

Lecture 7– Resources and the Environment

Sustainable Development

ECON 211 – 70: Economic Development

Chapter 10 Lecture - The Environment and Development



Sustainable Development

Development that meets the needs of the people today without compromising the ability of future generations to meet their own needs.



Environment and Development: The Basic Issues

- Environmental issues affect, and are affected by, economic development
- Classic market failures lead to too much environmental degradation
- Poverty and lack of education may also lead to non-sustainable use of environmental resources



2

Environment and Development: The Basic Issues

- We define environment capital as the “*Total of renewable and non-renewable natural resources of a country. Though substitutes for some natural resources may be found through technology, most of the natural resources are non-substitutable.*”
- So, running down the capital stock is not consistent with the idea of sustainability
- In developing countries, environmental capital is generally a larger fraction of total capital

3

TABLE 10.1 Principal Health and Productivity Consequences of Environmental Damage

Environmental Problem	Effect on Health	Effect on Productivity
Water pollution and water scarcity	More than 2 million deaths and billions of illnesses a year attributable to pollution; poor household hygiene and added health risks caused by water scarcity	Declining fisheries; rural household time and municipal costs of providing safe water; aquifer depletion leading to irreversible compaction; constraint on economic activity because of water shortages
Air pollution	Many acute and chronic health impacts: Excessive urban particulate matter levels are responsible for 300,000 to 700,000 premature deaths annually and for half of childhood chronic coughing; 400 million to 700 million people, mainly women and children in poor rural areas, affected by smoky indoor air	Restrictions on vehicle and industrial activity during critical episodes; effect of acid rain on forests and water bodies
Solid and hazardous wastes	Diseases spread by rotting garbage and blocked drains; risks from hazardous wastes typically local but often acute	Pollution of groundwater resources

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4

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TABLE 10.1 Principal Health and Productivity Consequences of Environmental Damage

Environmental Problem	Effect on Health	Effect on Productivity
Soil degradation	Reduced nutrition for poor farmers on depleted soils; greater susceptibility to drought	Field productivity losses of 0.5% to 1.5% of GNI common on tropical soils; off-site siltation of reservoirs, river-transport channels, and other hydrologic investments
Deforestation	Localized flooding, leading to death and disease	Loss of sustainable logging potential and of erosion prevention, watershed stability, and carbon sequestration provided by forests
Loss of biodiversity	Potential loss of new drugs	Reduction of ecosystem adaptability and loss of genetic resources
Atmospheric changes	Possible shifts in vector-borne diseases; risks from climatic natural disasters; diseases attributable to ozone depletion (perhaps 300,000 additional cases of skin cancer a year worldwide; 1.7 million cases of cataracts)	Sea-rise damage to coastal investments; regional changes in agricultural productivity; disruption of marine food chain

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5

Ecological Economics and Environmental Economics

- **Environmental (and resource) economics**
 - ☐ The environment ("land") is a "factor of production"
 - ☐ There are substitutes for environmental goods and services
 - ☐ Environmental problems can be addressed by adjustments in the economic systems
- **Ecological economics**
 - ☐ People (and economies) are part of the environment
 - ☐ There are no substitutes for many environmental goods and services
 - ☐ Addressing environmental problems requires contribution of disciplines other than economics

<http://www.worldbank.org/depweb>

6

Why are Environment Issues Different From Other Economic Issues?

- **Environmental questions are usually related to the issue of externalities:**
 - ☐ Situations where the social cost (or benefit) is different from the private
 - ☐ In these cases, the market solution won't be efficient
- **Environmental questions are usually related to resources which are renewable: they can generate themselves, given time, but they cannot be produced once they are extinguished**

7

Environmental Accounting

- **Calculating 'green' GDP**
 - ☐ Valuation of: environmental damages, environmental services, stock of natural capital, environmental expenditure;
 - ☐ Modifying traditional accounting framework and boundaries
- **Satellite accounts**
 - ☐ Valuation of: environmental damages, environmental services, stock of natural capital, environmental expenditure;
 - ☐ complementing national accounts without modifying them; coherent with GDP
- **Natural resource and environmental accounts**
 - ☐ Physical flows and stocks of natural resources. Physical and monetary flows associated with anthropogenic (relating to, or resulting from the influence of human beings on nature) pressures
 - ☐ Independent of and complementary to GDP

8

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Environment and Development: The Basic Issues

Sustainable net national product is:

$$NNI^* = GNI - D_m - D_n$$

Where

- NNI* is sustainable national income
- GNI is Gross national income
- D_m is the depreciation of manufactured capital assets
- D_n is the depreciation of environmental capital

9

Environment and Development: The Basic Issues con't

Sustainable net national product is:

$$NNI^{**} = GNI - D_m - D_n - R - A$$

Where

- NNI** is the revised NNI calculation
 - GNI, D_m, and D_n are defined as before
 - R is expenditure needed to restore environmental capital
 - A is expenditure required to avert destruction of environmental capital
- (Note: R and A are components of GNI but not NNI**)

10

The Poor as Both Agents and Victims of Environmental Degradation

Victims:

- ❑ The poor live in environmentally degraded lands which are less expensive because the rich avoid them
- ❑ People living in poverty have less political clout to reduce pollution where they live
- ❑ Living in less productive polluted lands gives the poor less opportunity to work their way out of poverty

Agents:

