Interaction between Economic Development and the Environment

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Basic question

- Are there any systematic associations between environmental conditions and development strategies?
- There are reasons to expect that there might be, in view of the fact that development-strategy influence variables, which in turn, influence environmental conditions.

Development strategy affects

- the structure of domestic production,
- the nature of the most binding constraints facing the economy,
- technological and investment choices,
- institutional structures,
- income distribution and
- domestic relative to international prices [terms of trade].

These variables affect

- Energy consumption and
- Patterns of land-use in the agricultural system,
- Which in turn affect
- The extent of environmental degradation.

Environmental Damage in Developing Countries

- Air and atmospheric pollution
- Water pollution and depletion
- Land degradation, soil erosion, and desertification
- Deforestation

Air and atmospheric pollution

- Energy generation and energy utilization emit hydrocarbons, nitrogen oxide, sulphur dioxide, and ozone into the air.
- Places where energy producing and energy consuming activities are concentrated, the concentration of these pollutants is very high.

Developing countries

- In developing countries, air pollution is aggravated by the use of energy-inefficient technologies with no pollution controls and by the use of cheaper, high-sulphur content, low-quality coal and fuel oil, especially for heating and transport.

SO2

- Of the 12 cities with the worst pollution in the world, only two are in developed countries.
- Average daily emissions of SO2 exceed the WHO safe daily mean standards in over 50 % of developing country cities.
- Even on good days, Beijing, Teheran, and Rio have mean daily concentrations of SO2 about 2.5 times the WHO standard.

Problem

- While developed country cities are improving, those of developing countries are deteriorating.. In most urban centres.
- Unplanned urbanization, pressure of development and urban concentration, etc.

Rural air pollution

- Particulates, organic matter, and various oxides, results seasonally from burning grasslands and from forest-clearing for cultivation and grazing.
- Most common in sub-Saharan Africa.
- Indoor concentration of carbon monoxide, particulates, and hydrocarbons is also observed in households without proper ventilation.

Commercial Energy use

Countries	industry	Commercial and residential use	transportation
Developed & NIC	40	30	20
Brazil	34	39	25
Poorest developing	8-9	16	75

Industries

- Fertilizer, cement, paper and pulp, chemicals, metal industries, and petroleum-reining are heavy energy users
- In these industries energy accounts for about half of total intermediate costs.
- It is the uneven use of energy across sectors which makes for the main link between development strategies and energy consumption.

Water Pollution and Depletion

- Two major water-related environmental problems are contamination and depletion.
- Surface and groundwater are being contaminated by agricultural, industrial, urban, and human wastes.

Water –cont.

- Safe drinking water and sanitation are a major urban environmental problem.
- Between 25 and 75 % of rural population in different developing countries do not have access to safe drinking-water.
- The results are chronic diseases, microbic infections, aggravated malnutrition, increased infant mortality, and shortened life expectancy.

Developing countries

- Major use of water is in irrigated agriculture (73%), industrial use (21%), and domestic (6%).
- Developing countries account for 75 % of the world's irrigated land area, require about twice as much water per acre as do developed countries.
- Irrigation is increasing most rapidly in these countries.

Land degradation, soil erosion, and desertification

- Cultivable land is the basis of the livelihood of 80 % or population of developing countries.
- Extremely rapid population growth leads to unsound agricultural practices whose results are land degradation, land erosion, and desertification.

Extent of the problem

- Soil erosion through the loss of topsoil that is either washed away or blown off the land affects over one-third of world's total rain fed croplands.
- Estimates of the extent of desertification, the extreme end of a gradual process of loss of soil fertility and soil erosion, vary substantially.
- According to UNEP, two-fifths of Africa's non-desert areas, one-third of Asia's, and one-fifth of Latin America's are at risk of desertification.

Who is affected?

- The world's poor are most seriously affected, since they depend on the most marginal lands for their livelihood.
- Population pressures, agricultural practices, poverty, price policies, and economic institutions interact to produce this devastating effect in mutually reinforcing cycles.

