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This report addresses the question of how True Cost Accounting compares with other tools that the private sector can use to improve the sustainable management of supply chains. It concludes that True Cost Accounting has added value compared to the existing palette of tools, but that further development is needed with regard to methodology and data requirements.

Key words: True price; real price; True Cost Accounting, sustainable management, food systems, sustainable food

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Preface

The PPP on 'True Price: from insight to action' is about exploring the applicability of the concept of True Cost Accounting (TCA). Private sector businesses are among the potential users of the concept, and they could apply it to various business issues related to improving the sustainability of production methods. Other sustainability tools are also available for that purpose, and this report describes how TCA fits into the landscape of sustainability tools.

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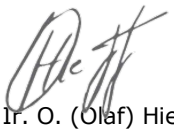
Finally, we would like to thank the PPP partners and the Ministry of Agriculture, Nature and Food Quality. Their financial contribution has enabled the PPP on 'True Price: from Insight to Action' and its many PPP partners to explore the diverse ways in which true cost accounting can help achieve sustainable food chains. This project is aligned with the Knowledge and Innovation Agenda on Agriculture, Water and Food 2024-2027, mission 2.



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Summary

If we want to make food systems more sustainable, the private sector needs access to tools that can help companies play their part. The True Cost Accounting (TCA) approach can contribute to this through three applications: creating transparency, applying weighting, and incentivising more sustainable behaviour. This report considers the question of how TCA fits into the landscape of sustainability tools that can be used for those three applications.

To arrive at an answer to this question, the following research questions were drawn up:
1. What are the motives for the private sector to move towards more sustainable operational management?
2. What tools are available to help them do so?
3. Which tools are most suitable for particular purposes and steps in the management cycle?
4. How do those tools relate to the three applications: creating transparency, applying weighting, and incentivising more sustainable behaviour?
5. What is the added value of TCA in this playing field?

The motives for private sector organisations to move towards more sustainable operational management are:
- sustainability laws and regulations
- reputational risk if potentially unsustainable production methods or other business practices come to light
- cost savings through increased efficiency
- differentiation from competitors and
- a purely ideological motive to make the supply chain more sustainable.

A variety of tools are available to help make companies more sustainable at different steps of the management cycle. These tools all have a different focus and can therefore support different and sometimes multiple steps of the management cycle. The management cycle consists of:
- Step 1: identifying risks and opportunities
- Step 2: setting targets
- Step 3: introducing measures or providing incentives
- Step 4: measuring
- Step 5: evaluating targets based on the measurement data, and finally,
- Step 6: communicating to consumers, suppliers, buyers or other relevant stakeholders.

The sustainability tools considered in this report – organised according to the different steps in the management cycle – are:
- Legislation requiring transparency with regard to sustainability: [1]
  - The Corporate Sustainability Reporting Directive (CSRD) provides guidelines for sustainability reporting and focuses on where efforts should be directed. There is flexibility around the weighting of issues and indicators, which allows businesses to focus on those indicators that are most relevant to them.
  - The Corporate Sustainability Due Diligence Directive (CSDDD) sets out the requirements for identifying and mitigating sustainability risks in the supply chain.
- Tools for identifying risks and opportunities (step 1 of the management cycle):
  - True Cost Accounting (TCA)
  - Social and Environmental Life Cycle Assessments (S/E-LCA) (based on secondary data)
  - Human Rights Risk Assessment (HRRA)

[1] The EU Deforestation Regulation (EUDR) is also a relevant piece of legislation but we haven't included it in this report because it focuses specifically on deforestation and not on other aspects of sustainability.

- Target-setting tools (step 2 of the management cycle):
  As yet, there don't appear to be any individual tools for setting targets in the management cycle that can be applied to a wide range of sustainability issues as well as to business model criteria such as risk, costs, turnover, profits and dividends. For greenhouse gas emissions, there is the Science Based Targets initiative (SBTi), but that hasn't been included in this report because we are looking at tools that can be used to address a variety of sustainability issues. The results of the comparison of tools for identifying risks and opportunities and for measurement and evaluation can be used to provide input to decision-making with regard to targets.
- Tools for introducing measures or providing incentives[2] (step 3 of the management cycle):
  - Sustainability labels
  - Eco-labelling
- Tools for measuring the impact of a product (step 4 of the management cycle):
  - Human Rights Risk Assessment (HRRA)
  - Social and Environmental Life Cycle Assessments (S/E-LCA) (based on primary data)
- Tools for evaluating targets based on the measurement data (step 5 of the management cycle):
  - Social cost-benefit analysis (SCBA)
  - True Cost Accounting (TCA)
- Tools for communicating to consumers, suppliers, buyers or other relevant stakeholders (step 6 of the management cycle):
  - Sustainability labels
  - Eco-labelling
  - True price, as an extension of True Cost Accounting

All of these tools have different origins and areas of focus, and can therefore all contribute in their own way to making the food system more sustainable. Sustainability labels focus mainly on communication towards consumers and don't really measure impact. The S/E-LCA approach, on the other hand, focuses on data collection and analysis to gain an insight into where there are areas for improvement in terms of environmental and/or social issues. S/E-LCA and eco-labelling often also use weighting, but unlike TCA it's not necessarily a weighting based on monetisation. Such weighting can also be based on expert knowledge or on the severity of the problems (e.g. it could be based on planetary boundaries, meaning the points at which environmental problems exceed the earth's capacity).

