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Environmental management — Guidelines for determining environmental costs and benefits

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 207, *Environmental management*, SC 1, *Environmental management systems*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Growing economic consequences regarding climate change impacts (in addition to mitigation and adaption measures), concerns about the global depletion of natural resources and the loss of functioning ecosystems are resulting in many challenges for organizations and society as a whole. Dependencies on natural capital (e.g. water, soil fertility, habitats, landscapes) on the one hand and the impact on the environment on the other hand are important issues for organizations and their interested parties in terms of strategic, operational or financial consequences along the whole value chain. There is a need for guidance on practical methods on how to assess and evaluate the economic consequences of environmental actions. Determining environmental costs and environmental benefits will help organizations to manage environment-related risks and opportunities.

Environmental costs are any costs related to the environment, which can result from, for example, the loss of natural capital that companies are dependent on, impacts on human health and the environment or environmental legislation-related compliance costs. Environmental benefits are any benefits related to the environment, which can result from, for example, natural resources used within products or the production processes of a given organization, including their value chain.

Understanding its environmental costs and benefits allows an organization to link environmental impacts and dependencies to its decision-making processes. This can create a better understanding of issues, such as the financial implications related to the environmental aspects of a site, the organization as a whole, or the organization's supply or value chain. It can improve operational performance, risk management, investment decisions and corporate communications. Using this document to determine environmental costs and benefits can help an organization to manage its environmental dependencies and to mitigate its environmental impacts. It will also help to align an organization's activities with national and international environmental goals or agreements.

This document provides organizations with guidance on determining and documenting environmental costs and benefits in a comprehensive and transparent way, either quantified in monetary or non-monetary terms, or described qualitatively. Assessments of the environmental costs and benefits can be carried out either ex-ante or ex-post. Guidance is provided to help organizations to disclose and exchange relevant information.

If organizations wish to assess environmental costs and benefits in monetary terms, the economic valuation methods in this document only capture changes that affect human wellbeing (utility), i.e. it takes a so-called "anthropocentric perspective", including their concern for, and dependence on, nature and ecosystem services. This includes use and non-use values as reflected in the concept of total economic value.

This document is intended for all sizes of organizations and all sectors. It can be applied to private or listed enterprises, organizations that are held by the public or are a public service unit, those that have a role as a large global actor or a small and medium-sized enterprise.

This document is suitable for use by managers, accountants, researchers and consultants who want to determine environmental costs and benefits. The work will require input from several operational areas that will need to provide relevant information. This document can help in the integration of financial and non-financial information in order to better inform organizational decision-making.

Environmental management — Guidelines for determining environmental costs and benefits

1 Scope

This document gives guidelines for organizations on determining the environmental costs and benefits associated with their environmental aspects. It addresses the dependencies of an organization on the environment, for example, natural resources, and the context in which the organization operates or is located. Environmental costs and benefits can be expressed quantitatively, in both non-monetary and monetary terms, or qualitatively.

This document also provides guidance for organizations when disclosing related information.

This document takes an anthropocentric perspective, i.e. looking at changes that affect human wellbeing (utility) including their concern for, and dependence on, nature and ecosystem services. This includes use and non-use values as reflected in the concept of total economic value when environmental costs and benefits are determined in monetary terms.

The ways in which the environmental costs and benefits are used after they have been determined are outside the scope of this document.

This document is applicable to any organization regardless of size, type and nature.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1 Organizations and the environment

3.1.1
natural resource
part of nature that provides benefits to humans or underpins human well-being

[SOURCE: ISO 14008:2019, 3.1.5]

3.1.2
product
item or service provided by an organization

3.1.3
good
something that satisfies human wants or needs

Note 1 to entry: A good can be a *natural resource* (3.1.1), an *ecosystem* (3.1.8) service, a *product* (3.1.2) or human health. It can be marketed or not, or be provided by an organization or not.

3.1.4
assessment
systematic process of collecting, processing and analysing information

3.1.5
environmental condition
state or characteristic of the environment as determined at a certain point in time

Note 1 to entry: Organizations can be affected by the state of the environment, e.g. through their dependency on weather-related events or the availability of water or other *natural resources* (3.1.1).

Note 2 to entry: The stock, flows and quality of renewable and non-renewable natural resources (e.g. plants, animals, air, water, soils, minerals) that benefit organizations and society are also referred to as "natural capital".

[SOURCE: ISO 14001:2015, 3.2.3, modified— Notes 1 and 2 to entry have been added.]

3.1.6
environmental dependency
reliance on the use of environmental resources or processes

Note 1 to entry: Expressions similar to "dependency … on the environment" are equivalent.

