Beneficial environmental externalities

Agriculture can be a source of a number of positive environmental externalities. One argument for agricultural land conservation policies is to safeguard agricultural production capacity from urban encroachment. The more cogent reason for agricultural land conservation policies, at least in countries with well functioning land and capital markets, is to influence the supply of related public goods (Bromley and Hodge, 1990). The study carried out by Kline and Wichelns (1994 & 1996) shows that people are willing to pay to protect farmland from development. While markets can efficiently provide some of the uses of rural lands (e.g., crop production, hunting, etc.) and many others are inherently non-market goods (e.g., visual amenities, habitat preservation, etc.).

Hodge (1995) identifies the following three broad categories of land use policy objectives:

(i) To prevent undesired land use changes (e.g., urban containment).

(ii) To modify existing land uses to reduce detrimental externalities (e.g., encouraging farming practices that preserve wildlife habitat or discouraging practices that result in water pollution).

(iii) To stimulate new uses that give public or quasi-public goods (e.g., wetlands).

Agricultural policy change

A number of economic studies provide evidence that price supports, input subsidies and other agricultural policies influence the nature, size and spatial distribution of agricultural externalities through effects on the scale and location of production, input usage and structure. For example, policies that increase producer prices without restricting output (such as price floors, output subsidies, import restrictions) encourage farmers to increase production. Adverse environmental impacts occur when environmentally sensitive lands are converted to agricultural production and when there is increased intensity of the inputs that can increase environmental harm from agricultural production (e.g., pesticides, fertilisers, irrigation water and fossil fuels). Increased livestock production also means an increase in the volume of livestock wastes.

The presence of policies that distort agricultural product or input markets has implications for environmental policies for agriculture beyond their effects on the nature, size and location of agricultural externalities. For example, the costs of environmental policies that reduce surplus production or the excessive use of subsidised inputs will be overstated if the benefits from reducing these

distortions are not counted. Shortle and Laughland (1994) demonstrate that the effectiveness of agricultural environmental policies can be diminished and the cost increased if distortion of agricultural policies are adjusted to compensate for the costs of compliance with environmental policies.

Policies for modifying agricultural land use to enhance rural amenities include regulations, cross compliance and environmental contracts. Architectural standards and other regulations can be, and are to some extent, used to control agricultural practices. However, in the provision of rural amenities, property rights and fairness considerations may reduce the feasible policy options to either voluntary action or subsidies to landowners for agricultural land use modifications (Hodge, 1989). Cross compliance makes eligibility for governmental benefits in one context contingent upon satisfying environmental performance goals in some other context.

ENVIRONMENT AND REGIONAL ECONOMICS

The emergence of regional economics as an established discipline dates back to the 1950s and aims to study the spatial patterns and processes of human activity from an economic perspective. Environmental economics has followed a slightly different developmental pace. Though the implications of external effects in a market economy were recognised, it was mainly the concern with the quality of life and that of the ecosystem that prompted interest in environmental economics.

Clearly, the concept of a region is central in regional economics. However, there is a multitude of regional demarcations: administrative regions, economic regions, natural resource regions and the like. A salient feature of a system of regions is its openness, which means the possibility of free trade, free movement of people and goods as well as transport of pollutants. The clear geographical focus in the region also means a close connection with the resource base and the pollution in a certain area.

We can, thus, conclude that there are many analytical connections between regional and environmental economic phenomena. These relationships may be unidirectional in nature, but may also show complicated feedback structures of modularly or hierarchically operating environmental economic systems in space and time. The nature of such interactions is dependent on ecosystems and human behaviour as well as on spatial environmental policy.

Spatial-environmental policy studies

Space can be observed in different ways:

- Space is the geographical medium, or physical market, for environmental externalities in a broad sense. This applies to global environmental change, but also to local issues like noise annoyance, soil pollution and so on.
- Space is of a heterogeneous nature with the consequences

that environmental externalities have geographically discriminating and distributive impacts (e.g., recreational visits to attractive areas may pose an excessive burden on such areas).

- Space is a scarce good whose consumption (e.g., land use) has environmental implications and welfare effects for other members of society (e.g., environmental degradation processes in a global space-time context) – now or in the future, here or elsewhere.