The HRRA approach is being developed by Wageningen Economic Research and it identifies the risks of human rights violations for eight human rights issues (risk prevalence). It provides a detailed insight into the potential impact (risk) of a particular product from a specific production region in terms of human rights, making it an important tool in the field of social indicators. A unique feature of this approach is that you can include 40 impact categories and gain an insight into the impact along every step of the supply chain, as well as per stakeholder, using both primary and secondary data.

SCBA originated in the public sector, where it's often necessary to weigh up the social costs and benefits of two different policies. TCA is oriented more towards the private sector because it's an approach that provides closely comparable data on external costs and benefits by expressing them in the same monetary unit. This enables explicit weighting based on quantitative impact indicators.

All of these tools support the objective of increasing transparency around sustainability. They also all enable some implicit or explicit weighting of sustainability issues or indicators. These tools have been designed to encourage producers, businesses and sometimes also consumers to behave more sustainably. All of the tools have their own unique characteristics, meaning they are all suitable to a greater or lesser degree for specific applications within a company's sustainability process. This is summarised in table 3.1 of chapter 3.8.

Looking specifically at the applicability of TCA,[3] most of the added value is located in steps 1 and 5 of the management cycle. TCA can play an important role in identifying relevant sustainability risks and opportunities by identifying the externalcosts of business activities. The extent of these external costs

[2] These are two well-known examples of measures and incentives; in reality, there are many other possible options but it is beyond the scope of this report to describe them all.

[3] This report focuses on TCA, as it was written as part of the PPP project 'True Price – From Insight to Action'.

provides a basis for identifying relevant risks and opportunities. TCA also lends itself well to the evaluation step. Calculating overall scores that are easy to weigh up and compare with each other provides transparency when evaluating particular targets and measures.

While TCA adds the most value to steps 1 and 5, it can also be helpful to other steps within the management cycle. For example, the insights provided by TCA can enable it to be used as a tool to support the selection of targets and measures. TCA provides points of entry for the introduction of measures, or for coming up with ways to incentivise more sustainable behaviour, but the approach itself can't do that on its own. De Vos (2024) explains that while TCA provides an insight into the particular areas that are crucial to improving a sustainability profile, it does not help with identifying the root causes so that those factors can themselves be addressed. An additional step is therefore needed, which is to define impactful measures that can address externalities.

TCA could potentially also serve as a basis for communication to consumers, for example as part of the labelling process (e.g. the A to E used by Nutriscore) or for calculating a true price. This would however still require a substantial effort. Indeed, research (Reinders et al., forthcoming) shows that consumers find TCA complicated and complex.

TCA has added value for the private sector due to the following three characteristics:

- TCA's use of monetisation provides explicit weighting based on welfare theory, damage costs, prevention costs or a rights-based approach and thereby facilitates informed consideration of strategic decisions. The quantitative impact indicators expressed in the same monetary unit are helpful to decision-makers.
- TCA is a calculation system for measuring and valuing external (environmental, social, health and economic) costs and benefits, and it therefore fits well with existing accounting processes used in the private sector.
- The TCA approach has the potential to be widely applicable because it includes environmental, social and human impact indicators and can also serve as an external communication tool and as a way of creating incentives that trigger more sustainable behaviour. However, this isn't yet the case as the development of social and human impact indicators is still in its infancy and there's additional effort involved in translating TCA into a true price.

But there are also areas of concern for the TCA methodology that currently make it difficult to deploy it widely in the private sector. There's still no universally agreed method for calculating the monetisation of all quantitative impacts. This leads to a degree of subjectivity and means the way that particular issues are weighed up can differ from person to person and from situation to situation. Critics therefore argue that quantification and monetisation unfairly shift some of the responsibility from decision-makers to researchers, because measurement is often so complex that it becomes a 'black box' for decision-makers. It's also often the case that not all impacts can be quantified, which means there's a risk of some impacts being excluded.

1 The various tools that can contribute to corporate sustainability

1.1 Businesses are paying more attention to sustainability

For a long time, the prevailing general view was that businesses have just one responsibility: to make a profit for their shareholders or owners. Over the past few decades, this view has shifted and now there's an increasing focus on integrating social responsibility into operational management, with people, animals and the environment being as important as profitability. However, sustainable management is not always easy to achieve, which is why a variety of tools are available to support private sector organisations as they strive to become more sustainable. Three distinct applications of TCA are central to this process: creating transparency, applying weighting, and incentivising more sustainable behaviour.