3.1.7
environmental dependency pathway
causal relationship ultimately starting at an *environmental condition* (3.1.5) and ending at an effect on the organization

3.1.8
ecosystem
dynamic complex of plant, animal, and micro-organism communities, and their non-living environment interacting as a functional entity

EXAMPLE Deserts, coral reefs, wetlands, rain forests, boreal forests, grasslands, urban parks, cultivated farmlands.

Note 1 to entry: Ecosystems can be influenced by human activity.

[SOURCE: ISO 14008:2019, 3.1.6]

3.1.9
ecosystem service
benefit people obtain from *ecosystems* (3.1.8)

Note 1 to entry: Ecosystem services are generally distinguished into provisioning, regulating, supporting and cultural services. Ecosystem services include the provisioning of *goods* (3.1.3) (e.g. food, fuel, raw materials, fibre), regulating services (e.g. climate regulation, disease control), and non-material benefits (cultural services) (e.g. spiritual or aesthetic benefits). The supporting services are necessary for the production of all other ecosystem services (e.g. soil formation, nutrient cycling, water cycling) and are also referred to as "ecosystem functions".

Note 2 to entry: Ecosystem services are sometimes called "environmental services" or "ecological services".

[SOURCE: ISO 14008:2019, 3.2.11]

3.1.10
environmental aspect
element of an organization's activities or *products* (3.1.2) that interacts or can interact with the environment

Note 1 to entry: An environmental aspect can cause (an) *environmental impact(s)* (3.1.11). A significant environmental aspect is one that has or can have one or more significant environmental impact(s).

Note 2 to entry: Significant environmental aspects are determined by the organization applying one or more criteria. This process can be referred to as a "materiality assessment".

[SOURCE: ISO 14001:2015, 3.2.2, modified— "or services" has been deleted and Note 2 to entry has been extended.]

3.1.11
environmental impact
change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's *environmental aspects* (3.1.10)

Note 1 to entry: The lowering of a water table and desertification are examples of environmental impacts from water use. A change in respiratory capacity is an example of an environmental impact from particulate matter emissions.

[SOURCE: ISO 14001:2015, 3.2.4, modified— Note 1 to entry has been added.]

3.1.12
environmental impact pathway
series of consecutive, causal relationships, ultimately starting at an *environmental aspect* (3.1.10) and ending at an *environmental impact* (3.1.11)

Note 1 to entry: Related terms are "impact pathway" or "cause-effect chain".

Note 2 to entry: It can be considered a system of interlinked environmental mechanisms.

[SOURCE: ISO 14008:2019, 3.1.9, modified — "impact pathway" has been added as a related term.]

3.1.13
interested party
stakeholder
person or organization that can affect, be affected by, or perceive itself to be affected by a decision or activity

EXAMPLE Customers, communities, suppliers, regulators, non-governmental organizations, investors and employees.

Note 1 to entry: To "perceive itself to be affected" means the perception has been made known to the organization.

[SOURCE: ISO 14001:2015, 3.1.6, modified— The admitted term "stakeholder" has been added.]

3.1.14
reference situation
baseline
current or future state relative to which the *assessment* (3.1.4) is performed

Note 1 to entry: Examples can be found in B.2.

3.1.15
release
emission to air or discharge to water or soil

[SOURCE: ISO 14040:2006, 3.30, modified — The term has been changed to singular form and "and" has been changed to "or".]

3.1.16
compliance obligations
legal requirements and other requirements
legal requirements that an organization has to comply with and other requirements that an organization has to or chooses to comply with

Note 1 to entry: Compliance obligations can arise from mandatory requirements, such as applicable laws and regulations, or voluntary commitments, such as organizational and industry standards, contractual relationships, codes of practice and agreements with community groups or non-governmental organizations.

[SOURCE: ISO 14001:2015, 3.2.9, modified — Note 1 to entry has been deleted and Note 2 to entry renumbered.]

3.2 Environmental economics and finance

3.2.1
use value
monetary value of a *good* (3.1.3) in relation to its actual, planned or possible use

[SOURCE: ISO 14008:2019, 3.2.5]

3.2.2
non-use value
monetary value of a *good* (3.1.3) independent of its actual, planned or possible use

[SOURCE: ISO 14008:2019, 3.2.6]

3.2.3
total economic value
net sum of all relevant *use values* (3.2.1) and *non-use values* (3.2.2)

Note 1 to entry: Total economic value does not encompass other kinds of values unrelated to human preferences.

[SOURCE: ISO 14008:2019, 3.2.12]

3.2.4
externality
external effect
consequence of an activity that affects *interested parties* (3.1.13) other than the organization undertaking the activity, for which the organization is neither compensated nor penalized through markets or regulatory mechanisms

Note 1 to entry: Current externalities of an organization can cause future issues in terms of dependencies of that organization.

