Integrated Environmental Management Information Series

Environmental Economics 16

Department of
Environmental Affairs and Tourism

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PREFACE

This document is one of a series of overview information documents on the concepts of, and approaches to, Integrated Environmental Management (IEM). IEM is a key instrument of South Africa's National Environmental Management Act, (Act 107 of 1998) (NEMA). South Africa's NEMA promotes the integrated environmental management of activities that may have a significant effect (positive and negative) on the environment. IEM provides the overarching framework for the integration of environmental assessment and management principles into environmental decision-making. It includes the use of several environmental assessment and management tools that are appropriate for the various levels of decision-making.

The aim of this document series is to provide general information on techniques, tools and processes for environmental assessment and management. The material in this document draws upon experience and knowledge from South African

practitioners and authorities, and published literature on international best practice. This document is aimed at a broad readership, which includes government authorities (who are responsible for reviewing and commenting on environmental reports and interacting in environmental processes), environmental professionals (who undertake or are involved in environmental assessments as part of their professional practice), academics (who are interested in and active in the environmental assessment field from a research, teaching and training perspective), non-government organisations (NGOs) and interested persons. It is hoped that this document will also be of interest to practitioners, government authorities and academics from around the world.

This document has been designed for use in South Africa and it cannot reflect all the specific requirements, practice and procedures of environmental assessment in other countries.

This series of documents is not meant to encompass every possible concept, consideration, issue or process in the range of environmental assessment and management tools. Proper use of this series of documents is as a generic reference, with the understanding that it will be revised and supplemented by detailed guideline documents.

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Note
All sources used have been acknowledged by means of complete references.

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SUMMARY

Environmental economics helps identify the costs and benefits of projects and given the costs and benefits, help select the best alternative option.

Environmental economics identify the costs and benefits (negative and positive environmental impacts) not taken into account by economics agents (external costs). In addition there are those cost and benefits the producers and consumers do take account of (private costs). The sum of the private and external costs is known as the social cost. In most cases, full social costs and benefits are not accounted for in markets prices and environmental economics present a number of valuation techniques to internalise such environmental impacts. These values facilitate a better understanding of the trade-offs between alternative economic values.

There are a number of valuation techniques that can be used to evaluate the total economic value. These are highlighted in this document. The resulting environmental values can be used by decision makers to choose projects that maximize the welfare for society.

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1. INTRODUCTION

The added value of an application of environmental and resource economic tools in the assessment of environmental impacts have been spelled out clearly in the literature on economics and the environment (see Dixon et *al*, 1994, Georgiou *et al*, 1997, Pearce and Turner 1990, Turner *et al*. 1993, Winpenny 1991). The key point is that the scarcity of natural and environmental resources often forces a choice between development, or at least an assessment of the best alternative options available. Natural and environmental issues may be critical to the success and failure of a project, programme or policy. Given that the purpose of integrated environmental management (IEM) is to resolve or to lesson any negative environmental impacts and to enhance positive aspects of development proposals, environmental economic tools provide a better understanding on the trade-offs between competing uses of natural and environmental resources. Specific environmental economic valuation tools and techniques to integrate quantifiable environmental, economic and social effects are used to inform these choices.

Economics is concerned about the satisfaction od man's unlimited wants with the scarce resources available. It is this concept of relative scarcity that imparts economic value to a good or service. Environmental economics is a branch of welfare theory-it focuses at the design of interventions that help attain economic efficiency when the market mechanism (or the invisible hand) is not working properly or when market failure occurs. Market failure does occur when property rights are not well-defined (e.g. air, ocean), when rights to the use of resources cannot be transferred, or when the costs of bargaining exceed the benefits of doing so. Once such externalised values are quantified they are included in standard decision analysis tools like cost benefit analysis and multi-criterion decision analysis. The valuation of environmental impacts is a skill used by environmental economists to inform such an integrated evaluation.

In summary, the science of environmental and resource economics strengthens environmental assessment in the following ways (Kirkpatrick 2000):

* it allows the size of different environmental impacts to be compared;
* it allows different environmental impacts to be aggregated into a single measure
* it provides the basis for clear and defensible decision-making criteria; and
* it allows environmental impacts to be considered along with the other economic benefits and costs of a development proposal.

For detailed information on the value of applying environmental economics tools to the assessment of environmental impacts refer to Dixon et al. (1994), Georgiou et al. (1997), Pearce and Turner (1990), Turner et al. (1993) and Winpenny (1991).

2. PURPOSE OF THIS DOCUMENT

This document focuses on providing introductory background information on the techniques available for placing monetary value on environmental impacts. This document is written as an introductory text to be used by a wide range of people, including policy makers, environmental practitioners, academics, interested and affected parties (I&APs) and developers. This document does not prescribe specific methods to use, but rather provides information on the range of tools that are available in the environmental economics field.

