

ECONOMIC DEVELOPMENT AND ENVIRONMENTAL ECONOMICS: AGENDA FOR BEFORE YEAR 2000

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Abstract

The objective of this paper is to analyze the immediate role of environmental economics in Sri Lanka with special reference to the development process of the country. There will be a tremendous pressure on natural and bio-resources to produce more food, fiber and energy in the future. Based on the available evidence it is clear that Sri Lanka has come to a critical stage with regard to utilization of some of the natural and bio-resources such as forest, soil, bio-diversity and water resources. Therefore, it is suggested that if the present level of economic development is to be continued or if a better development strategy is to be implemented in a sustainable manner, it is very important to understand the role of environmental economics in this process. This paper highlights the main areas where environmental economics is ignored, what steps can be taken in the future to overcome such shortcomings, and specifically addresses itself to the importance, means and ways of incorporating environmental economics at enterprise, project, regional and national level economic activities. Further it highlights the need for further training in environmental economics in the country.

Introduction

The term environment has been defined as the conditions, circumstances and influences under which an individual, group or organization exists. It may be affected or described by physical, chemical and biological features both natural and man-made. The environment is commonly used to refer to the circumstances in which man lives (Brackley, 1988). In general there are three fundamental types of environmental services or functions and they are as follows.

(a) Life support: The environment contains ingredients essential for life, health and human welfare. Some of these are being lost or modified by the present process of economic development while others are finite and subjected to irreversible losses.

(b) Raw-materials: These are physical inputs used in current production and consumption and which may either be renewable or exhaustible.

(c) Waste absorption: Sometimes this is called the 'sink' function of the environment. Up to a certain level, the environment can safely absorb most of the waste products. As long as it can absorb the waste this can be regarded as sustainable. There are certain materials however that cannot safely be absorbed by the environment in any quantity. Therefore it is very important to understand that each of these functions has its own limits and that man can operate only within such limits.

Environment and Development

Interest in the environment and its impact on economic development has increasingly become an important consideration since the mid sixties. In fact the major concern in the 1960's was "development without destruction". In the early seventies the interest in environmental affairs peaked in the United States and other developed countries. At that time, an "environmentally sound development" was emphasized. Again in the 1980's the concern revived with the emergence of the concept of "sustainable development". Today it is a major political, social and economic agenda item in many national and international fora.

The idea of sustainable development urges us to adopt a completely different strategy on the management of environmental and natural resources. According to the Brundtland Report (1987), development is sustainable, if and only if, it meets the needs of the present generation without compromising the ability of the future generations to meet their own needs. Although such a definition raises many questions about the operationalization of it, due to its influence, development projects and programs implemented without any recognition to the natural and social environment is no longer possible. There are over sixty definitions about the concept of sustainability and this stock is ever increasing. As with many other theoretical concepts, it is unlikely that there will be an universally acceptable definition of the concept of sustainability. However, the importance of this definition is that it has brought-up many other issues pertaining to better management of the natural environment which otherwise would not have come up.

Improvement of the standard of living is one of the primary expectations of economic development. To achieve such objectives, resource allocation must be done in a proper way. It is quite clear that economic development cannot be achieved without changes. In this process, certain aspects and components of society or the natural environment may be destroyed and certain other things may be built-up. Science of economics provides the foundation for a rational way of allocating resources, natural or man-made. It helps to compare the benefits and costs of such events. Unless any project is economically sound, a private entrepreneur may not invest on it. Further, public money should also not be allocated for such events. Today our concern is not only that a project should be economically viable but also it should be environmentally sustainable and socially acceptable. One may argue here that sustainability refers not only to the natural environment but also to other considerations such as social, political etc. and there is no counter argument for it.

The central objective of any development strategy is to obtain the highest welfare. On the other hand, it is clear that an improvement in environmental quality also contributes to economic development because it increases the social satisfaction or welfare. Such an interpretation raises many questions. For example, whose welfare are we talking about? It can be the case that we can improve this generation's welfare but

only at the expense of the next generations'. Should we take future generations into account and if so how can it be done? How far into the future should we look into?

