
**Tractors and machinery for
agriculture and forestry —
Sustainability —**

**Part 1:
Principles**

iTeh STANDARD PREVIEW
Tracteurs et matériels agricoles et forestiers — Durabilité —
Partie 1: Principes
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ISO 17989-1:2015

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 23, *Tractors and machinery for agriculture and forestry*.

ISO 17989 consists of the following parts, under the general title *Tractors and machinery for agriculture and forestry — Sustainability*:

- *Part 1: Principles*

Introduction

International concern over human impact on the health of the environment (e.g. acid rain, ozone layer depletion, air, water and soil pollution, ground compaction, soil erosion) and the consumption of the limited natural resources have encouraged organizations that are involved in the design, development and marketing of machinery to give attention to how a machine can impact the environment. Social issues, such as a safe workplace, and economic issues, such as a manufacturing organization considering increasing the number of workers to increase production rates, shall be balanced by organisations. This rise in attention is driven not only by issues relating to social responsibility of manufacturers, but also purchasers of machinery who themselves can have concerns about the impact that their machine has on the environment, as well as legislative bodies that are in positions to mandate certain actions intended to reduce the adverse impact of machinery on the environment. In order to address these concerns, application of the principles of sustainability has been regarded as appropriate strategy.

The sustainability concept was developed in the forestry sector when more and more wood was used as source of energy (before the use of coal started) and has a long tradition in agriculture as agricultural and forestry production are linked to the land.

Today, sustainability standards are used in agriculture with the aim of achieving a fair balance between the three sustainability aspects:

- economic aspects, such as:
 - cost-effectiveness;
 - liquidity;
 - stability / steady economic condition.
- environmental aspects, such as:
 - climate effects;
 - resource consumption;
 - biodiversity;
 - soil protection;
 - water and air pollution.
- social aspects, such as:
 - work and employment (education, training, safety);
 - social involvement.

It is recognized that a product's design and its use over its lifetime can have a significant impact on the quality and sustainability of the environment in which it operates. Taking steps during a product's design and development stage that are aimed at reducing the impacts of the product is an important factor in sustaining the environment. In this sense, designing for sustainability can be seen as a process and set of considerations that are integrated into a product's design and development activities in support of reducing the negative impacts and improving the performance of the product. The design and use of agricultural and forestry machinery, being very closely tied to the environment in the production of food, fibres, fuel and lumber for humans and livestock, is no exception to this objective.

Standards which provide designers and manufacturers of agricultural and forestry machinery with guidelines for the incorporation of sustainability into a machine's design and development are desired and would be useful in advancing the state of the art of sustainability in design in this industry sector, and could provide machinery purchasers with the means of fairly comparing the impacts of competing products.

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This part of ISO 17989 is the first of a series of standards that specifies principles related to sustainability and recommends to regard 'sustainability' as a management task to be addressed to the manufacturer. Other parts of this series are planned to address specific product families and to specify approaches related to sustainability in the design and use of products/machines.

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Tractors and machinery for agriculture and forestry — Sustainability —

Part 1: Principles

1 Scope

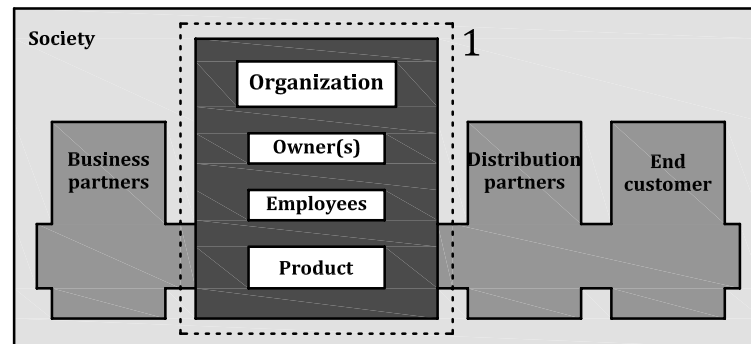
This part of ISO 17989 provides guidelines to assist designers and manufacturers of tractors and machinery for agriculture and forestry to integrate sustainability principles, practices and considerations into their organizations and processes. This part of ISO 17989 is specifically applicable to equipment used in the production of food, fibres, fuel and lumber for humans and livestock.

NOTE This part of ISO 17989 includes three different levels for the application: principles, recommendations and additional information (annexes).