3. BACKGROUND TO ENVIRONMENTAL ECONOMICS

A basic premise of economics is that a free market will allocate scarce resources in the most efficient possible way. It can happen, however, that the market fails in this function. Such 'market failure' can have many causes (incomplete information, government intervention, costs of performing transactions etc.). Environmental economics is concerned with failures caused by missing or incomplete information. For example, because there is no direct value (i.e. market) for clean air, the market system cannot be relied on to internalise the impacts of air pollution. These impacts manifest themselves as non-marketed goods and services called externalities (unpaid and uncompensated impacts). An externality is the impact that a person or company's economic activity has on other parties. For example, a factory may discharge pollutants into a water source, which is used by farmers for irrigation. The cost of the decline in water quality (as a result of the factory's polluting activity) is not accounted for by the factory. However, the impact of the poor water quality will affect the farmers agricultural output and earnings. The cost of the decline in water-quality (externality) is therefore borne by the farmers.

Resource economics focuses on the efficiency, sustainability and social welfare implications of natural resource extraction or harvesting (Hotelling, 1931). Ecological economics is a newer discipline that has emerged out of a concern that the conceptual framework used in environmental and resource economics is flawed. The argument against environmental and resource economics is that the focus is unduly on conventional measures of growth rather than sustainable development. These fields fail to adequately identify the role of the environment as a sink for wastes and by-products of production and consumption. Ecological economics advances more stringent notions of sustainability, going beyond the treatment found in conventional neoclassical economics. This includes reduction in population growth, minimization of raw material and energy throughputs, and aims for systemic efficiency. Much of it was informed by Kenneth Boulding's "Spaceship Earth" (Boulding, 1966) and by Georgescu-Roegen's extension of the laws of thermodynamics into economic theory (Georgescu-Roegen, 1971). Both environmental and resource economics are built on concepts in welfare economics, the underlying question being whether an economic policy will improve human welfare (Dinwiddy and Teal, 1996:77). By applying economic analysis, environmental economists are attempting to measure people's preference for a change in environmental quality and in turn the welfare (i.e. social benefit) gained from improved environmental quality (Pearce et al., 1989:52). This document focuses on the field of environmental economics because it provides a useful framework for using various tools to

value environmental impacts. At a global level, environmental economics has an extensive history of application to various environmental assessment processes.

4. KEY CONCEPTS IN ENVIRONMENTAL ECONOMICS

At the heart of environmental economics are a few concepts namely: opportunity costs, external costs, social costs and private costs. The *opportunity cost* of a particular environmental resource is the net benefit forgone by not using it in the next most beneficial use (Tietenberg, 1992:25). For example, suppose that the alternative options for using a stretch of river, is either recreational use (e.g. white water rafting) or the construction of a hydro-electric plant. Since it may not be possible for these uses to coexist, the choice is exclusive (i.e. one or the other). Thus, the opportunity cost of building a hydro-electric plant includes the lost revenues recreational users would have been willing to pay to enjoy nature's services.

An externality is an environmental or social effect that is felt externally. The effect is felt by persons or communities external to a project. The project proponent or developer who pays the financial costs and received benefits of a particular project is not affected by the external impact (Pearce et al., 1998). An externality occurs when a decision taken by an economic agent does not take into account the impact he or she has on the welfare of other economic agents and the environment (Grafton et al., 2001: 98). A coal-fired power station has its own financial costs (cost of coal, wages, maintenance, capital depreciation etc.), however once operating it may impose negative health costs on society as a result of pollution. When project construction or operating costs are incurred in order to reduce air pollution, the external costs are said to have been 'internalised'.

According to economic theory there can be optimal levels of externalities (or pollution). This idea of 'the right amount of pollution' rests on the concepts of marginal social cost (MSC), marginal private cost (MPC) and marginal external cost (MEC). Marginal costs are the costs of adding one additional unit to a project.

Marginal social cost is the cost one more unit of production output imposes on society. Producing that unit involved an additional private cost to the producer (MPC) and an incremental external cost borne by society (MEC).

Marginal social cost (MSC) is defined as the sum of two components: (1) the marginal private cost (MPC), which is the share of marginal cost caused by an activity that is paid for by the person or company carrying out an activity; and (2) the marginal external cost (MEC), which is the share borne by others (Guveya, 2000). If increased production by a factory increases solid, liquid and atmospheric pollution, then in addition to the company's private cost, expansion of production imposes external costs on others in the form of pollution. These are part of the project's or company's marginal social costs. Where the company's activities result in negative externalities, its marginal social cost will be greater than its marginal private cost (Figure 1). When the market is in equilibrium it will yield an output at which the consumer's marginal utility (MSB) is equal to the company's marginal private cost (MPC) (see Qp in Figure 1).

The consumers marginal utility (or marginal social benefit) is then smaller than the marginal social cost (MSC is indicated as position Q* in Figure 1). Society will benefit if output of the production were to be reduced (Guveya, 2000). It would lose the marginal utility (or benefit) but save the marginal social cost. Marginal social cost is greater than the marginal social benefit, meaning that the company's activity caused a negative externality (MEC).

