CHAPTER II

ENVIRONMENT AND DEVELOPMENT: SOME ISSUES

2.1 Introduction

For a long period of time, development economics ignores the issue of the environment. This is partly because of the special features that the environmental goods own. For a good to be considered as economic good,

- It must be marketable (tradable)
- It must provide utility
- It must be relatively scarce.

However, because of the problem of market failure, natural resources were not considered as economic good. Hence, even in the 1950's and 1960's environmental (natural) resources were considered as free goods. Because of this a number of environment related problems have arisen. These include, rapid deforestations, over grazing/fishing, pollution etc. (For the detail look at the following attachment.) These problems, if left unchecked, will undermine the economic development.

Attachment: Types (or forms) of environmental degradation

Environment refers to both the quality and quantity of natural resource. Hence environmental degradation is the deterioration of the environment both in quality and quantity.

1. Water related problems

- *Water shortages*
- *Water pollution & contamination*

2. Forest relate E. Problems

- *Deforestation →↓ in forest coverage*
- *Degradation of forest →↓ in forest productivity and loss of diversity*

3. Land related E. problems

- *Land related E. problems*
- *Sanitation →↓ in salt content*
- *Nutrient loss*
- *Land scarcity*
- *Overgrazing etc*

4. Fishery related E. problems

- *Ore fishing*
- *Fish poisoning/contamination*
- *Loss of fish species*

5. Urban related problems

- *Congestion*
- *Air , water and notice pollution*

N.B. As quality problems are worsen quantity problems emerge.

Note also that environmental degradation has three aspects/dimension

- *Quantity*
- *Quality*
- *Diversity composition (species)*

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In the late 1960's and 1970's concern of environmental degradation began in the industrialized countries and was extended to less developed countries by the 1980's. Thus, it is only after 1980s that environmental issues were treated as development issue and people observe that development is related to the environment.

Who is the victim of environmental problem? Both developed and developing country. However, the most pressing issues in LDCs are not necessarily the same as in the former countries.

- Unsafe water   - deforestation

- Soil depletion   - inadequate reforestation

- Indoor smoke (from use of biomass fuel such as wood, straw, dung)

- Outdoor smoke (from coal burning).

But for developed countries, the main concerns are issues like global warming (carbon dioxide emission, depletion of stratospheric ozone, photochemical smokes, acid rain and hazardous wastes).

The reason environmental problems differ so substantially between less and more developed countries is that few if any forms of environmental degradation tend to remain constant with economic growth. Some of the environmental problems such as inadequate urban sanitation tend to improve as income increases, others, and of course most environmental problems, such as urban air pollution initially worsen but then improve as income rises, and still others such as carbon dioxide emissions tend to worsen steadily with increasing income.

The Environmental problems of less and more developed countries are of course not completely independent of each other. If the carbon dioxide emissions that come primarily from rich countries are causing greenhouse warming, less developed countries are affected.

Loss of Biodiversity due to destruction of tropical rainforests in less destruction of tropical rainforests in less developed country is a problem for more developed countries as well.

Attachment

Industrial countries need to solve their own problems but they also have a crucial role to play in helping to improve the environments of developing countries

1. Developing countries need to have access to loss- polluting technologies and to learn from the success and failures of industrial countries environmental policies.

2. Some of the benefits from environmental policies in developing countries (e.g., the protection of tropical forests biodiversity) accrue to reach countries, which are therefore to bear an equivalent part of the costs.

3. Some of the potential problems facing developing countries (particularly global warming acid ozone depletion) stem from high consumption levels in rich countries; therefore the burden of finding and implementing solutions should be on the rich countries.

4. The strong and growing evidence of the links between poverty reduction and environmental goals makes a compelling case for greater support for programs to reduce poverty and population growth.