1.2 Three applications to improve sustainability – creating transparency, applying weighting and incentivising more sustainable behaviour

This report addresses the question of where TCA fits in relation to the various sustainability tools available for these three applications. The three applications are:

- *Creating transparency*: providing an insight into the *external effects* ('the impact') of production and consumption, which can also be communicated to consumers, suppliers and other stakeholders if necessary.
- *Applying weighting*: determining which sustainability issues are most relevant to the company or product based on an understanding of the *external effects* ('the impact') of production (and consumption). Achieving transparency makes it possible to do this.
- *Incentivising more sustainable behaviour*: the insights provided by the different tools can be used to change behaviour. The implication for businesses is that they will be able to come to a different decision than if they did not apply any form of impact measurement, or that they will be able to improve their risk management because they have a better understanding of the risks they face. This behavioural incentive is often seen as a price-based incentive based on the true cost calculation, such as government-imposed taxes, paying suppliers a higher price for a more sustainable product, adopting an internal carbon price within businesses, or raising the sale price.

These applications can be helpful as part of the process of making the food system more sustainable. TCA can play a role in this, but there are also other tools that can help with creating transparency, applying weighting, or incentivising more sustainable behaviour. In this report, we look at how TCA relates to those other tools with the ultimate aim of achieving sustainable food systems.

1.3 The various sustainability tools and their role in the management cycle

Several tools already exist for the three aforementioned applications. In addition, many businesses are already subject to relevant legislation set by the EU, or may be so in the future. Given the focus on TCA in this report – as part of the PPP on 'True Price: from Insight to Action' – we focus here on legislation and on tools that overlap with the role (or potential role) of TCA. As such, we compare TCA with the following tools:

- Sustainability guidelines prescribed by the European Union such as the Corporate Sustainability Reporting Directive ('CSRD') and the Corporate Sustainability Due Diligence Directive ('CSDDD')
- The voluntary certification schemes and sustainability labels and their different areas of focus

- The voluntary labelling systems for food products, based on Life Cycle Assessments ('LCA') (hereafter referred to as 'eco-labels')
- Life cycle analysis: Environmental Life Cycle Analysis ('E-LCA') and Social Life Cycle Analysis ('S-LCA')
- The Human Rights Risk Assessment ('HRRA') developed by Wageningen Economic Research and
- The social cost-benefit analysis ('SCBA') which has its origins in the public sector
- True Cost Accounting, and the follow-up step including the translation into a true price, which is also covered but not treated as a separate sustainability tool.

These tools all have a different focus and can therefore support different parts of the management cycle. The management cycle describes the various steps involved in determining and achieving business objectives and consists of:

- Step 1: identifying risks and opportunities
- Step 2: setting targets
- Step 3: introducing measures or providing incentives
- Step 4: measuring
- Step 5: evaluating targets based on the measurement data, and finally,
- Step 6: communicating to consumers, suppliers, buyers or other relevant stakeholders.

The various sustainability tools have been categorised according to their role in the management cycle, as follows:

- Legislation demanding transparency with regard to sustainability:[4] (step 0 of the management cycle):
  - The Corporate Sustainability Reporting Directive (CSRD) provides guidelines for sustainability reporting and focuses on where efforts should be directed. There is flexibility around the weighting of issues and indicators, which allows businesses to focus on those indicators that are most relevant to them.
  - The Corporate Sustainability Due Diligence Directive (CSDDD) sets out the requirements for identifying sustainability risks in the supply chain.
- Tools for identifying risks and opportunities (step 1 of the management cycle):
  - True Cost Accounting
  - Social and Environmental Life Cycle Assessments (S/E-LCA) (based on secondary data)
  - Human Rights Risk Assessment (HRRA)
- Target-setting tools (step 2 of the management cycle):
  As yet, there don't appear to be any individual target-setting tools for the management cycle that can be applied to a wide range of sustainability issues as well as to business model criteria such as risk, costs, turnover, profits and dividends. For greenhouse gas emissions, there is the Science Based Targets initiative (SBTi), but that hasn't been included in this report because we are looking at tools that can be used to address a variety of sustainability issues. The results of the comparison of tools for identifying risks and opportunities and for measurement and evaluation can be used to provide input to decision-making with regard to targets.
- Tools for introducing measures or providing incentives[5] (step 3 of the management cycle):
  - Sustainability labels
  - Eco-labelling
- Tools for measuring the impact of a product (step 4 of the management cycle):
  - Human Rights Risk Assessment (HRRA)
  - Social and Environmental Life Cycle Assessments (S/E-LCA) (based on primary data)
- Tools for evaluating targets based on the measurement data (step 5 of the management cycle):
  - Social cost-benefit analysis (SCBA)
  - True Cost Accounting (TCA)
- Tools for communicating to consumers, suppliers, buyers or other relevant stakeholders (step 6 of the management cycle):
  - Sustainability labels
  - Eco-labelling
  - True price, as a follow-up to TCA.