Economic efficiency (the economically optimal amount of production and pollution reduction) is achieved when the price of a product is equal to its MSC. Figure 1 illustrates the output of production and the price of a product that generates a negative externality. Left to itself the industry would be producing Qp units, but the economically optimal output would be Q*.

The damage done by the increase in pollution following production or consumption of an extra unit of a product (good) is referred to as its marginal damage. Marginal damage cost is the amount that society is willing to pay to avoid damage or improve the quality of the environment (Hussein, 2000: 288). Pollution damage can however be reduced (or controlled) by investing in pollution control equipment (e.g. cleaner technology mechanisms) or reducing output. The cost of controlling or reducing pollution by a unit is known as the marginal abatement cost or marginal control cost. Figure 2 illustrates the relationship between marginal damage and marginal control cost. Marginal control costs commonly increase with an increase in pollution quantity and with the amount of emissions controlled (Tietenberg, 1992).

Figure 1: Illustration of the effects of a negative externality in production.

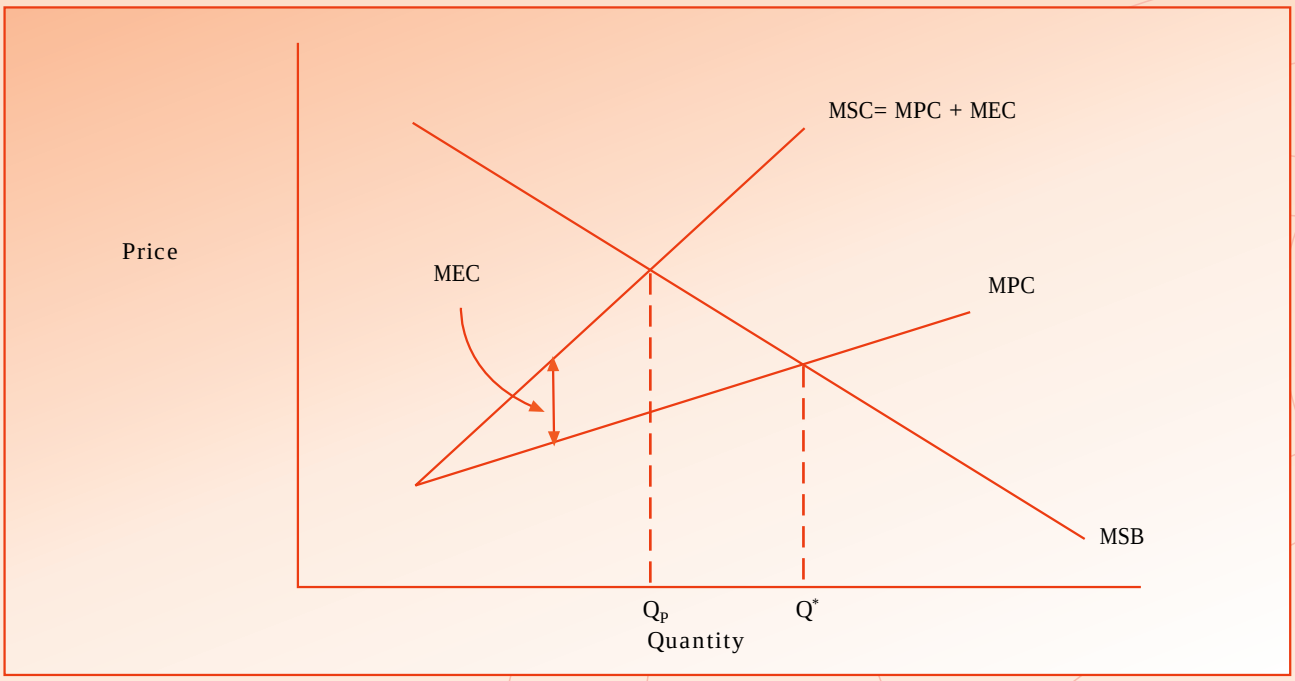
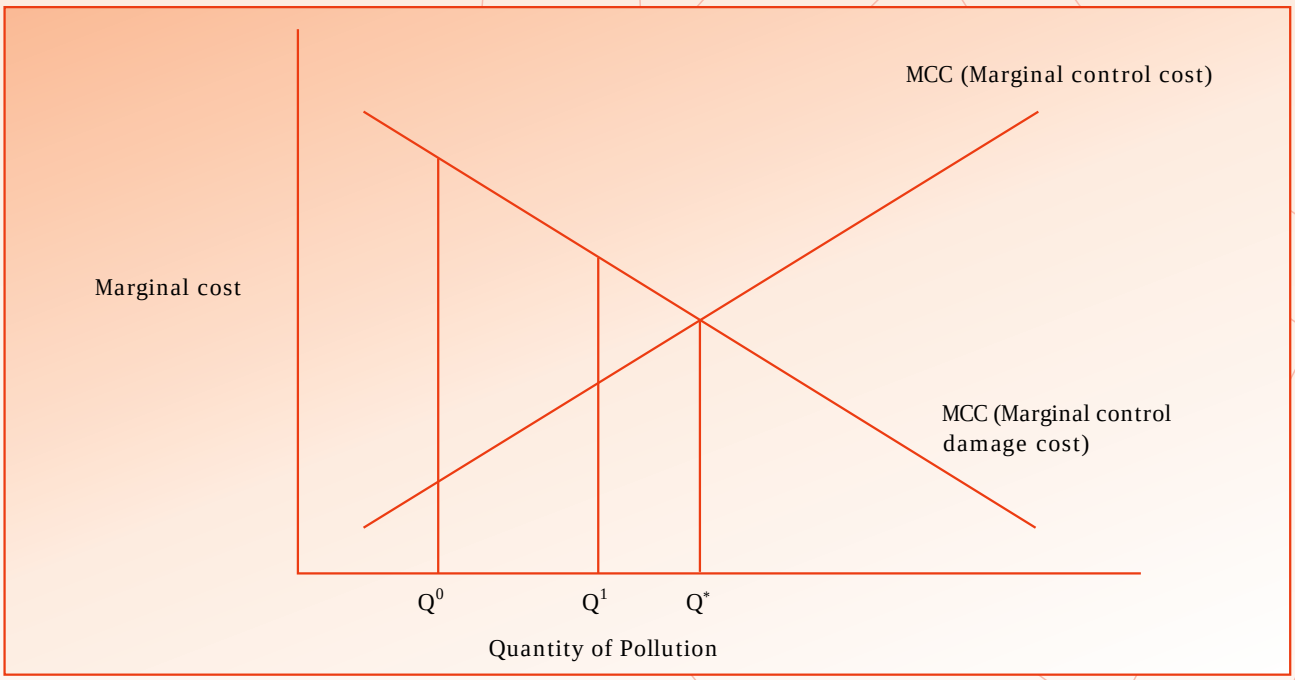