How does it work?

- Increase in population density, poverty, lack of alternative income-earning opportunities, and land degradation lead to reducing fallow-time below the required for natural restoration of soil nutrients.
- This interacts with the use of biomass for fuel to reduce soil fertility.
- Attempts to respond to reduced yields by clearing more marginal lands that are highly erodible lead to further land erosion and greater loss of land productivity.

further

- Clearing of land coupled with shorter fallow periods also results in deforestation.
- Deforestation increases water run-off, and leads to siltation and flooding in downstream areas, thus widening and reinforcing the cycle of environmental degradation and poverty.

Typical effects

- Loss of productivity of land and soil erosion lead to further impoverishment and set in motion technological and institutional changes which reinforce the other negative trends of agroecology.

Commercialization

- Under commercialization, monoculture replaces traditional mixed cropping pattern that were necessary for soil fertility.
- Problems of more intensive agriculture.

Land-tenure pattern

- Land-tenure patterns change due to agricultural intensification and commercialization.
- Enclosure of commons, and a loss of free access to the gathering of biomass fuels.
- Tenurial changes lead to greater rural inequality and intensify both absolute and relative povery.

Prevention better than cure

- Prevention requires an integrated approach to poverty, rural development, and the environment.
- It is hard to design, and more expensive than integrated rural development.

Deforestation

- Deforestation, in the sense of unsustainable tree-clearing, interacts with land degradation in a mutually reinforcing vicious cycle.
- About 1 % of tropical forests are destroyed each year; and the rate of deforestation is accelerating.
- Two-thirds of LDC tropical forests are in Brazil, Indonesia, and Zaire.

Causes of deforestation

- Evolution of agricultural systems
- Development of particular sectors [livestock, logging, and hydroelectric projects]
- Industrial fuel wood consumption
- Increase in accessibility, and
- Human and natural calamities [war, forest fires].

Effects of deforestation

- Soil erosion
- Flooding
- Desertification

- Poor are hardest hit, since they live on the most marginal soils, in the areas that are the most prone to run-offs and flooding, and prefer to rely on gathered wood for cooking.

Adverse global effects

- Loss of tropical forests leads to global effects like species extinction and emission of greenhouse gases.
- Loss of species entails loss of genetic material important to medicine. About one-quarter of prescription drugs in the US are based on chemicals derived from plants in tropical forests.

Global effects – cont.

- Loss of species diversity is also important to agriculture, since it provides recimes for engineering plants with particular traits.
- Globally, deforestation also leads to emission of greenhouse gases, by releasing CO2 into the atmosphere both immediately and through subsequent burning or decomposition.

Forest management

- With proper forest management, forests are renewable resources.
- Temperate-forest deforestation is a reversible process.
- However, many of the adverse immediate effects of unsustainable deforestation are not reversible.

Policy intervention

- All patterns of economic development lead to environmental damage.
- Accelerated development lead to the most rapid increase in environmental degradation.
- All environmental effects are amenable to policy-influence at the margin.

Environmental policy

- Environmental policy has to combat the invisible hand and the short-term self-interest of those who benefit from resource-mining policies at the expense of the longer run and, generally, at least some of the poor.

Questions that arise are:

- Are there some development strategies that are environmentally better than others?

- Are there some that are decidedly worse?

Development Strategies

- Developmental strategies are distinguished from each other along several interrelated, instrumental dimensions;
- Pace; and
- Primary engines of growth.

Clustering of countries

- Although there are differences along the dimensions among countries pursuing the same development strategy, the differences in how countries cluster along these dimensions are larger among countries engaging in different development strategies.

Sectoral lines development strategy

- Industrialization, balanced growth, and agricultural development.
- Also distinguish along the lines of trade strategies – outward or inward orientation.