Note 2 to entry: In this document, whenever "external" is used along with "cost" or "benefit", it refers to an externality.

3.2.5
internalization
act of taking into account *externalities* (3.2.4) in decision-making

Note 1 to entry: This includes, but is not limited to, integration into the accounts as *environment-related internal costs* (3.2.13).

3.2.6
environmental benefit
internal or external gain related to the environment

Note 1 to entry: Environmental benefits can be one or both of *external environmental benefits* (3.2.14) and *environment-related internal benefits* (3.2.12).

3.2.7
environmental cost
internal or external loss related to the environment

Note 1 to entry: Environmental costs can be one or both of *external environmental costs* (3.2.15) and *environment-related internal costs* (3.2.13).

3.2.8
environmental damage cost
cost of adverse *environmental impacts* (3.1.11) that are due to an organization's *environmental aspects* (3.1.10)

Note 1 to entry: Environmental damage costs consist of *external environmental costs* (3.2.15) and *environment-related internal costs* (3.2.13).

3.2.9
environmental dependency cost
cost of adverse effects of a change or changes in *environmental conditions* (3.1.5) on the organization

Note 1 to entry: Environmental dependency costs are part of the *environment-related internal costs* (3.2.13).

Note 2 to entry: Examples can be found in B.3.

3.2.10
management accounting
process of supplying the managers and employees in an organization with relevant information, both financial and non-financial, for making decisions, allocating resources, and monitoring, evaluating and rewarding performance

Note 1 to entry: Management accounting is used for the organization's internal purposes.

Note 2 to entry: Management accounting is connected to *financial accounting* (3.2.11) via the so-called "management approach", see the International Financial Reporting Standards (IFRS) framework[16].

3.2.11
financial accounting
process of classifying, measuring and recording the transactions of an organization, which is primarily concerned with providing a true and fair view of its activities to external *interested parties* (3.1.13)

3.2.12
environment-related internal benefit
benefit derived from the environment by an organization that is part of its *financial accounting* (3.2.11) and non-financial accounting

Note 1 to entry: Benefits can be derived from, for example, new sources of revenue, a social licence to operate, *product* (3.1.2) differentiation and reputational gains.

3.2.13
environment-related internal cost
cost derived from an organization's *environmental aspects* (3.1.10) and *environmental dependencies* (3.1.6) that is part of its *financial accounting* (3.2.11) or *management accounting* (3.2.10)

EXAMPLE Capital and operational expenditures related to environmental taxes or to mitigation measures for releases that are taken into account in the financial record of the organization.

3.2.14
external environmental benefit
positive *externality* (3.2.4) due to an organization's *environmental aspects* (3.1.10)

EXAMPLE Eradication of invasive non-native species from around a reservoir by a water company, which provides amenity benefits for the local community.

3.2.15
external environmental cost
adverse *externality* (3.2.4) due to an organization's *environmental aspects* (3.1.10)

4 Principles

4.1 General

These principles are fundamental and should be followed when planning, conducting, documenting and reporting the assessment of environmental costs and benefits.

4.2 Accuracy

Accuracy should be aimed for by carefully evaluating sources and data quality, and using appropriate methods. Bias should be avoided and uncertainty minimized.

4.3 Completeness

All significant information for the intended use should be included, in such a way that no other relevant information needs to be added, and, to the knowledge of those undertaking the assessment, no additional information will substantially change the results.

NOTE In this principle, "significant information" refers to an environmental aspect, impact or dependency that is material to an organization.

4.4 Consistency

Assumptions, methods and data should be, unless motivated by relevance, applied in the same way throughout the assessment process to arrive at conclusions in accordance with the purpose and scope of the study.

4.5 Credibility

All steps of the assessment should be conducted in a transparent and fair manner. The information provided to interested parties should be truthful, accurate, substantive and not misleading.

4.6 Relevance

Selected environmental aspects and impacts, data sources, assumptions, boundaries (temporal and spatial) and methods should be appropriate to the needs and meet the known requirements of the intended users as outlined in the purpose and scope of the study.

4.7 Transparency

It should be ensured that documentation and reports are available, comprehensive and understandable to allow the intended audience to use the environmental costs and benefits with appropriate confidence and/or facilitate replicability of the assessment.

5 Planning

5.1 General

Planning is critical when determining environmental costs and benefits. It seeks to ensure that results derived meet the intended purpose and follow the principles given in Clause 4. The planning process can help an organization determine and focus its resources in terms of time, finance or personnel needed for the assessment of those environmental costs and benefits that are most important in the