Environmental Economics

In this context, environmental economics provides some insights into the desirability of improving the environment further taking the social objective of increasing people's overall welfare or satisfaction. It is also a valuable tool, to analyze environmental problems and make policy prescriptions. Most environmental effects are not included in monetary transactions and hence their influence in policy decisions is highly restricted. Therefore, environmental economics attempts to value these effects wherever possible and to provide better guidance for public decisions.

Environmental Economics is a new field, essentially a creation of the present generation of economists. However, its roots are in the externality theories, the public goods theories, the general equilibrium theory and the applied field of cost benefit analysis (Knees and Russel, 1987). This statement raises several other questions and it requires additional definitions to understand the concept of Environmental Economics clearly.

Concept of Externality

An external effect arises when the utility or production function of one person is dependent upon the activities of other persons (Randall, 1981). If one considers only the nominal meaning of externality, it is apparent that each activity performed by every individual has external effects. Because externality, in the broad sense, refers to the utility of one individual in being influenced by the activity under the control of another. In the analysis of any environmental problem, it is obvious that due to any activity one individual or a group of individuals secure benefits, while the other party is compelled to tolerate damages due to the said activity. In some cases, the affected party has a desire to induce the acting party (those who create the environmental problem) to modify their behavior while in some other cases it is not.

Sometimes it is possible to modify the activity which produces undesirable effects in such a way so as to make the affected party worse-off. For example, activities that generate polluting emissions and toxic wastes from industries, polluting emissions from consumption such as automobile-exhaust, and cigarette smoke can be effectively modified to reduce the level of activity and to satisfy the above notion. In some instances, the affecting party may benefit from the considered activity and then allows others to continue with it. Therefore it is clear that there is no one explanation to address the issue of externality or unaccounted market activities in the modern world. Solving the issue of externality is not the only problem faced by environmental economists. There are several other market failures such as public goods, common properties and allocation

of indivisible commodities are also at their concern. The following is a brief description of such market failures.

Some goods are called public goods because their units are not divisible and distinct. Further, public goods is a form of externality. Their services are available to many persons at the same time, including those who do not pay for them (indivisible) and unlike private goods the use of their services by one person does not diminish (non-rival in consumption) their availability to others (Samuelson, 1954).

There are some goods and services which are indivisible in consumption. And they have greater importance in natural resource environmental policy. If air is provided in proper composition everyone would fulfill his/her needs of breathing and use it in visual medium, without reducing the quantity of it available to others. Similarly, when one enjoys scenic beauty, its quality will not diminish if another observer joins the former.

Congestible goods is another group which falls under the public goods category. They are indivisible in consumption and as the number of users increase the utility of all users tends to diminish. Many services provided to the public falls into this category and some examples would be roads, bridges, restaurant services and concerts. Many natural amenities also possess the characteristics of congestible goods.

It is productive to consider how an externality affects the allocation of scarce resources in the process of production and consumption. Suppose a firm is producing electricity using generators run by coal-burning. This will result in air pollution. Here the firm uses air resource for its waste disposal.

Suppose that a charge is levied on an electric company by the government or some other authority for the waste disposal. Then what will happen to the production and price of electricity? Very clearly, the existing electricity price is not efficient after the introduction of reform, and so is the quantity of the electricity produced. In fact, before the regulation is imposed the firm produced "too much" of electricity and sold at a lower price; a case of inefficient resource allocation. On the other hand, pollution abatement tends to restrict the production and raise the price, which can be argued as a form of efficacy.

Property Rights

Imagine for a moment, a society in which it was illegal to interfere with any person attempting to take any car for his use. This would certainly be a radical change in the laws with which we are familiar. Not only would "car theft" be legal but the term itself has no meaning. How could such a law affect the production, use and exchange of cars?

One simple legal change, the abolition of the concept of car theft would be sufficient to eliminate markets for automobiles within a relatively brief time. This legal change is simple, yet quite radical. It would effectively abolish the concept of ownership. Ownership is a legal device that assigns the right to use (Randall, 1981).

Ownership is an essential precondition for trade, although it alone is not enough. For example, your neighbor's failure to maintain his property in good condition may also reduce the satisfaction you derive from your property. This brings the possibility of conflicts among the owners as well as conflict between owners and non-owners. Therefore, property rights, must not only be exclusive but also be completely specified.