[4] The EU Deforestation Regulation (EUDR) is also a relevant piece of legislation but we haven't included it in this report because it focuses specifically on deforestation and not on other aspects of sustainability.

[5] These are two well-known examples of measures and incentives; in reality, there are many other possible options, but it is beyond the scope of this report to describe them all.

1.4 The need to understand the role of True Cost Accounting

The participating partners within the PPP on 'True Price: from insight to action' have been exploring the issue of how True Cost Accounting (TCA) might be applied. The main question that the PPP addresses is: 'What role can TCA play in making the food system more sustainable?' One of the sub-questions is whether TCA adds value to businesses as part of their efforts to create a more sustainable food system, and if so, how. That question lies at the heart of this study.

This report aims to explore what TCA has to offer compared to other tools in making both internal and external operational management more sustainable.[6] The aim is to compare TCA to other sustainability tools in order to better understand whether it can play a part in delivering the applications, and if so, how it can do so. To arrive at this understanding, we provide an overview below of the different ways that TCA and related tools can be applied, in order to perform a comparison.

In order to conduct a proper analysis, the following research questions were drawn up:

- What are the motives for the private sector to move towards more sustainable operational management?
- What tools are available to help businesses become more sustainable?
- Which tools are most suitable for particular purposes and steps in the management cycle?
- How do those tools relate to the three applications: creating transparency, applying weighting, and incentivising more sustainable behaviour?
- What is the added value of TCA in this playing field?

The following chapters will answer these questions in succession, ending with a conclusion.

[6] Internal operational management is also known as 'micro operational management'. External operational management consists of the meso environment (competitors, customers, suppliers, etc.) and macro environment (factors beyond an organisation's control).

2 What are the motives for achieving sustainable management?

This chapter answers the following question: What are the motives for businesses to move towards more sustainable operational management? First, there is the question of why private sector organisations want to commit to sustainability. We then look at the three applications that play a role in making businesses more sustainable: creating transparency, applying weighting, and incentivising sustainable behaviour. Finally, we take a close look at the management cycle and how it applies to the issue of 'sustainability'. What steps can we identify and distinguish there?

2.1 Five business motives for sustainability

Businesses are increasingly focused on improving the sustainability of their production methods and supply chains. There are five broad motives for this. The first motive is that businesses simply have to comply with sustainability legislation and regulations, and must take action to meet the minimum requirements. Secondly, the issue of reputational risk can incentivise businesses to make their production methods and supply chain more sustainable, to avoid the negative attention that can result from certain unsustainable production methods coming to light. A third motive is cost savings. More efficient use of transportation or switching to sustainable energy can be a way for businesses to cut costs, either directly or in the longer term. A fourth motive for businesses to focus on making their production methods and supply chain more sustainable is the way it can set them apart from their competitors. Finally, a business may have a purely ideological motive for making its production methods and supply chain more sustainable (primary goal) and, in so doing, it may be setting an example for other businesses in the same sector (secondary goal).[7]

2.2 Three applications to make businesses more sustainable

Three different applications are central to the process of making businesses more sustainable. These are: creating transparency, applying weighting, and incentivising more sustainable behaviour. These three applications each have their own added value in the sustainability process, and the different tools all deliver them in their own way. Chapter 1 provided a brief introduction to the concepts. A slightly more detailed explanation is set out below.

The first application is *creating transparency*. This means ensuring that the external effects – or 'hidden impacts' – of production and consumption are clearly identified and that they can then be communicated transparently to consumers, suppliers and other stakeholders. Insight and transparency are crucial to the sustainability process because they provide a foundation for the other two applications.

The second application is *applying weighting*, or being able to calculate and weigh up different impacts. This is about determining and prioritising the sustainability issues that are most relevant to the company, based on an understanding of the *external effects* ('the impact') of production (and consumption). These issues can then be translated into *impact or process targets* and Key Performance Indicators (KPIs). It's useful for a business to know which interventions are most effective in reducing negative impacts. This is because targets can be more effectively achieved if efforts and investments are focused on those activities that have the greatest potential impact or that are cost-efficient to implement (Simmons and Boone, 2022).

[7] One example of this is Tony Chocolonely, which has set itself the goal of producing chocolate that is 100% slave-free. Tony's has also taken the initiative of establishing a 100% slave-free sustainability label so that other chocolate producers can become allies in the pursuit of 100% slave-free chocolate. Albert Heijn is one example of this, with its Delicata line of chocolate products manufactured by Barry Callebaut.