In short, the space-environment relationship manifests itself as a complex nexus at the interface of regional economics and environmental economics.

Spatial-environmental policies cover a wide range of government measures such as local and regional taxation schemes or subsidies, land use zoning initiatives, regional environmental standards, industrial location strategies, infrastructure investments and the like. Such measures may be market-oriented or based on second-best principles. They may be of a control and command type or of a stimulating (discouraging) nature. Also, they may be strictly environmental in nature or address broader issues related to regional sustainable development. It is clear that different economic policies in an open economic system of regions have

immediate implications for the environmental quality in each of the regions. Furthermore, different environmental policies in a spatial system of regions have consequences for the well being in each area. Thus, both regional-economic and environmental-economic policies may soon become competitive weapons in an open regional system. Spatial-environmental policy studies are subdivided into the following:

- **Impact studies:** These normally deal with 'what if' questions. Such studies are particularly important because in an open spatial-economic and environmental system, interregional flows (e.g., goods, services, migration, pollution, etc.) may lead to spatially discriminating distributive effect, which may affect the root of many conflicts. Clearly, both industrial policies and environmental policies may generate complicated spatial spill-overs, which may affect the welfare position of the regions at hand. For instance, public investment programmes, physical planning and infrastructure measures, land use zoning principles, establishment of regional environmental standards and the like will all affect the environmental quality of regions in an open spatial system.
- **Decision support studies:** These aim at mapping out the trade-offs between different policy options, including distributional conflicts and environmental quality consequences. In a spatial context, these trade-offs are also reflected in different development opportunities of regions or places in a spatial system. In several cases, however, research has to rely on ad-hoc information, expert opinion and so on, so that a precise assessment of the socio-economic and environmental implications of spatial-environmental policies is fraught with uncertainties.

ECOLOGICAL ECONOMICS

Ecological economics is a policy-oriented perspective that addresses the interdependence and co-evolution between human economies and their natural ecosystems. Interest in this area has been prompted by concerns of the adverse impacts of human economic growth processes on natural systems. Ecological economics recognises that humans and their economies are parts of larger natural ecosystems and co-evolve with those natural systems. There is a material and energy basis for the relations between human economies and their ecosystems, defining not only economic, but also social structures and processes.

The willful effort to extract useful things from natural systems is motivated by the satisfaction of basic biological needs and the seemingly limitless search for pleasure through consumption of goods and through social associations. The magnitude of potential impact on their own welfare through effects on natural systems requires that human decisions be guided by some notion of the value of their actions and the value of their impacts on ecosystems, either in terms of benefits of use or costs of abuse. Some concept of value is required for rational activities of human economies within their natural systems.

Both the structures and processes of natural systems have identifiable instrumental value to the human economy. However, natural systems also have aesthetic, moral and cultural values. These values are more intrinsic and immeasurable using traditional human preferences.

> Valuation is made more complicated by the fact that our natural environment is highly likely to shape values through establishing social and economic relations, aesthetic standards and culture. If so, our decisions now about the natural environment will shape future value systems, making values endogenous and, therefore, a poor guide to behaviour. A way out of this dilemma is to make valuations of natural systems based on what the society should be rather than on what the current valuations are.

Furthermore, our understanding of ecosystems is primitive. We know that structures change through normal succession and evolution, that processes are altered as the structures through which they change, that processes have various temporal and spatial scales and that catastrophic changes can occur without much evident alteration of structures and processes. However, beyond this abstract knowledge and except for a finite number of circumstances, we know too little about ecosystems to be confident that we can predict the full range of impacts of economy on ecosystems.

In order to understand the paradigm of an ecological economics framework, it is useful to contrast it to a characterisation of the current management paradigm. The two paradigms differ primarily on the primacy given to human economies versus natural ecosystems.

The prevailing management paradigm focuses on how humans can manage ecosystems for instrumental purposes of optimising human economic wealth. This wealth is, typically, measured in the value of utility enhancing things and actions, frequently measured by "willingness to pay" or "willingness to accept" monetary compensation for gains or losses and by summing across independent individuals. Preferences are, typically, taken as given and immutable and the manipulation of natural systems for human benefit addresses those preferences.