5. The capacity of developing countries to enjoy sustained economic growth will depend on industrial country's economic policies; improved access to trade and capital markets, policies to increase saving and lower world interest rates, and policies that promote robust, environmentally responsible growth in industrial countries will all help--------

Poverty and the environment

There is a strong relationship between poverty and the environment. In terms of causation, poverty leads to environmental degradation and environmental degradation worsen poverty. This implies that poverty leads to environmental degradation and in turn environmental degradation leads to poverty.

- Poor people are forced to engage in number of activities like fetching water, fire wood collection, cattle grazing, etc. This causes environmental degradation
- The environmental degradation can lower labor productivity of the poor. For example, fuel wood become scarce, and poor people spend more time collecting fuel wood consequently the poor earn lower income.

Principal health and productivity consequences of environmental problems;

Environmental problem	Effect on health	Effect on productivity
water pollution & water scarcity	- deaths and illness, - poor household hygiene and - added health risks caused by water scarcity	- declining fisheries, - household time and municipal costs of providing safe water shortages
Air pollution	- premature deaths - childhood chronic coughing	- restriction on vehicle and industrial activity during critical episodes; - Effect of acid rain on forests and water bodies.
Solid and hazardous wastes	Disease spreads by rotting garbage and blocked drains.	pollution of ground water resources
Deforestation	Localized flooding leading to death and disease	loss of sustainable logging potential of erosion prevention and carbon sequestration
Solid degradation	- reduce nutrition for poor farmers on depleted soils - greater susceptibility to drought	Field or land productivity loss
loss of biodiversity	potential loss of new drugs	reduction of ecosystem adaptation and loss of genetic resources
Atmospheric changes	- Possible shift in vector born diseases. - risks from domestic natural disaster.	Regional change in agricultural productivity.

2.2 Population Growth and the Environment

Population growth leads to environmental degradation. How do more people pollute the environment?

1. Population growth increase the demand for goods and services this cause environmental degradation

2. More people produce more waste- additional stress on assimilative capacity of the environment. Hence, there should be policies for reducing population growth rate. Some of the policies used to reduce population growth include

a. access to family planning should be increased
- encourage people to use contraceptive
b. Educate the people to the benefit of having small family
c. marriage age law
    - People should not be allowed to marry before they reach certain age.
d. Economic incentives and disincentives

E.g. free education, house allowance, free food etc

e. Using force
    - Putting this people producing more children in to prison.

Of course there are some individual who argues to population as an asset and creative so that it will find solutions to the environmental problem.
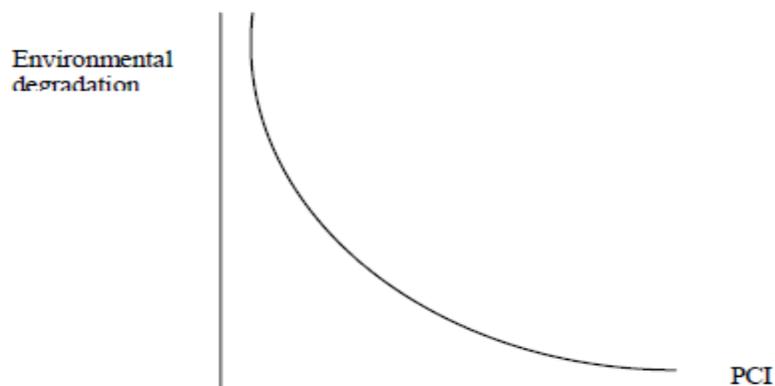
2.3 Economic growth and the Environment

Is economic growth lead to environmental degradation?