The third application is *incentivising more sustainable behaviour,* whereby the insights provided by the different tools can lead to more sustainable behaviour in both internal and external operational management. In other words, based on this insight, a business can make decisions that minimise negative impacts and do so at a minimal cost. This means that businesses can make operational management decisions and introduce changes to their production processes based on the insights gained. They can also use tools to get a better picture of non-financial risks and thereby improve their ability to classify, prioritise and evaluate risks. But businesses might also make the remuneration of their suppliers dependent on their sustainability achievements, or increase their selling price based on their social impacts, thereby placing the onus of sustainable behaviour onto buyers or consumers.

If the use of a sustainability tool does in fact create an incentive for more sustainable behaviour, then measuring the impact of this behavioural change becomes a possible and indeed an important next step. This is because measuring impact can provide an insight into the effect of a measure.

2.3 The management cycle of businesses consists of 6 steps

Based on the business motives for sustainability described above, and the three applications, we can identify a number of different requirements. We can shed more light on these requirements by referring to the management cycle, which shows the steps that are usually followed by businesses when making strategic decisions. An important first step here is a good understanding of the different steps in a management cycle.

The management cycle consists of the following steps:
- Step 1: Identification of relevant sustainability risks and opportunities
- Step 2: Translation into targets
- Step 3: Translation of targets into measures or incentives
- Step 4: Measurement through data collection and analysis
- Step 5: Evaluation of targets and
- Step 6: Reporting & Communication

The first step in the management cycle is the *identification of risks and opportunities (hotspots)*. A risk and opportunity analysis can provide an organisation with a picture of the most important issues it faces. Many businesses today already consider sustainability risks and/or opportunities in some way, but it's often still separate from financial risk analysis. Financial risk analysis deals with risks that have a direct financial impact on the business. Non-financial risks still tend to get passed on to society as a whole. If social and ecological risks are captured alongside every other business risk as part of the risk analysis, they can all be compared and systematically integrated into risk classification, prioritisation and evaluation. This takes the organisation's risk management to the next level. Risk management includes performing an analysis of the surroundings, with legislation and regulations being one component. Legislation and regulations can play an important role in risk management because businesses want to be compliant with these, both now and in the future, and sustainability legislation and regulations are constantly evolving. It can therefore be helpful to keep a close eye on developments in this area as part of the identification of sustainability risks and opportunities.

This then helps with step 2, which is where the business *determines its targets* and clearly articulates them. It might express them in terms of emission values or financial sums, for example, if a decision has been made to apply SCBA or TCA.

The next step in the management cycle is then to *establish measures and incentives*. This means finding a way to encourage appropriate behaviour or an appropriate balance of investments. In this context, three different types of incentives can be distinguished:
- market-based incentives such as prices, subsidies, fines and rewards
- information-based incentives that increase knowledge, awareness and/or transparency and
- behavioural incentives that appeal to emotions, values or social norms. One example of this would be the introduction of a sustainability label that gives an incentive to businesses or producers (regulatory

incentive) as well as to consumers (information-based incentive). In other words, if a business wants to meet the requirements of a particular sustainability label, it will have to adopt certain measures aimed at sustainability in compliance with the standards of the certification. That certification serves as an information-based incentive to consumers by increasing awareness and transparency.

The fourth step is to *assess the impact of the measures*. In step 1 this was based mainly on secondary data as a way of providing a broad understanding, but in step 4 it's performed on the basis of as much primary data as possible. This gives a business a detailed understanding of the extent to which it has already achieved its targets, and of any additional measures that may still need to be taken.

The *evaluation* takes place in step 5 where, based on the data, it becomes clear how much progress a businesses has made in achieving its sustainability targets and to what extent particular measures have contributed to these targets.

This component must be properly *reported* and documented for future decision-making, accountability and for step 6, *communication*. A study by the Harvard Business Review (2019) showed that 65% of consumers want to buy products from brands that demonstrate sustainability and clear targets, but that only 26% actually do so. Transparent and reliable information plays an important role here and is therefore a crucial part of the management cycle.

Figure 2.1 *The 6 steps in a management cycle.*

3 What tools can businesses use for creating transparency, applying weighting, and incentivising more sustainable behaviour, and what is their role in the management cycle?

This chapter looks at the various tools that can contribute to making businesses more sustainable, and discusses their role in the management cycle. It also explores how the functionalities of these tools support the provision of the three applications for the private sector.

- Corporate Sustainability Reporting Directive (CSRD - step 0 of the management cycle)
- Corporate Sustainability Due Diligence Directive (CSDDD - step 0 of the management cycle)
- Human Rights Risk Assessment (HRRA) (steps 1 and 4 of the management cycle)
- S/E-LCA (steps 1 and 4 of the management cycle)
- Sustainability labels (steps 3 and 6 of the management cycle)
- Eco-labelling (steps 3 and 6 of the management cycle)
- Social cost-benefit analysis (SCBA – step 5 of the management cycle) and finally
- True Cost Accounting (TCA – steps 1 and 5 of the management cycle, and true price as a follow-up step to TCA in step 6 of the management cycle).