Figure 2: Illustration of the relationship between marginal damage cost and marginal control costs.



A movement from the right to the left in Figure 2 refers to greater control and less pollution emitted. Efficient allocation is represented by Q*, the point where the damage caused by the marginal unit of pollution is exactly equal to the marginal costs of controlling it.

Points to the right of Q* are economically speaking inefficient because the marginal control cost exceed the cost of reduction in damages. The points to the left of Q* are also inefficient because marginal damage cost exceed marginal control cost. This means that the additional damage of increasing pollution is more than the additional costs incurred to curb such pollution.

5. VALUING THE ENVIRONMENT

The aim of integrated environmental management is to ensure that the environmental considerations of development proposals are integrated into the entire project life cycle so that negative environmental impacts are mitigated and positive aspects are enhanced. A useful framework to inform such a process is the concept of total economic value (TEV) (Turner et al., 1994, Bateman, 1999).

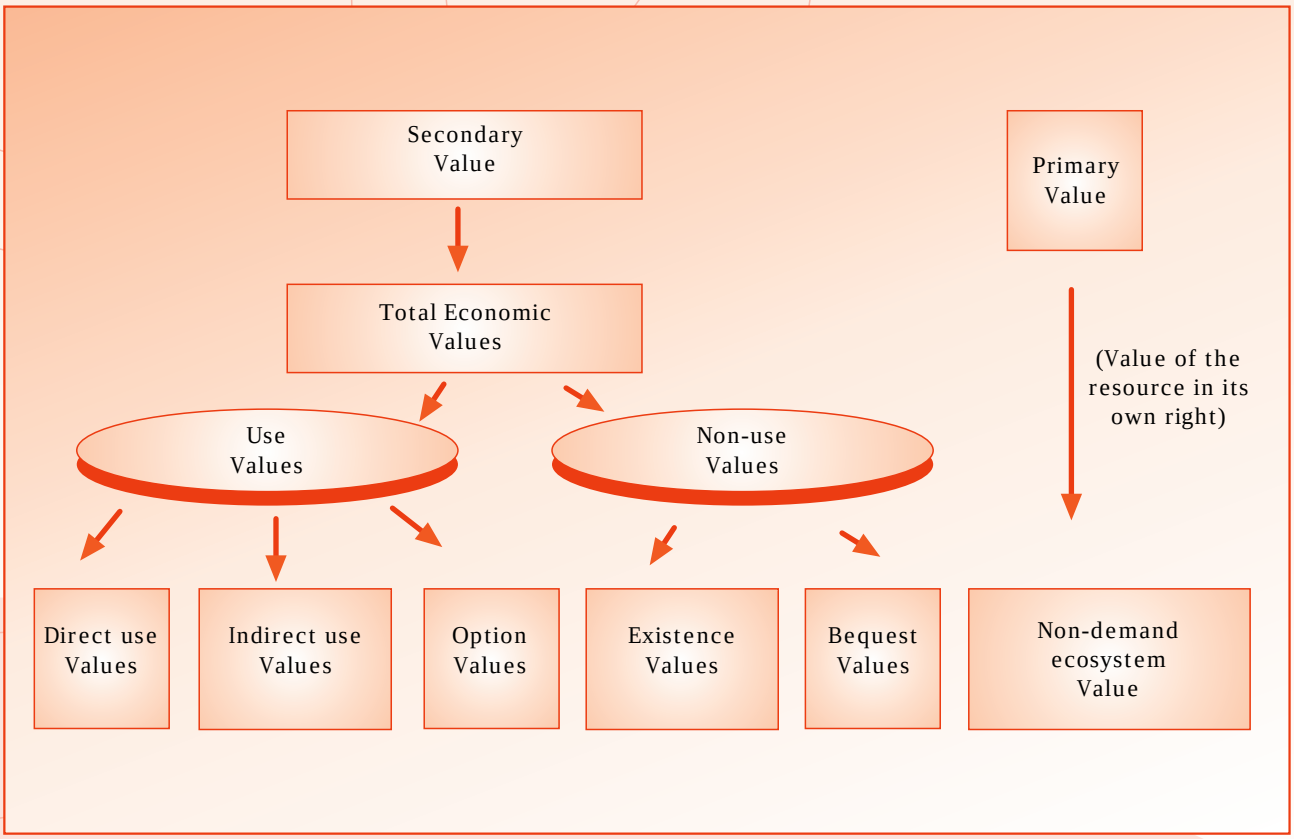
Figure 3 provides a framework for understanding the primary and secondary values of the environment. Environmental values are seldom accounted for in market prices. The primary value of the environment is its intrinsic value (i.e. the value of the resource in its own right). The secondary value of the environment is the total economic value of environmental impacts. The breakdown of total economic values into use and non-use values (or more specifically: direct use, indirect use, option, existence and bequest values) is a useful conceptualisation of the secondary values of the environment.