Further, property rights must be transferable and effectively enforceable. An unenforced right is effectively no right at all. Therefore property rights can be defined as the proper relationships among people with respect to using things and the penalties for violation of these proper relationships (Randall, 1981). Without proper property rights, which is the case for most of the environmental resources, the classical markets do not work. Since there is no properly defined property rights with respect to most natural resources such as ambient air, ocean fisheries, eroded soil etc., other ways of reaching the most efficient solutions are needed. Therefore environmental economics can play an important role in helping resource owners as well as resource users to make better decisions in allocation of them.

Valuing of Environmental Resources

Valuing or pricing of environmental resources is one of the major concerns of environmental economists. After realization of the grave error of not incorporating environmental values in the decision process, current work aims to extend the economic valuation techniques to cover environmental resources.

On the other hand, the idea of sustainability also distinguishes the need to place proper values on the goods and services provided by the natural environment. The central problem is that many of these services are provided "free" and they have a zero price. This is simply because no market exists for these items and consequently their true values cannot be revealed through acts of buying and selling. Some examples for such events are the water purification and stream protection functions of coastal wetlands or the biological diversity of the tropical forests.

The basic theory of supply and demand tells us that if a good is provided at a zero price, more of it will be demanded than if there was a positive price. Simply, the cheaper the good or service is, larger the quantity demanded by the user. The danger of this is that a greater level of demand may be unrelated to the capacity of the natural environment and it may not be able to meet the demand. For example, by treating the Ozone layer as a resource with a zero price, there never was any incentive to its users to protect it. Its value to mankind and to the global environment in general is never mentioned

anywhere in a balance sheet. This situation underlines the importance of valuing the environment correctly and integrating those values into the economic policy making process.

Economics and Environmental Values

As economics deals with choosing the highest welfare under given income constraint, applying economic principles to environmental problems give some insights into the desirability of improving the environment. Moreover, given the social objective of increasing people's overall satisfaction (or welfare), it is clear that an improvement in environmental quality is also an economic improvement because it increases social satisfaction or welfare. In this context, the preferences for the environmental change need to be measured and compared with its benefits against costs.

A benefit is a gain in welfare (or satisfaction or "utility"). A cost is any loss in welfare. If we prefer clean air we place a value on it. Although the clean air is not bought or sold in the market place, at least, the enhancement of air quality is an economic benefit. It improves the welfare of the people. In valuation of such change money is considered to be the convenient mode of measurement. There cannot be any harm done if environmental economists acknowledge the fact that there will be some immeasurable gains and losses. For example, what does it mean to place a money value on the benefit of preserving the Sri Lankan elephant, the Californian condor or African rhinoceros? The tendency is to say that such creatures are "beyond price"; but it does not mean they are valueless.

There are certain things in our life which simply cannot be valued in monetary terms. For example, it is more appropriate to say that human life is beyond price rather than putting an infinite price for it. This brings us to the conclusion that the process of monetary valuation is illicit in some contexts. The reality is that choice has to be made in contexts of scarce resources, money as a measuring rod is a satisfactory means of proceeding.

Environmental improvements are shown-up in the form of effects which have direct money values. Improving the beach or wetland area for example, can increase the number of visitors to these sites. If the area has an entrance fee, the revenue from those charges will increase. Similarly, reducing air pollution can improve the growth and the quality of agricultural crops and there is a direct monetary counterpart to such gains. Reducing the sulphur emissions may lower the rate at which buildings or metal structures corrode. The direct market value of such reduced corrosion can be estimated by looking at the prolonged life of the structures and hence the reduced cost of protecting them or replacing them.

It is important to realize that, while the absence of a market or indirect markets make the process of economic valuation difficult, it by no means renders it impossible.

Even more important, the absence of a direct or indirect market does not mean that economic gains are not present. Therefore the rationale of valuing the environment remains unchanged.

Techniques for Economic Valuation

The most common methods of project appraisal are cost-benefit and cost effective analyses. The first one is used where benefits can be valued, and the second method used where the exercise is one of selecting the lowest cost method of satisfying given objectives. The underlying principle for both these methods is to compare costs and benefits.

Typically the problem in benefit cost analysis of projects affecting natural and environmental resources is that one frequently needs to estimate the economic value of goods that are un-priced. Or sometimes it may be necessary to estimate the value of a resource which bears no obvious relationship to market clearing prices. In the process environmental economics distinguishes three broad types of environmental resources which are also referred to as capital.