After describing the various tools, we end with a concluding table which explains how the different sustainability tools support the provision of the three applications and what their specific strengths are.

3.1 Corporate Sustainability Reporting Directive

The text below is based on information from the Corporate sustainability due diligence - European Commission (europa.eu)[8] and the Corporate due diligence rules agreed to safeguard human rights and environment - Press release (Dec. 2023).[9]

What is the Corporate Sustainability Reporting Directive ('CSRD')?
The CSRD aims to make sustainability reporting as important as financial reporting. The directive is an extension of the existing European directive around sustainability reporting – the Non-Financial Reporting Directive (NFRD) – and aims to increase the transparency and improve the quality and comparability of sustainability information. It is part of the European Green Deal and came into force on 1 January 2024.

What is the purpose of the CSRD and to whom does it apply?
The CSRD is about reporting sustainability efforts and results. Its aim is to (i) identify sustainability risks and opportunities and (ii) account for the impact of business activities on people and the environment. The idea is that this will lead to businesses making more sustainable choices regarding the environmental and social impacts of their current production processes, and change capital flows from unsustainable to sustainable activities.

[8] https://commission.europa.eu/business-economy-euro/doing-business-eu/corporate-sustainability-due-diligence.
[9] https://www.europarl.europa.eu/news/en/press-room/20231205IPR15689/corporate-due-diligence-rules-agreed-to-safeguard-human-rights-and-environment.

The CSRD applies from ... to:

- 2024: Businesses with more than 250 employees and/or 25 million euros in assets and/or 50 million euros of turnover (businesses must meet at least 2 of the 3 criteria) (this applies to around 50,000 European businesses and around 3,000 businesses in the Netherlands).
- 2026: Listed SMEs.
- 2028: Non-EU businesses with at least €150 million turnover in the EU.

What is the role of the CSRD in the management cycle?

As mentioned in section 2.1, one of the five motives for corporate sustainability is to comply with legislation. The CSRD isn't in fact a tool that can be used in the management cycle but is a fundamental (step 0) stage of the progress through the management cycle to achieve more sustainable operational management. This is because the CSRD makes sustainable reporting as important as financial reporting and enables shareholders, investors, funders and other stakeholders to get a clear picture of a company's sustainability achievements and ambitions and to make informed choices on that basis. It also serves an important internal purpose, because it clarifies sustainability risks and opportunities and helps to align business strategy accordingly. Because the CSRD requires accountability regarding the way in which sustainability is integrated into all parts of a company's management, it acts as an incentive and good guideline for how a company can accurately complete and report on the steps in the management cycle. As a tool, it provides the most comprehensive contribution to every step of the management cycle.

What are the functions of the CSRD?

The CSRD relates to the Paris Agreement in which EU countries agreed to limit global warming to 1.5 degrees celsius. The 'Green Deal', which the CSRD and CSDDD are part of, is supposed to help the European Union in its transition to a modern, climate-neutral economy by 2050, one in which economic growth no longer relies on the depletion of raw materials, and people and regions are well supported. Funding this depends on public and private money flowing into sustainable economic activities. With that in mind, we can ascribe the following functions to the CSRD:

- *Creating transparency:* sustainability reporting requires businesses to be transparent about the production process and its impact on people and the environment.
- *Redirecting capital flows:* greater transparency creates a better understanding of a company's practices (including sustainability practices) and allows investors and/or banks to make better-informed choices about what they invest in or who they extend credit to, and under what conditions (such as interest rates and terms).
- *Creating a level playing field:* a harmonised legal framework within the EU creates legal certainty and a level playing field for businesses to operate in. This incentivises businesses to make choices that benefit people and planet, but come with higher costs.

The applications of the CSRD as described above largely correspond to the applications called for by the private sector as set out in Chapter 2 of this report, namely creating transparency, applying weighting (materiality analysis) and incentivising sustainable behaviour. The CSRD encourages the identification and qualification of the externalities of operational management, which then means those externalities:

- become transparent and
- can be compared to each other to determine their relevance and
- based on this, strategic choices can be made within operational management regarding how to achieve the greatest impact on sustainability.

Based on this, we conclude that the specific strength of the CSRD lies in the insight it provides into the impact of a business on society, resulting from the mandatory reporting on the topic. The CSRD cannot itself be used as a means of communication to consumers, and also does not enable explicit weighting. The CSRD does not require a business to establish a single overall score based on the indicators related to individual issues. However, businesses can use some form of TCA or other calculation tool to present a total score or scores in their CSRD annual report. In principle, all indicators are reported separately under the CSRD, but they are not weighted in order to arrive at an overall score. It's up to the reader to make an overall assessment of the business.