Direct use values
Direct use values can be categorised as consumptive (e.g. commercial or industrial market goods such as timber or minerals) and non-consumptive uses (e.g. recreation, cultural and spiritual use). Direct use values refers to benefits that accrue from direct use of an environmental asset. This is generally the easiest component of TEV to value. Direct use values relates to observable quantities of resources or products whose market places can be observed (Kirkpatrick, 2000).

Indirect use values
Indirect use values refer to services from nature known as 'ecological functions'.
Indirect values derives from the services that the environment provides (e.g. watershed protection, carbon sequestration, nutrient recycling) in addition to and separately from direct use value (Kirkpatrick, 2000)..

Option values
Option value is the value obtained from retaining an option on the future use of an asset. No use is made of the asset now but there is value in retaining it for possible use in the future (Kirkpatrick, 2000). Option values are an expression of preference, a willingness-to-pay for the preservation or conservation of an environment against the probability that the individual will make use of it later.

Figure 3: The total economic value (TEV) of the environmental impacts of projects can be disaggregated into individual components, based on their different attributes (adapted from Turner et al., 1994).



Existence and bequest values

Existence and bequest values are both non-use value items in TEV. The non-use value derives from the benefits that the environment provides which do not involve using it in any way. Existence value is derived from the knowledge that something exists. For example, a value is placed on the protection of rare and endangered animals to exist (Kirkpatrick, 2000).

Bequest value measures an individual's willingness-to-pay to ensure that a natural resource is preserved for the benefit of future generations. Bequest values are non-use values for the current generation, but a potential future use or non-use value for their descendants. Determining use values is more common than to calculate the non-use and primary values of a resource. Should only the use values be calculated, the value of the resource would grossly be underestimated but it would render an estimate of the lower bound value of the resource.

Bequest value is therefore the value derived from the knowledge that something is being passed on to a future generation (Kirkpatrick, 2000). Existence value measures the willingness to pay for the preservation or conservation of a natural resource that is not related to either current or optional use. Existence values are based on the concept of the natural resource being allowed to exist and function.

6. VALUATION TECHNIQUES

The key feature of cost benefit studies is that money is used as a common denominator, where all impacts are valued. Negative impacts are costs and positive impacts are benefits. This presents a problem when projects or policies have environmental or social implications that cannot be measured using a simple market price. Where such impacts exist the economist has to establish what the implicit market value would be.

Economic and financial analysis are commonly used in project evaluation. Financial analysis focuses primarily on market prices and cash flow. Economic analysis attempts to address the total economic value of the effects that development projects have on the environment. Project analysis usually focuses on the easily measured direct benefits and costs and often ignore the economic externalities. The identification and inclusion of economic externalities is at the basis of environmental economics (Dixon et al., 1994). The choice of method to measure and value environmental impacts depend on whether there are readily available market prices or whether hypothetical markets have to be constructed (e.g. by using sampling and survey methods). The choice of the valuation method depends on what needs to be measured. Table 1 lists the various techniques that can be used to measure and value environmental impacts.