(a) **Man-made capital** - Includes factories, houses, roads etc.

(b) **Critical natural capital** - i.e. Ozone layer, global climate, bio-diversity, Antarctica - comprises natural assets essential to life that cannot be replaced or substituted by man-made capital.

(c) **Other natural capital** - includes renewable natural resources and some finite mineral resources that can be wholly or partly replenished or substituted by man-made capital.

This distinction implies that there are some kinds of natural capital that are vital, irreplaceable and beyond price. The preservation of such assets should be an absolute constraint on all activities. It also implies setting safe minimum standards and ruling certain kinds of development out of bounds. These goods are generally categorized as non-market goods. The words "non-market" addresses not only the complete absence of markets but also substantial imperfections of direct or indirect markets that may exist. The priced/un-priced distinction is inadequate for understanding the values that economists attempt to measure. A useful framework of economic value namely "total economic value" developed by many environmental economists, is widely used today. The concept of total economic value can be described as follows.

1) Use Value

(a) **Direct use value** - Use value pertains to goods directly or;

(b) **Indirectly consumed or used by humans.** Goods with market prices are always in this category, but many use values do not have market prices.

2) Non-use Value

(a) **Option value** - Individuals often pay a positive or negative premium to retain the option to use some goods and services and this premium is called option value.

(b) **Existence value** - Existence value results simply from knowing that a good exists. It is associated with goods that we are certain never to see or use in the future.

(c) **Bequest value** - One wants to conserve something not for his use or consumption but for future generations. This value is primarily derived from altruistic motives.

The proposed valuation framework can be used at every level of economic activities; enterprise, project, regional or national. One must note however, when the resource on valuation is unique and rare all these components will have positive and large values; otherwise they become almost none. At the enterprise level it can be used to internalize the unaccounted benefits and costs through proper economic incentives such as tax/subsidies. Once they are internalized all accounts are under private domain and thus project and national level integrations will have to be still done outside the private domain.

Extended Benefit Cost Analysis/Project Level

During the last few years the government of Sri Lanka has enacted several legislation related to environment and natural resource management. Environment related issues have become national priorities and also reasons for major national debates and controversies. The Environmental Impact Assessment (EIA) or Environmental Assessment (EA) is a mandatory requirement of all development projects in the country today. Familiarity of the techniques of the EIA and resorting to simple and traditional benefit cost analysis have become grossly inadequate to perform the expected tasks of both natural scientists and economists. The new approach proposed to include environmental aspects into project level is the application of Extended Benefit Cost Analysis (EBCA) for the project analysis work.

If proper valuation of such impacts is made all beneficial as well as harmful environmental aspects need to be expressed in monetary terms. Then such benefits and costs can be included into the cash flow analysis. Although all aspects of environmental changes can not be valued an effort has been made to value several of the environmental goods and services even in Sri Lanka. For example "Recreational Value of Peradeniya Botanic Gardens" by Abeygunawardena and Kodithuwakku (1992); "Economic Assessment of Non-market Commodities of Coconut Based Farming Systems" by Abeygunawardena and Fernando (1992) and "Economic Value of Non-timber Forest Products of Hantana Forest" by Abeygunawardena and Wickramasingha (1992) can be considered as initial effort in this direction.

For example in the Peradeniya botanic gardens study they estimated the substantial consumer surplus obtained by the users as well as finding that the recreational facilities demand a better pricing policy from the garden management based on such information. As a result today Peradeniya botanic garden generates a much higher revenue as well as providing a much better service than a few years ago. In the Hantana study Abeygunawardena and Wickramasinghe estimated that each hectare of forest provides about Rs. 2000 worth of non-timber forest products per year. Such findings open-up a new dimension to the whole area of forest management which is traditionally not considered as important. The study by Abeygunawardena and Fernando found that besides increment of income due to intercropping in coconut lands it appreciates the land value substantially.

If decision makers use such information at least as minimum values for environmental goods and services it is much easier for them to make more objective decisions leaving less room for value judgements.

