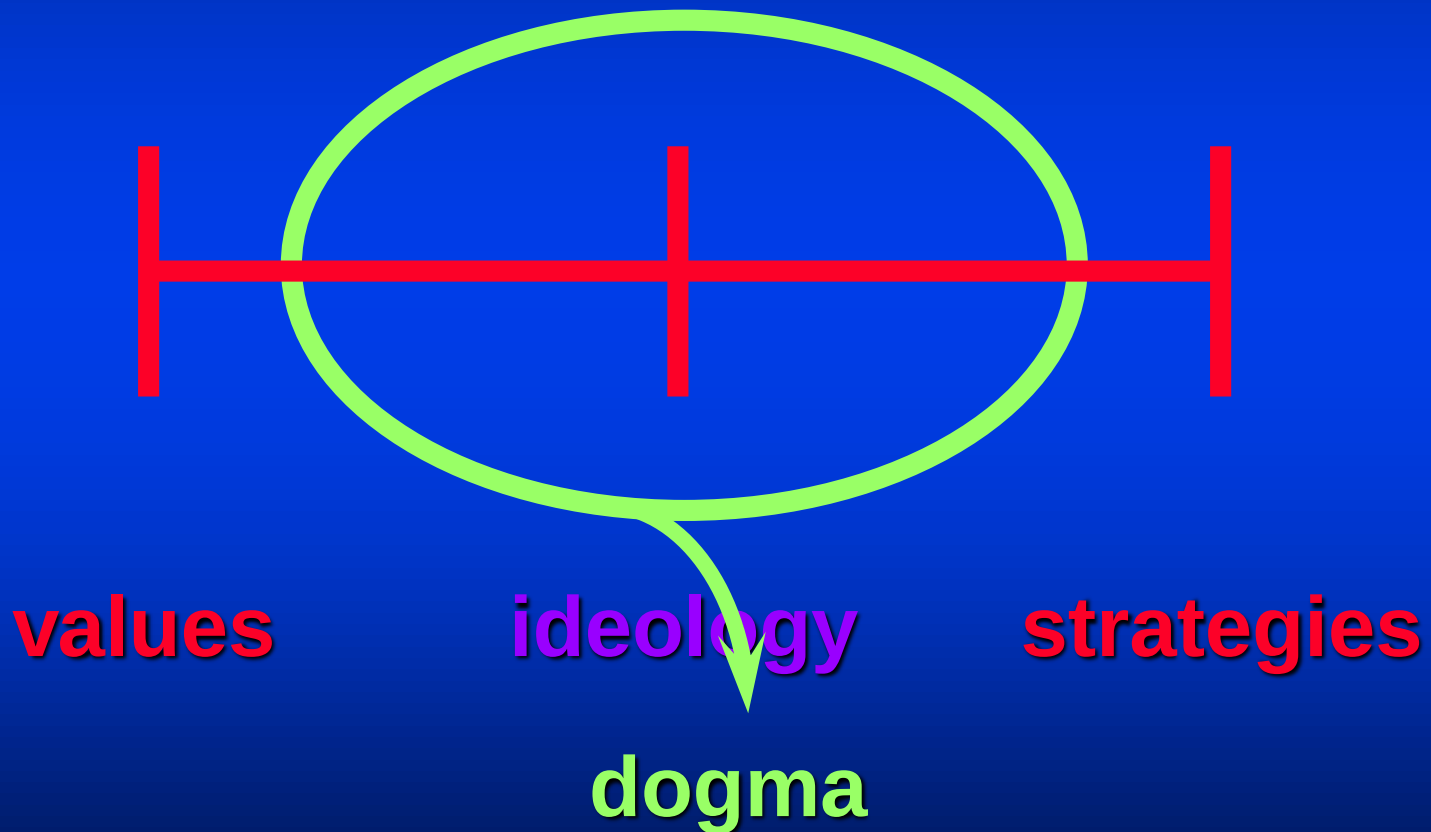
- *feedback loop allows for reflection, re-evaluation, adaptive management*

interactions amongst **values / ideologies / strategies**



- *if no feedback loop: inflexible, unresponsive*

interactions amongst
values / ideologies / strategies



Sustainability:

*How do we move
from rhetoric to
reality?*

principles

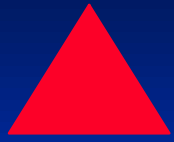


```
graph TD; A[principles] --> B[policy]; B --> C[practice];
```

policy

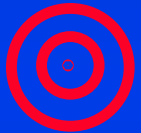


practice



To be useful, principles of sustainability must:

- ◆ be easily understood
- ◆ be applicable in many contexts
- ◆ be transferrable across scales
- ◆ translate well from fundamental values into applied policy and practical action
- ◆ identify possibilities for **radical transformative change** AND **positive incremental change**



Some

Principles of Sustainability

in the literature:

- ◆ Our Common Future (WCED 1987)
- ◆ Principles defining sustainable development (*OSEM 1989*)
- ◆ Defining a sustainable society (*Robinson et al . 1990,1996*)
- ◆ Agenda 21 (1992)
- ◆ Six principles of sustainable development (*ORTEE 1992*)
- ◆ Guideposts for a sustainable future (*Nickerson 1993*)
- ◆ Framework for Sustainable Development (*CIDA 1994*)
- ◆ The Natural Step (*Robert et al . 1994*)
- ◆ Sustainability Principles (*ORTEE 1994*), etc.

disciplinary

Multidisciplinary

Interdisciplinary

Transdisciplinary

- what are the differences?

Reference: Stefanovic, Ingrid. 1996. Interdisciplinarity and Wholeness: Lessons from Eco-Research. *Environments* 23(3): 74-94.

Disciplinary:

- ◆ often associated with discipline-specific vocabularies, methods, and assumptions
- ◆ Examples of disciplines:
sociology, philosophy, biology,
political science, chemistry, economics,
geography, mathematics...

Multidisciplinary:

- ◆ standard disciplinary approaches are applied to a common research question, problem or issue
- ◆ insights achieved through an approach which is essentially *additive* rather than *integrative*

Multidisciplinary:

- ◆ a **spontaneous coalescence** of these disparate approaches is anticipated
- ◆ arguably the approach which produces the most substantive research results

Interdisciplinary:

- ◆ the *issue, problem, or concern* defines the disciplinary expertise which is brought to bear

...arguably the most effective policy-oriented problem-solving approach

Interdisciplinary:

- ◆ a level of integration which involves more than an additive analysis of the disciplinary perspectives
- ◆ insights are achieved through an approach which is explicitly **integrative** -> an *a priori* attempt is made at **synthesis** across disciplinary boundaries

Transdisciplinary:

- ◆ recognizes the interconnectedness of all aspects of reality and knowledge
- ◆ Goal: distinctions amongst disciplines are eliminated completely

Transdisciplinary:

- ◆ “an attempt to transcend the dynamics of a dialectical synthesis to grasp the total dynamics of reality as a whole”
- ◆ Examples of transdisciplinary endeavour:
 - general systems theory
 - phenomenology