The techniques listed in Table 1 measure and value specific impacts.

Table 1: Techniques that can be used to value environmental goods and services and that can be used to quantify environmental impacts (adapted from Dixon et al., 1994).

General applicable and standard approaches that rely on physical production or on direct cash expenditures
Approaches that use market value of goods and services * changes in productivity * cost-of-illness * opportunity-cost
Cost-side approaches that use the value of actual or potential expenditure * cost-effectiveness * preventative expenditure * replacement costs * relocation costs * shadow project
Approaches that are selectively applicable and can only be used in certain situations * surrogate market techniques * travel-cost * marketed goods as environmental surrogates * contingent valuation techniques
Potentially applicable techniques Hedonic methods: * Property and land value approaches * Wage-differential approach
Macro-economic models: * Linear programming * Natural resource accounting * Economy-wide impacts

The choice of a particular technique of measurement (Table 1) will depend on what needs to be valued. Figure 4 presents a flow diagram to determine how and where an environmental economic analysis can be initiated.

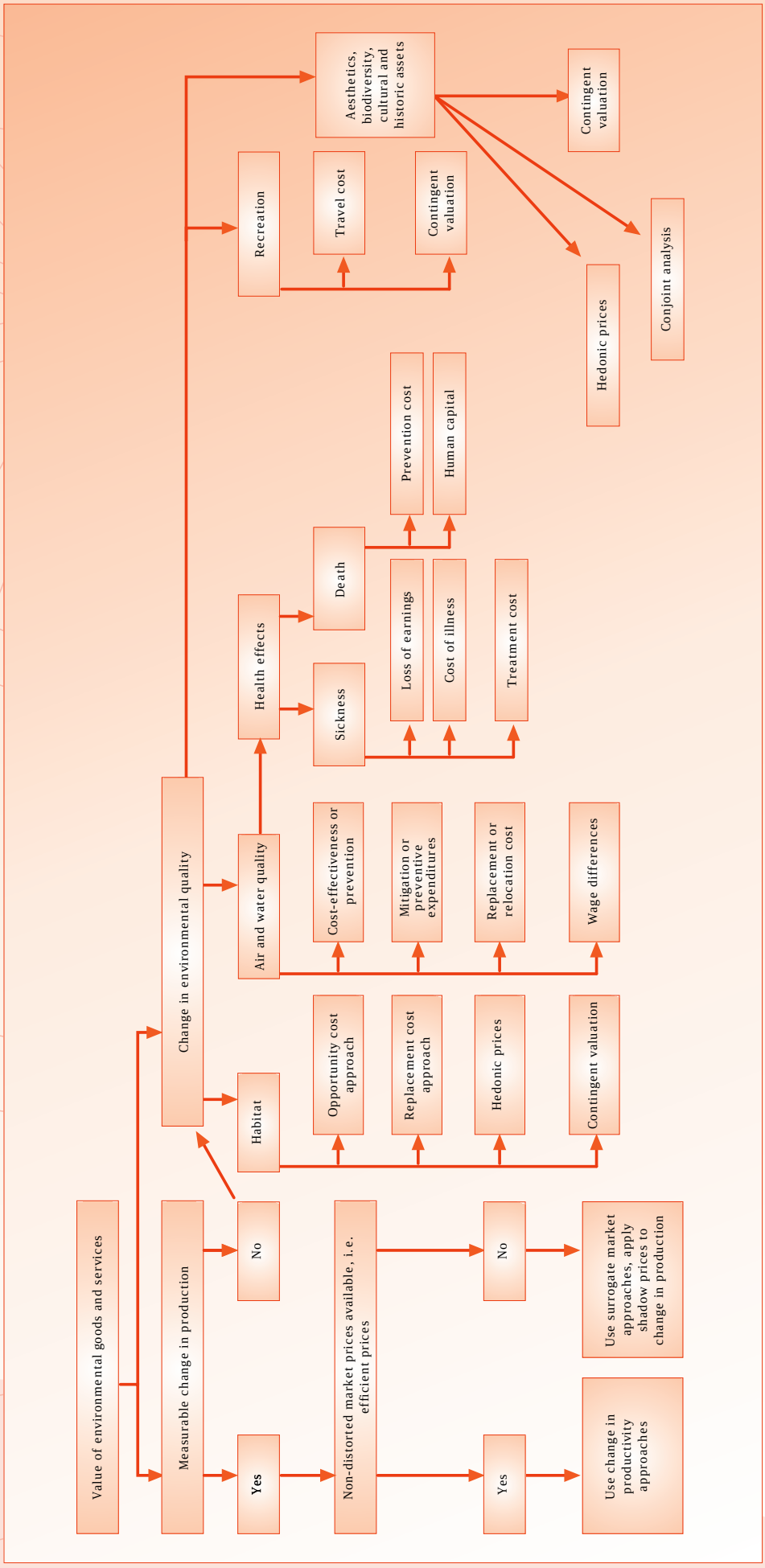


Figure 4: Flow diagram to determine appropriate environmental economic technique (adapted from Dixon et al., 1994).