Three patterns of relationship between economic growth and environmental degradation.
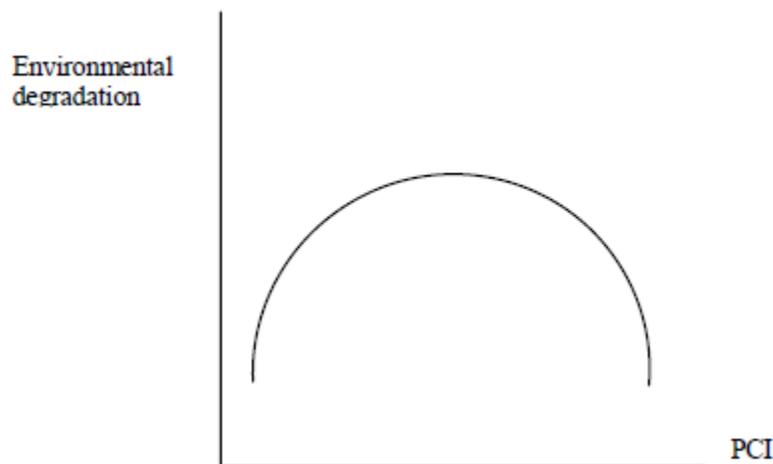
1. Some environmental problems decline as income rise

This is because increasing income provides the resources for public services such as sanitation safe water, rural electricity.

2. Some environmental problems initially worsen but then improve as income rise.

E.g. Most forms of air and water pollution.

Environmental
degradation

PCI

Rationale (the Conventional explanation)

At early stage of economic growth, people don't worry about the environmental problems; they worry about PCI growth. But when they grow more and more, they taste that pollution is the major problem. People look at environmental quality. As income rises, people attach high value to the environmental quality. They need clear air, water etc. People, then start to take measure to reduce pollution as they grow more. Because they have the ability to do: they have more resources and afford to reduce environmental problems. As they use environmental policies, environmental degradation declines.

The tendency of many forms of environmental degradation to follow an "inverted U" when plotted against income has been christened the "Environmental Kuznet Curve." Environmental Kuznet Curve comes from Kuznet Curve, named after Simon Kuznet. Kuznet Curve shows the relationship between Per capita income and income inequality. At lower level of development income inequality is low; as economic growth increases it increases initially and then as countries grow more and more income inequality become low.

Attachment: The "Environmental Kuznet curve"

We have seen that some environmental degradation increases first and then decreases with per capita income. Because this is reminiscent of Kuznet's conjecture for income inequality, this inverted U relationship has become known as the *Environmental Kuznet curve*

The cause of the upswing of the inverted U is simply that the greater out put per head generates more emissions, all else equal.
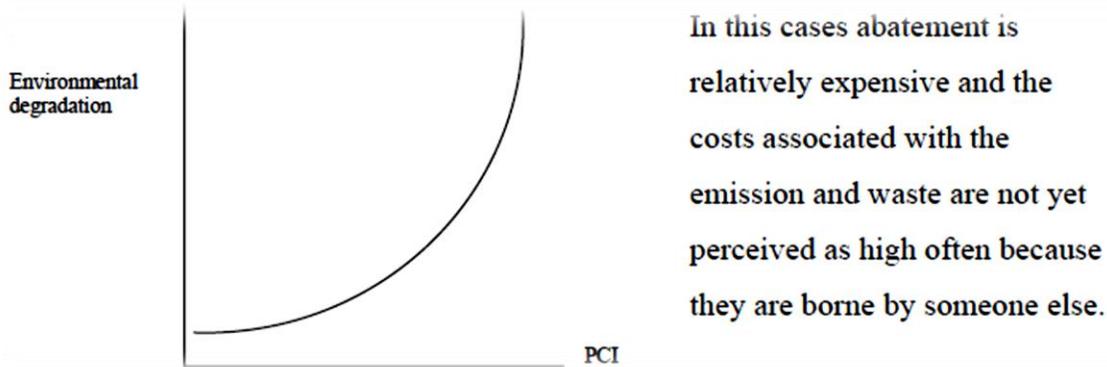
The cause of downswing is more controversial.

The conventional explanation is that richer consumers demand higher environmental quality, richer governments are better able to enforce regulations that yield the higher environmental quality their constituents demand, and more technologically advanced producers are better able to control their emission

A more pessimistic explanation focuses on the composition of out put. Richer countries produce more service relative to manufactures, and with in manufacturing they tend to specialize in "cleaner" industries. Demand for the output of dirty industries in met by imports from poorer countries.