3.2 Corporate Sustainability Due Diligence Directive

The text below is based on information from the Corporate sustainability due diligence - European Commission (europa.eu)[10] and the Corporate due diligence rules agreed to safeguard human rights and environment - Press release (Dec. 2023).[11]

What is the Corporate Sustainability Due Diligence Directive ('CSDDD')?
The CSDDD requires large enterprises to conduct ongoing research (due diligence) into their own business activities and those of the partners they work with. Businesses are required to identify the environmental and human rights impacts of their own business activities and those of their established business partners, and must also commit to identifying, preventing, mitigating and justifying any such negative impacts. The proposal for the CSDDD was published by the European Commission on 23 February 2022 and the European Parliament adopted the CSDDD on 24 April 2024.

What is the purpose of the CSDDD and to whom does it apply?
The CSDDD calls for efforts to be made to identify, prevent and reduce any potential and existing risks in the supply chain. Like the CSRD, its aim is to (i) identify sustainability risks and opportunities and (ii) account for the impact of business activities on people and the environment. The idea is that this identification will lead to businesses making more sustainable choices regarding the environmental and social impacts of their current production processes, and redirect capital flows from unsustainable to sustainable activities. In addition, the CSDDD requires businesses to take measures to address these impacts and to test the effectiveness of those measures themselves.

The CSDDD will become applicable in a phased approach to:[12]
- Businesses in the EU with more than 5,000 employees and a global turnover of more than 1,500 million euros, using a three-year application period.
- Businesses in the EU with more than 3,000 employees and a global turnover of more than 900 million euros, using a four-year application period.
- Businesses in the EU with more than 1,000 employees and a global turnover of more than 450 million euros, using a five-year application period.

What is the role of the CSDDD in the management cycle?
As mentioned in section 2.1, one of the five motives for corporate sustainability is to comply with legislation. The CSDDD isn't in fact a tool that can be used in the management cycle but is a fundamental (step 0) stage of the progress through the management cycle to achieve more sustainable operational management. The CSDDD requires large enterprises to conduct ongoing research (due diligence) into their own business activities and those of the partners they work with. This means identifying the most significant risks and opportunities and stating how these can be prevented, mitigated or remedied. The process of building that understanding and identifying relevant issues often involves the use of a broad materiality analysis, meaning a prioritisation of risks based on severity and probability of impact. This means that a business or organisation, with the help of relevant stakeholders, will identify its key sustainability risks and opportunities. The CSDDD therefore also expects businesses to translate the risk analysis into measures (step 3) and into the other steps of the management cycle.

[10] https://commission.europa.eu/business-economy-euro/doing-business-eu/corporate-sustainability-due-diligence.
[11] https://www.europarl.europa.eu/news/en/press-room/20231205IPR15689/corporate-due-diligence-rules-agreed-to-safeguard-human-rights-and-environment.
[12] At the time of writing, this is still part of the final negotiations and is therefore not yet completely certain.

What are the functions of the CSDDD?
The CSDDD relates to the Paris Agreement in which EU countries agreed to limit global warming to 1.5 degrees Celsius. The 'Green Deal', which the CSRD and CSDDD are part of, is supposed to help the European Union in its transition to a modern, climate-neutral economy by 2050, one in which economic growth no longer relies on the depletion of raw materials, and people and regions are well supported. Funding this depends on public and private money flowing into sustainable economic activities. With that in mind, we can ascribe the following functions to the CSDDD:

- *Creating transparency:* the CSDDD requires businesses to be transparent about the production process and its impact on people and the environment.
- *Performing a non-financial risk assessment:* identifying the risks posed by production chains to people and the environment creates transparency and means those risks can be prevented, mitigated or remedied. Businesses must also come up with and/or cooperate with remedial measures if necessary.
- *Creating a level playing field:* a harmonised legal framework within the EU creates legal certainty and a level playing field for businesses to operate in. This incentivises businesses to make choices that benefit people and planet, but come with higher costs.

The applications of the CSDDD as described above largely correspond to the applications called for by the private sector as set out in Chapter 2 of this report, namely creating transparency, applying weighting (materiality analysis), and incentivising more sustainable behaviour. The CSDDD drives the identification and qualification of the external effects of operational management, which means those effects:

- become transparent and
- can be compared to each other to determine their relevance and
- based on this, strategic choices can be made within operational management regarding how to achieve the greatest impact on sustainability.

Based on this, we conclude that the specific strength of a CSDDD lies in the insight it provides into the impact of a business on society – a result of the requirement to be transparent about that impact – as well as the requirement to take measures to address it. Like the CSRD, the CSDDD cannot itself be used as a means of communication to consumers, and also does not enable explicit weighting.

3.3 Human Rights Risk Assessment

Wageningen Economic Research is working to develop its own method in the field of human rights. This is part of the 'Environmental and social risks of agricultural trade flows' project. More information on this can be found on the relevant website.[13] Details of this method have not previously been published externally.