This part of ISO 17989 is addressed to the organization management and provides guidance for considering sustainability aspects relevant for the organization and the product life cycle. It defines the factory gate as the system boundary (Figure 1).

This part of ISO 17989 is not applicable to contractual or regulatory purposes or to registration and certification.

Except when they are closely related to sustainability, this part of ISO 17989 does not address issues of occupational health and safety or operator safety aspects of a machine's design. Designers can find guidance on these issues in other International Standards.



Key

1 system boundary

Figure 1 — System boundary specifying also the scope of ISO 17989-1

2 Terms and definitions

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

**2.1
design and development**

set of processes that transforms requirements into specified characteristics or into the specification of a product, process or system

Note 1 to entry: The terms “design” and “development” are sometimes used synonymously and sometimes used to define different stages of the overall design and development process.

Note 2 to entry: A qualifier can be applied to indicate the nature of what is being designed and developed (e.g. product design and development or process design and development).

[SOURCE: ISO 9000:2005, definition 3.4.4]

**2.2
end-of-life machine**

machine that has completed its useful life and is taken out of service for disposal, recycle or reuse

[SOURCE: ISO 10987:2012, definition 3.7]

**2.3
energy efficiency**

effectiveness of converting energy into useful work

[SOURCE: ISO 10987:2012, definition 3.11]

**2.4
environment**

surroundings in which an organization or product operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

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[SOURCE: ISO 14001:2004, definition 3.5, modified]

**2.5
environmental aspect**

element of an organization’s activities or products or services that can interact with the environment

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[SOURCE: ISO 14001:2004, definition 3.6 modified]

**2.6
environmental impact**

any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization’s activities, products, or services

[SOURCE: ISO 14001:2004, definition 3.7 modified]

**2.7
environmental label
environmental declaration**

claim which indicates the environmental aspects of a product or service

[SOURCE: ISO 14020:2000, definition 2.1]

**2.8
life cycle**

consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal

[SOURCE: ISO 14044:2006, definition 3.1]

2.9**life cycle assessment**

compilation and evaluation of impacts over a product's life cycle

Note 1 to entry: The life cycle to be assessed includes raw material selection, manufacturing, transportation, use, maintenance and end-of-life.

2.10**life cycle thinking**

consideration of all relevant environmental aspects of a product during the entire product life cycle

2.11**manufacturing organization**

organization, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

[SOURCE: ISO 14031:2013, definition 3.20 modified]

2.12**product**

machine, attachment or system that performs a specific function and that is placed on the market for sale or distribution or placed into service

Note 1 to entry: A product can be software, hardware or processed material (e.g. lubricant).

2.13**sustainability**

balance between social, environmental and economic needs that optimizes the current quality of life without sacrificing future quality of life

[SOURCE: ISO 10987:2012, definition 3.1]

2.14**end customer**

synonym for farmer, contractor, product owner or operator

3 Principles

This concept shows that sustainability is characterized by a high degree of complexity which can affect the organization and its processes. The amount and importance of stakeholders, their interests, and their needs clarify that sustainability relates to the organization as a whole. Therefore, sustainability shall be seen as management task.

In order to satisfy this concept, the following principles shall be applied:

- identification of stakeholders and their interests (see [4.1](#));
- shaping of the organization policy (see [4.2](#));
- identification of relevant performance indicators (see [4.3](#));
- installation of the process that allows the optimization of performance (see [4.4](#));
- information to stakeholders (see [4.5](#));
- application of assessment procedures (see [4.6](#)).

4 Recommendations for the application of the principles

4.1 Stakeholders and their interests

Stakeholders are to be understood as persons or groups with requests or demands concerning the organization, which are affected by or can influence organization decisions. With respect to their interests, stakeholders can be divided into the following groups:

- Owners and employees are primarily organization-oriented, i.e. their concern centres on long-term successful organization management and development; for additional information, see [Annex A](#).
- Business partners (suppliers), distribution partners (dealers, agents) and end customers are primarily product and after sales oriented, i.e. for them the benefits, advantages and total costs of a product are of particular importance; for additional information, see [Annex B](#).
- Other stakeholders such as analysts/lenders, scientists, politicians/society as well as communities and residents at the locations.