If this latter explanation is correct, then at the global level of income growth of countries with per capita incomes above the turning point of the inverted for a certain form of environmental degradation does not improve environmental quality but instead distribute degradation to poor countries.

3. Some indicators of environmental stress worsen as income increase

E.g. Emissions of carbon and nitrogen oxides and municipal wastes are current examples.

In this cases abatement is relatively expensive and the costs associated with the emission and waste are not yet perceived as high often because they are borne by someone else.

Rationale:

- As income grows, people consume more and more of petroleum products that results in the emission of CO2. This changes the composition of the atmosphere and leads to global warming (environmental degradation)

- As income grows, people tend to consume packed products, whose package becomes waste material.

Note: The above analysis does not imply an inevitable relationship between income levels and particular environmental problems; countries can choose polices that result in much better (or worse) environmental conditions than those in other countries at similar income levels. Nor does it imply a static picture, as a result of technological progress, some of these curves have shifted down word over recent decades, providing an opportunity for countries to develop in a less damaging manner than was possible earlier.

- Developed countries come up with technique which reduce emission. Poor countries rely on technique developed by DC and reduce pollution

- Influence of donor on poor countries to take measure on environmental pollution.

2.4 Sustainable Development: Basic Concept

Economic Growth is simply defined as Sustainable rise in per capita income. The use of the term "Development" rather than "Economic growth" implies acceptance of the limitation of the use of measures such as a gross national product (GNP) to measure the well-being of nations. However, development embraces wider concerns of the quality of life. Since "development" is a value word, implying change that is desirable there is no consensus as to its meaning. What constitute development depends on what social goals are being advocated by the development agency,

government, analyst or adviser. We take development to be a vector of desirable social objectives; i.e. it is a list of attributes which society seeks to achieve or maximize. The element of this might include,

Increase in real per capita income

- Improvement in health and nutritional status

- Educational achievement

- Access to resource

- A "fairer" distribution of income

- Increase in basic freedoms

The term Sustainable Development (SD) was bought into common use by the World Commission on the Environment and Development (The Brundtland Commission) whose report is known as "Our Common Future" in 1987.

According to the commission, Sustainable Development was defined as: "Development that meets the needs of the present without compromising the ability of the feature generations to meet their own needs".

This definition highlights both an equity dimension (inter-generational and intra generational) and social/ Psychological dimension (need is used instead of want).

Compared to economic development, SD is a much wider concept. It is a situation in which the development vector does not decrease over time. i.e., it is economic development that endures over the long run (or that lasts forever). The emphasis on sustainability suggests that what is needed is a policy effort aimed at making these developmental achievements test well in to the future. Hence the goal of SD is principally an equity rather than efficiency issue and this is not to say that economic efficiency is irrelevant to SD but it is not a sufficient condition for SD.

Sustainability is concerned with knowledge of what the resource capacity is and managing the resource to the maximum of that capacity, but not beyond. Therefore, sustainability is using the interest produced by natural capital but never eating in to the capital itself.

SD can alternatively defined as, '….*the maximum development that can be achieved without running down the capital asset of a nation, which are its resource base"*. The base is interpreted widely to encompass man made capital (K_m) natural capital (K_n), human capital (K_h) and moral (ethical) and cultural capital (K_c).