Incorporating environmental aspects into project level would be a major achievement in environmental economics. This open-ups a new series of more organized benefits and costs to be included into the analysis. Further, this will pave the way to address environmental concern at the regional as well as national level of development activities. Under the system of provincial councils and recognition of the office of divisional secretaries as development units in the country, regional level development projects and programmes would be one of the prime concerns in the future. Therefore more emphasis on addressing issues of environmental economics in natural resource management at both regional and national level is urgently needed to safeguard the natural resource base of the country. Unless such priorities are set, tourism will not be able to convert into "Eco-tourism" or business will not be able to change into "green-business". Further agriculture will not be able to convert into "conservation farming". These are the areas where our major thrust will be placed on the development strategy in the twenty first century.

Environmental Accounting System/National Level

The inadequacy of the present system of national accounting (SNA of the United Nations) to represent long lasting economic progress of a country is greatly realized after acceptance of the concept of sustainable development. This notion should be reflected in economic indicators to derive a measure of long term welfare. Under the current accounting procedures man-made assets such as buildings and equipment are depreciated over time, but natural assets are not. This asymmetry sends misleading signals to policy makers and validates the idea that rapid economic growth can be achieved and maintained by exploiting natural resources. This can result in illusory gains in current income and permanent losses in wealth and future incomes. (Repetto *et al.*, 1989).

The attempts to incorporate environmental aspects within some accounting system can be traced back on the one hand to the work of Nordhaus and Tobin (1972) in the United States and, on the other hand, to the natural resource accounting modelling work of the Norwegian government beginning around 1974 (OECD, 1988). In 1974 the UN Statistical Office (UNSO) began working on the problems of organizing environmental data sets and followed it up by several environmental accounting workshops. A case study was done in Indonesia to estimate the net resource depletion and to derive a measure of sustainable income. In this case study real depletion in Java's hill farming, national forestry and petroleum was estimated and it was found that Indonesia's national income in 1984 would be lower by about 17%. Its rate of growth between 1971 and 1984 would be nearer 4% rather than the 7% which it is normally credited with (ODI, 1990).

Sri Lanka inherits an economy based on a promising stock of natural resources. The agriculture sector of Sri Lanka which includes forestry and fishing, accounts for one fourth of the country's GNP (Central Bank, 1990). The primary product of the country is comprised of agriculture, forestry and fishing which use renewable resources while mining and quarrying use exhaustible resources. The contribution of the sub sectors using renewable resources to the GNP is 23.7% while contribution from the sub sectors utilizing exhaustible resources accounts for 3% of GNP.

The viability of the agriculture sector of Sri Lanka greatly depends on fertility of the soil and climate. For example, tea the main agricultural export commodity of Sri Lanka is grown in higher elevations, and a considerable amount of top soil is lost through erosion causing decline in productivity. Though the export earnings from tea is included in conventional accounts as an income, the hidden cost of asset erosion is completely ignored and excluded from conventional accounts. Thereby the true income from these economic activities are not shown.

The contribution of natural forests to the economy is not fully understood or appreciated. Rapidly disappearing forests pose an open threat to wildlife, bio-diversity, and to watersheds. Most developing economies including Sri Lanka have a higher weightage to agricultural production in the GNP. Therefore the need of the services and environmental functions of natural forests to sustain the crop productivity is a crucial factor in these countries. A framework to incorporate environmental aspects into national income accounts in Sri Lanka can be found in Abeygunawardena and Ananda (1992).

Presently the industrial sector contributes about 15% of the GNP of the country. In the recent past it has shown a rapid growth compared to the agriculture sector of Sri Lanka. Due to the structural adjustments program of the government, expansion of export oriented industries have shown a rapid growth. As a result of rapid growth in industrial sector, it was able to make a considerable contribution to the GDP and absorbed more labour resources into this sector.

Growth of the industrial sector is expected to increase the severity of industrial pollution in the country, mainly in the urban areas. About 80% of small and medium level industries are concentrated around the capital which has the highest population density in the country. Major impacts of industrial pollution are reduction in water quality and air pollution. Further, along with the growth of the construction and transport sectors which are highly inter-linked with the industrial sector, these will develop substantial pressure on natural resource stocks and flows of the country. Therefore better ways and means of accounting these costs and benefits are urgent needs of the country where environmental economists will have an important role to play.