Major development strategies

- Import substitution
- Export-led growth
- Balanced growth
- Staple export strategies
- Agricultural-development-led industrialization [ADLI]

Import substitution

- Industrialization occurs behind high and variable tariff walls and with overvalued exchange rates.
- Growth-impetus comes from domestic demand growth.
- Heavy industry oriented
- Discriminate more against agriculture through lower agricultural terms of trade.
- Lower rates of investment in domestic agriculture
- Rely more on primary exports to finance imports.

Possible outcome

- Lower than average rate of economic growth
- More input intensive
- More capital intensive
- Lower average rate of factor productivity growth
- Subsistence agriculture, and dualistic structure
- Rely more on input-intensive, commercial agriculture for food production and exports.
- Higher disparities in income distribution
- Productivity gap between rural and urban.

Constraints and threats

- Countries adopting Import-substitution growth strategy have had greater difficulty in adjusting to major external shocks, and also suffer from BOP constraints.
- Given all these outcomes and constraints, this strategy has severe adverse environmental consequences.

International differences

- Almost all the countries excepting perhaps Britain have engaged in import-substitution industrialization in their early stages of development.
- Differences lie in both the degree of import-substitution, and how long did countries pursue this strategy.
- Asia, Latin America differences lead to differential environmental consequences.

Export-led growth

- East-Asia after the mid 1960s is the best example.
- They have more labour intensive patterns of industrialization
- A higher share of consumer-goods manufacturing,
- Achieved higher rates of eco. Growth, productivity growth and export growth.

Also,

- They have pursued unimodal [rather than bimodal] patterns of agricultural devt.
- Early redistributive, universal land reforms were supplemented by small-farmer agricultural strategies and there was early emphasis on agricultural investment in extension and in technology dissemination.

Different phases of export-led growth

- First phase, mfg exports consist of labour-intensive consumer goods, clothing, textiles, processed food, leather and footwear.
- Second stage, shift from labour intensive to skill-intensive exports; electronics, engineering industries, small machinery and consumer durables.
- Lesser environmental consequences than import substitution.

Balanced growth

- Mostly followed in small, densely populated countries that have pursued open-devt. Strategies.
- They combine wage-goods industrialization with fostering of high-productivity, diversified, high value-added specialty agriculture – Denmark and Switzerland.

agriculture

- Did not protect their agriculture from the influx of cheap grains from overseas.
- Farmers shifted into specialized, high-value agricultural activities such as commercial dairying.
- Achieved high standard of living, shared the benefits of growth more widely.

Environmental effects

- Better environmental effects than did export-led growth, as it combined environmental conservation technologies with non energy-intensive manufacturing industries.
- Taiwan and South Korea also could be considered in this category, especially because they implemented land-reforms, land to the tiller policy, prior to major industrialization thrust.
- However, there agricultural technology has been more on input intensification than on resource conservation.

Staple export strategies

- Traditional primary-export-oriented growth patterns of colonial economies.
- Most least developed countries.
- Some export wood logged without proper forest-conservation practices.
- Low, effective exchange rates are needed to support the export of staples.
- Adverse soil and forest conservation practices, although low energy per unit of GDP.

Agricultural-development-led industrialization

- First step is to increase the productivity of food agriculture, focusing on medium and small farmers.
- The economic linkages of income expansion in the countryside then provide a stimulus for expansion of a mass market for domestic wage good manufacturers.
- Formulate appropriate agricultural TOT.

Who followed it?

- Present day developed countries like Canada, France, Germany, Great Britain, Japan, Sweden and the USA.
- Currently Indonesia.
- China and Hungary have also been ADLI type.

Environmental impact

- ADLI strategies reduce energy requirements.
- But have potential for substantial damage to soils, in the absence off specific attention to soil and forest conservation in technologies propagated to increase productivity.

Answering the Questions that arise:

- Are there some development strategies that are environmentally better than others?
- Yes, but needs to use it cautiously.

- Are there some that are decidedly worse?
- Definite evidence is there, especially for import substitution, and staple export strategies.