Sustainable development has three set of objectives:

1. Economic objectives:

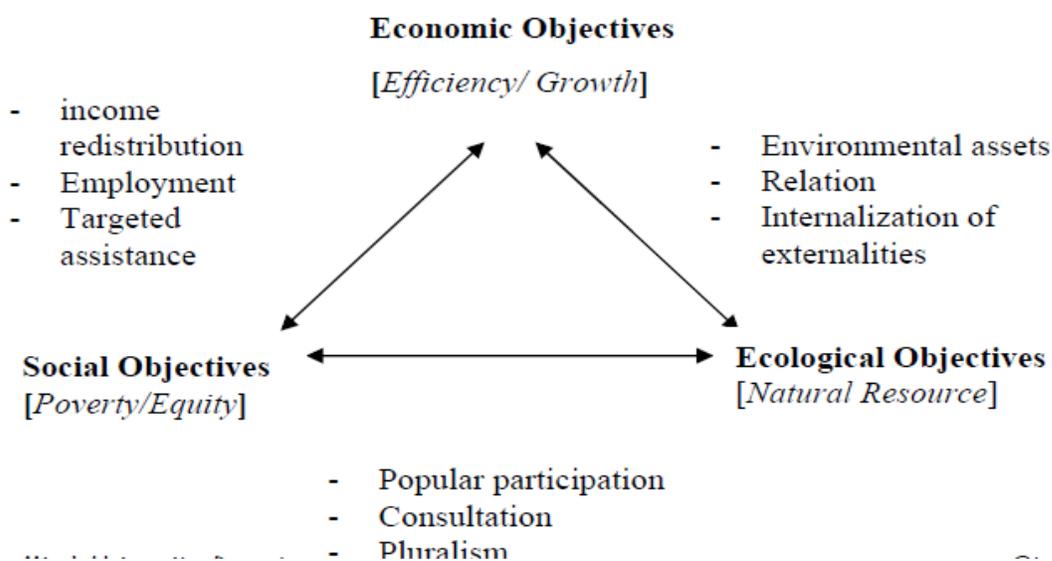- It includes promoting growth or efficiency

2. Social objectives:

- It includes fulfilling people's cultural, material, spiritual needs in equitable manner.

3. Environmental objectives:

- It includes maintaining and improving the long-term validity of the ecosystem.

The triangular representation of the objectives of the sustainable development.

Economic Objectives

[Efficiency/ Growth]

- income redistribution
- Employment
- Targeted assistance

- Environmental assets
- Relation
- Internalization of externalities

Social Objectives
[Poverty/Equity]

Ecological Objectives
[Natural Resource]

- Popular participation
- Consultation
- Pluralism

The central rational for SD is to increase people's standard of living (broadly defined) and in particular, the well-being of the least advantaged people in the societies, while at the same time avoiding uncompensated future costs.

From the above discussions we can concluded that SD involves in balancing among the following.

a) Balancing between human needs & ability of the environment to meet these needs.

b) Balancing between the needs of the present & future generation

c) Balancing between the poor & the rich.

Weak Vs Strong Sustainability

Weak sustainability rule merely requires that the overall stock of capital assets $(K_m + K_n + K_h)$ should remain constant overtime. I.e. the total value of that man-made physical capital stock, human capital stock, and natural capital stock should not decrease. This rule is consistent with any one asset can be reduced as long as another capital asset is increased to compensate; (i.e. increase in other capital stocks can substitutes for decrease in the natural capital stock.).

On the *Strong Sustainability* view, it is not sufficient to just protect the overall level of capital, rather, K_n must be protected, because at least some of K_n (initial K_n) is non substitutable. Thus, the SS rule requires that K_n be constant and the rule would be monitored & measured via physical indicators; i.e., the natural capital stock should not decrease.

Pre requisite for SD

The two important aspects of SD are

> i. Respect & concern for people
>
> ii. Respect for Ecosystem.

1. Respect and concern for people

> Development is likely to be sustainable if it improves the quality of human life for a long time; and these qualities include:
>
> - Long and healthy life
>
> - Access to education
>
> - Need for decent standard of living
>
> - Political freedom
>
> - Guarantee on human rights, etc.

2. Respect for Ecosystem Development must be conservation best; i.e., it must protect the structure, functions & diversity of the world's natural system.