Training and Environmental Economics

The realization that the "Green Revolution" is really not as green as we expected it to be, has made many people use a more holistic approach to examine agricultural problems. The inability to incorporate the environmental aspects into projects and programs has resulted in many questioning the width and depth of the training that is obtained by the scientists in the country. Therefore an extremely important task the country is faced with today is to develop the necessary skills and other infrastructure to perform the extended benefit cost analysis at various levels regardless of the implementing agency whether it is public or private sector. Such an approach will certainly reduce the chance of making decisions which are not acceptable to the maintenance of natural resource base of the country.

The demand for trained professionals in these areas is expanding both as employees of the government as well as in the provincial councils. Several NGOs and the private sector have also begun recruiting persons with proper knowledge and skills in environmental management. There is a vast area of researchable problems both applied and theoretical in the areas of natural resource management in the country. Agriculture, industry and service sectors are already faced with several practical environmental problems needing the attention of researchers. Thus man power training with advanced skills to perform EIA and environmental valuations is an urgent task. This skill will be vital in almost all different areas of economic development related activities in the country.

Sri Lanka has only one Environmental Economist trained at the Ph.D. level working in the country today. There are several M.Sc level trained environmental economists attached to various institutions in the country but there is no overall co-ordination among them to produce something significant. This is primarily because they are busy with their day to day routine work and have forgotten that they are environmental economists.

Presently at the University of Peradeniya a course (30 hrs) on environmental economics is offered under new curriculum for undergraduate students at the Faculty of Agriculture. In the final year many students work on their B.Sc. thesis work in addressing environmental economics problems. The Post Graduate Institute of Agri-

culture (PGIA) offers two major courses amounting to a total of sixty hours of lectures and practicals. The PGIA has been offering this training since 1987 and several students are completing their M.Phil thesis research work on environmental economics. With the help of NAREPP/USAID the PGIA has developed two M.Sc. programmes in Environmental Economics and Natural Resource Management. It is expected to commence these two programmes for the academic year 1993/94.

Conclusion

Environmental aspects have to be considered very seriously in every aspect of economic development if such development is to be sustainable. The overall philosophy of how and when environmental economics can play a positive role in this context is answered in this paper with special reference to Sri Lanka. It is shown that linking both socio-economic systems with natural, biological and ecological systems can be made more meaningful through environmental economics. Therefore professionals in related disciplines will have to establish a continuous and constructive dialogue in the future, if the development which Sri Lanka will achieve is to be sustainable.

Sri Lanka has the highest population density in the developing world next to Bangladesh with a total population of over 17 million people. This is projected to be 25 million in year 2040 and there will be a tremendous pressure on natural and bio-resources to produce more food, fiber and energy in the future. Economic progress in Sri Lanka relies highly on natural resources and on the productivity of the natural systems, regardless of the initiatives that come through the field of agriculture or industry. In this process it is necessary to maintain the natural resource base in a sustainable manner. Although food production has put increasing pressure on environment and bio-resources, it is important to find the ways to manage these two aspects in a complementary manner instead of as competitive goals.

Given these circumstances the role of environmental economics in the future development of Sri Lanka will be a key factor and this paper highlighted the main areas where it is crucial. Regardless of the economic activities, whether they are enterprise, firm, project, regional or national level, the role of environmental economics is indispensable. The traditional belief that economic development is the prime enemy of natural environment will have to be changed.

At the enterprise level it is shown that internalization of externalities can be done. If so it is quite clear that on-site environmental considerations can be addressed within private accounting. At the project level via extended benefit cost analysis most of the off-site impacts as well as some of the intertemporal aspects can be taken into account. For regional and national level economic activities a certain amount of public involvement is necessary to address the issues which are not taken care of by the other parties such as individuals or groups. Required public policies however, will be quite diverse and they depend on the nature of the environmental issue which is focused on.

Finally it is stressed that the above mentioned role of environmental economics can not be performed if the necessary man power is not trained and made available in the country. In this process universities will have a prime responsibility of training young minds both at undergraduate as well as at postgraduate levels to take these challenges. In this context it is important to divert social scientists especially economists with bio-physical science backgrounds in these directions. If younger and brighter minds devoted more and more attention to environmental economics, Sri Lanka can face the 21st century reasonably well.

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