Dialogue with the stakeholders permits the organization to recognize early general trends and developments as well as opportunities and risks. With regard to sustainability, such a dialogue provides the possibility of inventorying, continuously updating and evaluating the topics that are important to stakeholders. Topics evaluated from the stakeholder and organization perspectives tend to display a high level of agreement. The resulting matrix ([Figure 2](#)) is the starting point for the development of a sustainability strategy.

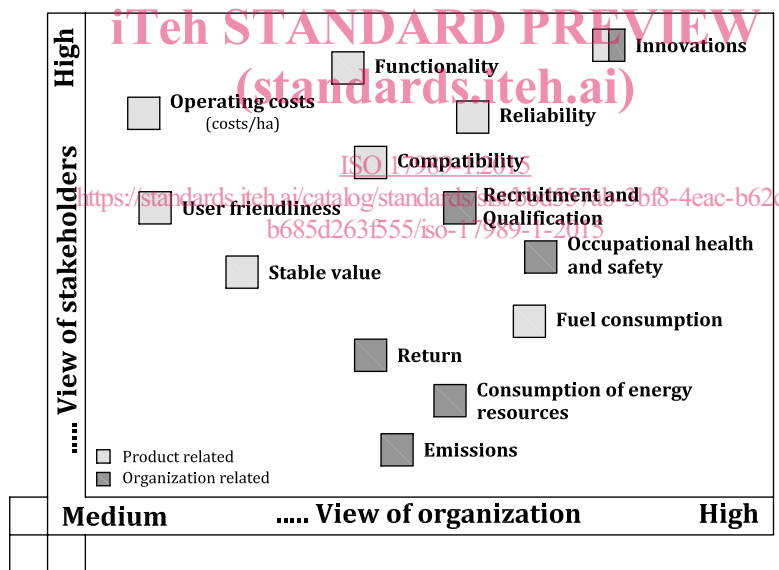


Figure 2 — Topic matrix: Importance of topics from the organization and stakeholder perspectives (example)

4.2 Organization policy

Organization policy defines not only the field of activity and fundamental goals, but also in particular the self-image and values of the organization (corporate culture). Codes of conduct describe interactions both within the organization and with external stakeholders.

Since sustainability affects all internal and external organization matters in the sense of taking into account the interests of all identified stakeholders, organization management shall also assume a position in this regard and adapt the values of the organization. The formulations chosen are less important than whether the convictions and associated messages of management are successfully transmitted.

4.3 Performance indicators

The multidimensional 'sustainability' concept shall be made manageable and comprehensible, so that it can be applied in the organization. Based on the topics identified within the framework of the stakeholder dialogue, specific targets and performance characteristics and indicators are to be determined, to which specific measures can be assigned. [Figure 3](#) shows the derivation of specific targets and performance indicators.

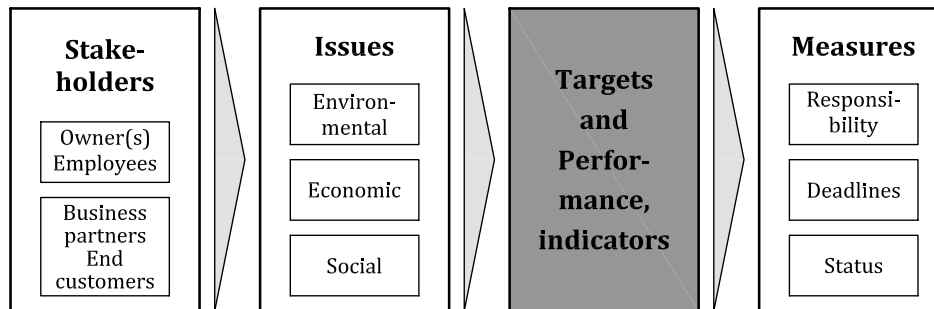


Figure 3 — Derivation of sustainability targets and indicators

According to the principle of sustainability (see [Clause 3](#)), the performance indicators should address economic, environmental and social aspects. The performance indicators can deal with the following:

- **Economic performance indicators, e.g.:**
 - Economic performance;
 - Market presence;
 - Indirect economic impacts.
- **Environmental performance indicators, e.g.:**
 - Materials;
 - Energy;
 - Water;
 - Biodiversity;
 - Emissions, effluents and waste;
 - Products and services;
 - Compliance;
 - Transport.
- **Social performance indicators, e.g.:**
 - Labour practices;
 - Human rights;
 - Society;
 - Product responsibility.