> It includes:
>
> - the need to conserve the life support system
>
> - the need to conserve the biological diversity (all species of animal & plants)
>
> - ensure that all uses of renewable resource are sustainable
>
> - Keep with the current capacity of the earth of population.
>
> - Minimize the depletion of non renewable resources, how? Via
>
> > o recycling
> > o efficiency
> > o switching to renewable substitutes

Signs of unsustainable Development There are some signs of unsustainable development

1. Increasing population and consumption of resources
   - Since industrial revolution, the population has increased 8 folds
   - Water with drawl have grown from 100 – 4000 km^3 year

2. Poverty
   - More than a billion live in absolute poverty
   - One fifth of them can not get enough food
   - Every year million of children die from mal nutrition & preventable diseases

3. Resource Depletion
   - In less than 200 years the planet has lost 6 million km^2 of forests.
   - Every year 700,000 km^2 of agricultural land made un productive

4. Pollution
   - It is becoming a major problem on industrialized counters. It affects the health of the people; e.g. Cancer

5. Global climate change
   - Global warning because of ozone layer

6. Debt problems
   - The cumulative debt of low income countries is more than 1 trillion and the interest payment has reached 60 million dollar per year.
   - Since 1984, there has been a net transfer of resource from developing to developed countries.

Attachment

What are the major focuses of economists after 1950's

- In 1950's & 1960's, the focus of economic thought was 'growth of output' based on economic efficiency.

- In 1970's, there was an attempt to employ strategies which 'promote economic growth & reduce income inequality' among different groups in a given society.

- In 1980's there was a grown concept that environmental degradation was a major barrier to development and because of that the protection of environment has become the major objectives of the development process.

National Accounting Practice and Macroeconomic Performance

Traditionally, the economic activity of a country was measured by GDP (and preferably by NNP). I hope you know what GDP and GNP are and their components. But do these indicators tell us what is really happening to the environment?

The traditional measures of aggregate income have long been recognized to reflect welfare only partially, due to their inadequate treatment of non- marketed asset-human capital and natural resources.

The two major criticisms of the current System of National Accounts which was advocated by UN (UN-SNA) are:

1. It fails to account for informal economics, black economics and other non-marketable assets.

2. Services provided by the environment are not taken in to account.

A country can fell its forests, erode its soils, exhaust its minerals, pollute its aquifers, and erase its wildlife, without adversely affecting its measured income. Hence, NNP clearly fails as a measure of SD owing to many aspects of natural resource depletion being ignored by SNA; whilst is expenditure on pollution clean-up actually adds to NNP, with any loss in welfare due to the pollution itself being ignored. This can hide a permanent loss of wealth beneath an illusion of gains in income.

How do we make an adjustment? We have two approaches:-

1. Physical Resource Accounting (PRA) approach

This is making the adjustment in physical terms via the physical inculcator. Examples of the physical indicators include

o   Deforestation:- measuring the volume of forest decline

   ⇒ by how much the forest decline per year.

o   Soil degradation:- measuring the amount of soil fertility decline

   ⇒by how much does the soil quality go down? How many tones of soils are lost?

o   Water pollution:- measuring the volume/quality of water decline

   ⇒ what is happening to the total quantity and quality of water?

The challenge associated to this approach is that the calculation is not an easy task, it requires in put-out put calculation in physical terms. In this approach, as the name indicates, we are talking about changes in physical terms.

⇒ Basically, this is the work of natural scientists.

2. Monetary Accounting (MA):

⇒ this is particularly the interest of economists. In this case we try to attach monetary value to the change. Here, we will be able to come up with a single aggregate measure and we can tell what is happening to the economy. We convert the different measurement used in monetary value. This is not possible in the case of PRA. But, how do we attach monetary measure? Again we have two methods.

a) Environmentally Adjusted Domestic Product (EDP):

Net Domestic Product (NDP) is total income earned by the economy in any year less an allowance for the depreciation of man-made capital. $NDP = GDP - D_{mc}$ D_{mc} = depreciation of manmade capital.