6.1 Assumed preference techniques

This category of techniques uses the market prices of actual goods and services to value the effects of changes in environmental quality. However, the market prices used are only reliable to the extent that they are not distorted e.g. by monopoly power, taxes and subsidies. Four commonly used assumed preference techniques are:-

* changes in productivity;
* cost of illness;
* replacement costs; and
* preventative or mitigation expenditure.

Changes in productivity
Physical changes in production are valued by using market prices for inputs and outputs (Winpenny; 1991:45). For example, water pollution can destroy or reduce productivity in a fishery or mariculture operation. The change in value of the commercial fishery's annual harvest is a component of the value of the water pollution.

Cost of illness
This technique uses a dose response function combined with a measure of worker incomes to value the cost of pollution related to morbidity (rate of infection). More controversially, the same function combined with a value of human life can be used to value impacts on mortality rates. In other words, the damage function relates level of pollution (which is commonly termed the dose) to the degree of health effect (which is commonly termed the response).

Replacement cost
Measures costs incurred in replacing an asset damaged by a project. A factory may emit sulphur dioxide, which is one of the main contributors of the damage caused to buildings. The replacement cost technique values the sulphur dioxide damage by using the cost of repairing the building (e.g. concrete replacement, painting, steel replacement and stone refacing) (Eyre et al.; 1997:15).

Preventive or mitigation expenditure
This technique examines the actual expenditures that is made in an attempt to avert damage from pollution. For example, the amount of money spent on double glazing windows to insulate buildings from noise pollution.

6.2 Revealed preference technique

The revealed preference method includes the travel cost method and the hedonic pricing method. It derives the individuals willingness to pay for a natural (or non-market) resource by observing their economic behaviour in associated markets.

Hedonic pricing method
The hedonic pricing method estimates the value of non-market amenities by assuming that the price of a marketed good is related to its different characteristics (Mitchell and Carson, 1989:80). An example of this method is the property market where the price of a particular house is an indication of the characteristics of the house (e.g. plot size, number of rooms, number of bathrooms, etc.) (OECD, 1994:143).

Travel cost method
The travel cost method values a non-market environmental good, for example, the scenic view of a recreational area, by using consumption in related markets. For example, entry fees, expenditure on plane tickets and petrol expenditures are all used as a proxy for the value of a recreational site.

6.3 Expressed preference technique

The expressed preference technique, which includes the contingent valuation method, directly asks individuals their willingness to pay in a hypothetical situation using surveys. The value of an environmental resource is either expressed in maximum willingness-to-pay to obtain more of the amenity or to preserve the amenity or as the minimum willingness-to-accept compensation for a decline in the quality or quantity of the amenity. As a result of willingness-to-pay values being contingent upon the hypothetical market described to respondents, this approach to the valuation of non-market goods is also known as the contingent valuation method (Mitchell and Carson, 1989:3).

6.4 Benefit Transfer

Benefit transfer is the process by which the demand function and values from one particular study can be applied to estimate the benefits of another study termed the policy site. If a benefit transfer is to be applied, the study site (site of previous research) should be comparable to the policy site in terms of population characteristics, the provision of goods and property rights. The issues in the two sites should be similar and the policy site should have employed a sound valuation procedure (Desvousges et al., 1998:26-28).

6.5 Shadow projects

A shadow project is usually required to restore the environmental damage produced by another project. This is a special type of the replacement-cost technique. For example, assume that an original project is to build a dam that will result in the destruction of forest (Munasinghe, 1993). The shadow project will entail replanting an equivalent area of forest elsewhere. The assumption implicit in this type of analysis is that the human built alternative will provide the same quantity and quality of goods and services as the original forest. An additional assumption is that the cost of the shadow project will not exceed the value of the lost productive service of the original resource (Dixon et al., 1994:61).

7. CONCLUSIONS

Once the relevant costs and benefits are estimated by environmental valuation techniques, an economic evaluation can then be applied. Economic evaluation is a tool used by decision-makers to aid them in choosing projects that attempts to maximize the welfare of society. This is essentially achieved by comparing the sum of the external and financial benefits to that of the external and financial costs of a particular project. It could also be used to compare the net benefits of a number of potential projects. Economic valuation of the environment has the potential for integrating quantifiable environmental, economic and social effects (Crookes and de Wit, 2002: 131). The inclusion of environmental costs is a worthwhile extension to traditional financial-economic evaluation, by making external costs explicit and part of the economic analysis.

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9. GLOSSARY

Definitions

Affected environment

Those parts of the socio-economic and biophysical environment impacted on by the development.

Affected public

Groups, organizations, and or individuals who believe that an action might affect them.