- ❑ The high fertility rate of people living in poverty
- ❑ Short time horizon of the poor (by necessity)
- ❑ Land tenure insecurity;
- ❑ Incentives for rainforest resettlement

11

Global Warming and Climate Change: Scope, Migration, and Adaptation

- The benchmark 2007 IPCC report (to be updated in 2014) paints a dire picture for developing economies <http://www.ipcc.ch>
- Recent reports amplify:
 - ❑ Using data not yet available to IPCC report, the 2010 U.S. NOAA study found evidence of global warming due to greenhouse gases on all 11 indicators examined
- Impact of global warming likely hardest on the poorest
- Agriculture harmed in tropical and subtropical areas
- Resultant conflicts over natural resources may grow
- Range of adverse health impacts

12

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Some Impacts of Climate Change in Developing Countries Identified by IPCC

- prolonged droughts, expanded desertification
- increased severity of storms with heavy flooding and erosion
- longer and more severe heat waves
- reduced summer river flow and water shortages
- decreased grain yields

13

Some Impacts of Climate Change in Developing Countries Identified by IPCC

- climate-induced spreading ranges of pests and disease
- lost and contaminated groundwater
- deteriorated freshwater lakes, coastal fisheries, mangroves, coral reefs
- coastal flooding
- loss of essential species such as pollinators and soil organisms,
- forest and crop fires

14



Wajir residents walk past carcasses of livestock in Athibohol, North East of Nairobi, Kenya. Close to 1.4 million people in the region are in dire need of food and water, as a result of the prolonged drought. (AFP)

15

Urban Development and the Environment

- Environmental Problems of Urban Slums
 - ▣ Health threatening pollutants
 - ▣ Unsanitary environmental conditions
 - ▣ Serious impact on poor
- Industrialization and urban air pollution
- Problems of congestion, Clean water, and Sanitation

16

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The Local and Global Costs of Rain Forest Destruction

- Rainforest loss contributes to global warming
- Loss of biodiversity
- Loss of livelihoods for people living in poverty who depend upon them
- Much waste in the process of forest clearing
- Thus, rainforest preservation (and restoration) is a global public good - a restorative mechanism for the environment
- Sustainable management of rain forests is a priority
- Provide funds, debt relief to help enhance biodiversity
- In addition, support for forest preservation as climate change mitigation

17

Policy Options in Developing and Developed Countries

- **What Developing Countries can do**
 - ❖ Proper resource pricing
 - ❖ Community involvement
 - ❖ Clearer property rights and resource ownership
 - ❖ Improved economic alternatives for the poor
 - ❖ Improved economic status of women
 - ❖ Investments that yield returns regardless of the shape of climate change, such as a better road network
 - ❖ Industrial emissions abatement policies
 - ❖ Proactive stance toward adapting to climate change

18

Policy Options in Developing and Developed Countries (cont'd)

- **How developed countries can help developing countries**
 - ❖ Lower developing country costs for environmental preservation
 - ❖ Trade policies: reduce barriers, subsidies
 - ❖ Debt relief and debt for nature swaps
 - ❖ Development assistance

19

Policy Options in Developing and Developed Countries (cont'd)

- **What developed countries can do for the global environment**
 - ❖ Emissions controls, including greenhouse gases
 - ❖ Research and Development on green technology and pollution control
 - ❖ Transfer of technology to developing countries
 - ❖ Restrictions on unsustainable production

20

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Regulating Economies for Optimal Environmental Performance

- **Correcting market failures**
 - E.g. clarifying property regimes, supplying information, providing public goods, regulating monopolies
- **Correcting government failures**
 - E.g. removing perverse taxes and subsidies, proper CBA (cost-benefit analysis) for public investments
- **Regulation to set pollution at the “optimal” level**
 - **Command and control (e.g. standards)**
 - **Market-based instruments**
 - Charges
 - Subsidies
 - Marketable permits
 - Others
- **Other approaches**
 - Voluntary incentives, education, planning, etc.

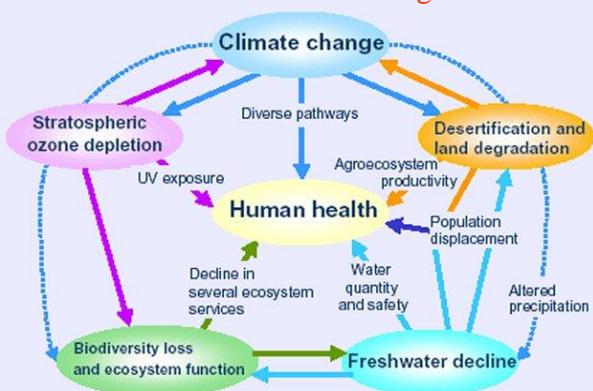
21

Comparison of Three Major Environmental Worldviews



22

What are Your Thoughts?



23

Concepts for Review

- Absorptive capacity
- Climate change
- Common property resource
- Debt-for-nature swap
- Deforestation
- Environmental accounting
- Environmental capital
- Environmental Kuznets curve
- Externality
- Free-rider problem
- Global public good
- Global warming
- Greenhouse gases
- Marginal cost
- Marginal net benefit
- Pollution tax
- Present value
- Private costs
- Producer surplus
- Property rights
- Public bad
- Public good
- Social cost
- Sustainable development
- Sustainable net national income (NNI*)

24