Note that D_{mc} is subtracted because it is the used part of capital in production process (or it is a loss in the value of the asset). But it is not only the man-made capital which is lost in the production process. In the production process we also lose natural resource capital. Hence, NDP is not the true measure of a country's economic activity and sustainable development. A country's economic activity and its sustainable development is obtained if the loss of natural resource capital is taken in to account. The measurement so obtained is called Environmentally Adjusted Domestic Product (EDP). When is an environmentally adjusted measure of NDP (or EDP) a good measure of sustainable development?

1st. When all elements of NDP are correctly valued interims of current economic situation.

2nd. When this is true in a fore ward looking sense too (prices reflect future scarcity).

3rd. When all depreciation of natural capital is similarly allowed for as well.

Consequently, we have $EDP = GDP - D_{mc} - D_{Nc}$

D_{Nc} = depreciation of natural capital which includes renewable, non-renewable

= also includes loss of environmental quality.

EDP is the annual pay offs from one total (natural plus manmade) capital stock. EDP can rise through time if this total capital stock rises, and/or as technology improves. But if we fail to account for a loss of natural capital, our NDP measure exaggerates the real increase because that change in NDP may be at the expense of degrading the environment. Hence, in relative term, EDP

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better shows what is happening in the economy, and you may start taking measures. The main challenge to this adjustment is that practically measuring D_N is difficult.

Note: The adjustment of the entire system of national accounts for resource depletion and environmental degradation is known as ''Green National Accounting''

b) Genuine savings (GeS):

  - Saving is very important for economic growth.

  - ↑s →↑I→ ↑output

  - Developing countries have low level of saving which leads to low level of development.

From your macroeconomics, recall that it is net saving that really boosts the investment of a country and hence its economic growth. Net saving is usually computed as: *Net Savings=Gross Savings - D_{mc}*

The problem related to the above calculation is that it does not take in to account what happens to natural resource. It considers only the man-made capital. Just as the entire system of national accounts can be adjusted for resource depilation and environmental degradation, so can the saving rates. This adjustment has become known as *Genuine Savings.*

The concept of genuine savings is implied from the definition of weak sustainability. Genuine savings are savings adjusted not for depreciation of the man-made capital stock but also for depletion of natural resource and degradation of the environment

Genuine Savings = Net savings - $D_{Nc.}$

Note: high dependency of natural resource results in lower GS. Countries which depends on natural resource have lower GS. Failure to account for depletion of natural resource results in wrong policy presentations.

Policies for Development and the Environment

Some policies that are designed for efficient income growth can complement those for environmental protection and some others substitute them. To overcome the causes of environmental damages, two category of policies are required (available).

  1. Win-Win Policies

These are policies that improve both the economic efficiency and the environment. Such objectives can be attained:

a) By correcting (preventing) policy failures E.g. -Eliminating subsidy for the use of fossil fuels, eliminating subsidy on chemical fertilizers etc.

b) By improving access to resource and technology

E.g. - Definition properly right (improves over grazing, over fishing)

- Use of better technology ($\downarrow$ environmental degradation)

c) By promoting equitable income and growth.

The most important of the win –win opportunities that remains unexploited is related to poverty reduction: not only is attacking poverty as a moral imperative, but it is essential for environmental stewardship. Because of the very complex link between poverty and the environment, it is usually the poor who suffer most from the consequence of environmental degradation and pollution and also who seriously affect (promote) environmental degradation. Unlike the rich, the poor cannot afford to protect themselves from contaminated water

o In cities they are more likely to spend much of their time on the streets, breathing polluted air;

o In rural areas they are more likely to cook on open fires of wood or dung, inhaling dangerous fumes:

The poor may also draw a large part of their likelihood from unmarketed environmental resources: common grazing lands, for example, or forests where food, fuel, and building materials have traditionally been gathered. The loss of such resources may particularly harm the poorest. Sound environmental policies are thus likely to be powerfully redistributive. *Win – win policies may also include*

i.   Investing in human resource/human capital investment,

⇒ Interims of education, health, nutrition, family planning, etc.

ii. Investing in a better sanitation & safe water, and

iii. Improved research & extension services can both improve the environment and raise incomes.