Alternative proposal

A possible course of action, in place of another, that would meet the same purpose and need. Alternative proposals can refer to any of the following but are not necessarily limited thereto:

* alternative sites for development
* alternative projects for a particular site
* alternative site layouts
* alternative designs
* alternative processes
* alternative materials

In IEM the so-called “no-go” alternative also requires investigation.

Authorities

The national, provincial or local authorities, which have a decision-making role or interest in the proposal or activity. The term includes the lead authority as well as other authorities.

Baseline

Conditions that currently exist. Also called “existing conditions.”

Baseline information

Information derived from data which:

* Records the existing elements and trends in the environment; and
* Records the characteristics of a given project proposal

Economics

Study of how society allocates scarce resources.

Decision-maker

The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal.

Decision-making

The sequence of steps, actions or procedures that result in decisions, at any stage of a proposal.

Economic efficiency

Economic efficiency holds that it is impossible to improve one person's well being without making someone else worse-off.

Environment

The surroundings within which humans exist and that are made up of -

i. the land, water and atmosphere of the earth;

ii. micro-organisms, plant and animal life;

iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and

iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being. This includes the economic, cultural, historical, and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

Environmental Assessment (EA)

The generic term for all forms of environmental assessment for projects, plans, programmes or policies. This includes methods/tools such as EIA, strategic environmental assessment, sustainability assessment and risk assessment.

Environmental consultant

Individuals or firms who act in an independent and unbiased manner to provide information for decision-making.

Environmental valuation

Procedures for valuing changes in environmental goods and services,whether or not they are traded in markets, by measuring the changes in the producer and consumer surpluses associated with these environmental goods.

Environmental Impact Assessment (EIA)

A public process, which is used to identify, predict and assess the potential environmental impacts of a proposed project on the environment. The EIA is used to inform decision-making.

Externalities

A benefit or cost associated with an economic transaction, which is not taken into account by those directly involved in making it. A beneficial or adverse side effect of production or consumption.

Fatal flaw

Any problem, issue or conflict (real or perceived) that could result in proposals being rejected or stopped.

Free market

With free market, there is not intervention by government in the market, the price is determined by demand and supply.

Impact

The positive or negative effects on human well-being and/or on the environment.

Integrated Environmental Management (IEM)

A philosophy which prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity - at the local, national and international level - that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools to a particular proposal or activity. These may include environmental assessment tools (such as Strategic Environmental Assessment and Risk Assessment); environmental management tools (such as monitoring, auditing and reporting) and decision-making tools (such as multi-criteria decision-support systems or advisory councils).

Interested and affected parties (I&APs)

Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. These may include local communities, investors, business associations, trade unions, customers, consumers and environmental interest groups. The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Lead authority

The environmental authority at the national, provincial or local level entrusted in terms of legislation, with the responsibility for granting approval to a proposal or allocating resources and for directing or coordinating the assessment of a proposal that affects a number of authorities.

Marginal control cost

The cost of controlling or reducing pollution by a unit is the marginal abatement cost

Marginal damage

The damage done by the increase in pollution following production or consumption of an extra unit of a good.

Marginal damage cost

The amount that society is willing to pay to avoid damage or improve the quality of the environment.

Markets

Any coming together of buyers and sellers of produced goods and services or the services of productive factors.

Market failure

Instances of a free market being unable to achieve an optimum allocation of resources.

Mitigate

The implementation of practical measures to reduce adverse impacts.

Non-governmental organizations (NGOs)

Voluntary environmental, social, labour or community organisations, charities or pressure groups.

Opportunity cost

The best alternative sacrificed to have or to do something else.

Proponent

Any individual, government department, authority, industry or association proposing an activity (e.g. project, programme or policy).

Proposal

The development of a project, plan, programme or policy. Proposals can refer to new initiatives or extensions and revisions to existing ones.

Private costs

The portion of the cost of an economic decision, which accrues to the party making that decision. These are direct cost incurred by the producers.

Public

Ordinary citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

Role-players

The stakeholders who play a role in the environmental decision-making process. This role is determined by the level of engagement and the objectives set at the outset of the process.

Scoping

The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.

Screening

A decision-making process to determine whether or not a development proposal requires environmental assessment, and if so, what level of assessment is appropriate. Screening is initiated during the early stages of the development of a proposal.

Significant/significance

Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic). Such judgement reflects the political reality of impact assessment in which significance is translated into public acceptability of impacts.

Social costs

The sum of private costs and external costs

Stakeholders

A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (I&APs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Stakeholder engagement

The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term "public participation".

Stakeholder engagement practitioner

Individuals or firms whose role it is to act as independent, objective facilitators, mediators, conciliators or arbitrators in the stakeholder engagement process. The principle of independence and objectivity excludes stakeholder engagement practitioners from being considered stakeholders.

ABBREVIATIONS

CBO	Community-based Organization
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management Systems
I&AP	Interested and Affected Party
IEM	Integrated Environmental Management
NGO	Non-governmental Organization
SEA	Strategic Environmental Assessment

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