This management paradigm approaches uncertainty about natural systems by either denying or opting in favour of human economies. If not denying the uncertainty, the optimistic argument is given that natural processes are either reversible with enough time and engineering skill, or economic systems can find human-made replacements for lost ecosystem materials and services. The prevailing issue for this paradigm is that which relates to the use of ecosystem to effectively enhance human wealth and welfare.

The use of ecological economics requires knowledge of how ecosystems and economies work and how they interact at various spatial and temporal scales.

First, the ecological economics framework requires knowledge of both how natural ecosystems respond to economic activity as well as how economic activity responds to ecosystem changes. A seemingly useful analytical construct at this boundary is a full ecological-economic, input-output matrix. Flows of material, energy, nutrients, etc., between the economic and ecological systems will be quantified and impacts of one system on the other could be established.

Valuations of ecosystem services have, typically, been from the perspective of current generations and propose that value is represented by the willingness to pay for these services. The valuation methods developed by environmental economists may not be appropriate to valuing such services in a sustainability context. In a sustainability context, ecosystem structure and functions will be evaluated on the basis of the extent to which they contribute to the goal of economic and ecosystem health and sustainability rather than on the basis of their immediate contribution to current economic welfare.

Valuation of ecosystems based on individual preferences can be useful where spatial scales are narrow and temporal scales are short. However, the dramatic and potentially most serious ecosystem issues (e.g., global warming) are huge spatial and temporal scale problems. Preference-based valuations appear shallow in this context. For example, an appropriate question will be the willingness of future generations to pay current generations

to avoid passing a legacy of a severely degraded ecosystem. The preferences of future generations are simply unknown, though possibly formable by current generations through education and cultural legacies and adaptable to future circumstances. The current generation's most empathetic valuation will consist of asking: How maximally sorry could the future be if we altered their inherited ecosystem by action X and what would the valuation of that sorrow be? It is difficult to find an answer to this question. But, we can pass on to the future an ecosystem that has the ecological properties of integrity and resilience, if an effective environmental/ecological policy is in place.

Policy guidelines from Ecological Economics

In neoclassical microeconomics consumption is defined as the act of buying goods and services, and it is assumed that consumption yields utility. Daly and other contributors question both the definition of consumption as the act of buying, since this does not make sense from a biophysical point of view, and the idea of a direct relation between consumption and utility (more on this below in relation to quality of life).

Nevertheless, the act of buying can be seen as one of the important links between household activities and the environment (although the payment can be separated from the actual acquisition of the good, e.g. paying for water and electricity), as consumers appropriate resources this way. Other links are constituted by use behavior (e.g. way of driving) and waste handling. Guidelines include

1. Never reduce the stock of natural capital below a level that generates a sustained yield unless good substitutes are available for the services generated".
2. Index of sustainable economic welfare (ISEW)

This includes total output, unpaid work. Subtraction of environmental destruction and degradation from it and also subtraction of environmental improvement measures along with depreciation of human made capital. Addition or subtraction of welfare distribution effect to the previous calculations this results in ISEW.

3. Ecological tariffs on free trade which includes limitations as stated below
    - Regional specialization obscures view of resource exploitation, depresses ecological and social laws, weakens terms of trade and impoverishes landholder.
    - Externalities from the shipping of goods around the world
    - Therefore, tariffs to compensate or reduce free trade

4. Community based sustainability through self sufficiency and diversification
    - Community rather than corporations or government creates social conditions (wants and needs) that limit impacts
    - Greater self-sufficiency through decentralized control
    - Local synergies for recycling and energy reduction
    - Ethical bonds amongst business community

SUMMARY

In this Unit, we gave you an overview of environmental economics. We began the Unit by establishing the relationship between economics and the environment. We then presented some of the techniques for valuation of environmental costs and benefits. We also discussed the use of economic instruments for environmental improvements. In other words, we explained how the present standards could be met more cost-effectively. We also touched upon the concept of regional economics. Finally, we introduced the concepts of ecological economics to address the interdependence and co-evolution between human economies and their natural ecosystems.