2. Forgeted Environmental Policies

The win-win policies are not enough to ensure environmental quality. Strong public institutions and policies for environmental protection are also essential. The world has learned over the past two decades to rely more on markets and less on government to promote development. But environmental protection is one area in which government must maintain a central role. Private markets provide little or no incentive for curbing pollution. Whether it be air pollution in urban

centers, the dumping of unsanitary wastes in public waters, or the over use of land whose ownership is unclear, there is a compelling care for public action.

Here, there may be tradeoffs between income growth and environmental protection, requiring a careful assessment of the benefits and costs of alternative policies as they affect both today's population and future generations. The evidence indicates that the gains from protecting the environment are often high and that the costs in forgone income are modest if appropriate policies are adopted.

- The forgetted environmental policies aim at

> o Changing the behavior of polluters
>
> o Specific environmental problems

These policies include

   a) Policies based on incentives

   e.g.: *Taxation*- government charges polluters according to the amount they pollute.

   b) Policies based on quantitative restrictions (command a control policy).

   e.g.: Setting emission standards. (I.e. a legal limit on how much pollutant a firm emits).

Economy Wide Policies and the Environment Here we point out how different policies are related to and affect the environment.

Trade liberalization:

   ⇒ This is advised by donors

   ⇒ It includes, removal of taxes on export, tariffs etc.

   - This results in higher competition, and in order to remain in the country, factories have to increase product, w/c intern results in higher pollutions.

   - It also encourages exports, especially NR for LDCS.

   Price liberalization: ⇒ This includes removal of price control, removal of subsidy.

   This was advocated on the ground that it increases efficiency. Subsidy, on the other hand, leads to misallocation of resources. But subsidy on kerosene for instance encourages people to buy and use it. This decreases the pressure on fire wood as a source of energy which decreases reforestation.

Exchange Rate Reform:

E.g. *Devaluation*: discourage import and encourages export (because when you devalue the domestic currency exporters may get more money from an export of a dollar item). This, (especially for LDCS,) encourages export of NR – it may lead to deforestation.

Institutional reforms:

- Privatization:- this is transfer of some resources which were owned by the state this ↑ Production → ↑ waste product.

- Fiscal reform:- this is change in taxation. ↓ Aggregate tax →encourage more production → farmers may have an incentive to clear the forest.

- Financial liberalization:- this includes changes in interest rate. ↑i→↓I (industrialization) →↑pollution.

- Land reform: this is change of properly right from state to the private.

Attachment: (From ETV)

Drought → Deforestation → Drought

Uses of the forest:

- Protecting the ecosystem

- Balancing temp

- Home for wild life

- Drops (40% of medicine is from plants)

- Source of energy

- Recreational use

- Source of good

- Source of income.

- Brazil owns 65% of Amazon forest but 36% of total deforestation is in   Brazil?

- Congo, has the largest forest coverage in Africa.

Ethiopian cases

- In early 19th c, 35% of the country is covered with dense forest. ⇒ 42   mill. Hectare.

- In early 1950's only 16% of the land was loved by dense forest ⇒ 19-mill lecture.
  Around 1980's the figure is reduced to 3.6% ⇒ 4 mill Hectare.

- As a result, Ethiopia annually lose 3.5 million tone of fertile land. X (S. Africa lose
  300-400 tone of …)

  From the 19th c, world temp ↑ by 0.4 to 0.8 rainfall dedine by 20 to   49%

  * One hectare forest absorbs 20% of carbon dioxide.

Causes

Major: high Populn → dd of arable lend as source of income.

Others: *↑ Top →dd of grazing land → deforestation

  * Ill managed grazing system

  * Lack of investor due to lack of market and lack of attention