What is a Human Rights Risk Assessment?
The Human Rights Risk Assessment (HRRA) is a method that identifies the risks of human rights violations (risk prevalence) for eight human rights issues. These risks are specific to certain issues, countries, sectors and products. The risk scores can also be calculated at the regional (subnational) level. The human rights issues have been selected for their relevance to international standards and regulations in the field of sustainability reporting and corporate social responsibility, such as the UN Guiding Principles, the OECD Guidelines, the CSRD and the CSDDD. The method focuses mainly on the first phase of the production chain: the production of agricultural raw materials. The method can also be applied to the first stage of processing, as these are the two phases in which most human rights violations occur.

[13] Environmental and social risks of agricultural trade flows - WUR.

The same issues are systematically assessed in the same way for each country-product combination. This allows a comparison of risks between products within a country (such as coffee and soy in Brazil) or between countries (such as coffee from Colombia and coffee from Brazil). The human rights issues included in the methodology are:

- child labour
- forced labour
- discrimination
- violence & intimidation
- freedom of association & collective bargaining
- occupational health & safety
- insufficient remuneration
- access to land and natural resources.

The method is part of Wageningen Economic Research's 'insights for due diligence' tool. This tool also provides additional risk scores for seven environmental issues. The Human Rights Risk Assessment can be seen as a first step in a due diligence cycle, in which impacts (negative or otherwise) need to be identified and assessed. The OECD Guidelines actually allow businesses to prioritise their risks ('risk-based due diligence') based on a 'high-level scoping exercise' (similar to the Human Rights Risk Assessment). This prioritisation then forms the basis for an 'in-depth mapping and risk assessment' and ultimately the development of intervention strategies to stop, prevent or mitigate impact.

A Human Rights Risk Assessment (HRRA) consists of several phases:

- For each human rights issue, a national risk score is calculated based on various existing quantitative indicators. These indicators have been selected on the basis of a literature study, and collectively they provide a picture of the prevalence and importance of a particular human rights issue at the national level. Each indicator is benchmarked (0-5 risk scale) and their underlying weighting is determined based on a statistical analysis (factor scores).
- For 6 of the 8 human rights issues, 1-2 additional quantitative indicators shed light on the risk at the regional (subnational) level. This is a further specification of the national risk. These indicators have been selected on the basis of a literature study. The national risk score is adjusted for different subnational regions based on their risk profile.
- A 'commodity-specific national risk score' is calculated by giving a higher weighting to the subnational risk scores identified for major production regions (volume) for each product. This provides a national risk score in which a greater weight is given to the risks in the most important production regions. Any regions in which a specific product is not produced are therefore not included in the calculation of the 'commodity-specific national risk score' for that product.
- The 'commodity risk score' is calculated on the basis of a standardised qualitative literature study. This step looks at whether the production circumstances of a particular product in a particular country (production systems, cultivation methods, workforce) imply a particular risk profile. This is performed for each of the human rights issues. The product-specific risk scores are benchmarked on a scale of 0-5.
- Ultimately, the 'commodity-specific national risk score' (3) and the 'commodity risk score' (4) are combined into one 'country-commodity specific risk score', in which the weighting of the two different scores depends on the reliability and validity of both underlying scores.

What is the purpose of a Human Rights Risk Assessment?

'Insights for Due Diligence' is an example of a 'hotspotting' tool. It provides an overview of 'hotspots' for various human rights and environmental issues at the country, regional and product level based on secondary data and/or literature studies. It can also serve as the first step in an S-LCA. The purpose of an HRRA is to provide an insight into the human rights risks associated with the production of a particular commodity in a particular country (or sub-national region). It enables a comparison between raw materials, countries and sub-national regions. The HRRA facilitates the prioritisation of risks to support a risk and/or impact analysis for a specific supply chain.

What is the role of a Human Rights Risk Assessment in the management cycle?
The HRRA adds most value to steps 1 and 4 of the management cycle. The Human Rights Risk Assessment can be seen as a first step in a due diligence cycle in which impacts (negative or otherwise) on human rights issues need to be identified and assessed (prioritised). This is done by means of a 'high-level scoping exercise'. This prioritisation then forms the basis for an 'in-depth mapping and risk assessment' in line with the 'measurement' step of the management cycle. That information is then used to develop intervention strategies to stop, prevent or mitigate impacts.

What are the functions of a Human Rights Risk Assessment?
The functions of the HRRA are:

- *Creating transparency:* the implementation of an HRRA provides an insight into the risk prevalence of certain human rights in the production of a particular commodity in a specific country or region. This provides a reliable picture of which human rights issues are at play within the sector, country or sub-national region. It enables the comparison of risks between raw materials and countries and regions and can serve as a starting point for a prioritisation of risks for further analysis and the development of interventions to prevent and mitigate impact.
- *Applying weighting:* by using a standardised set of issues and indicators, the HRRA provides an overall picture of the relevant risks in particular sectors and countries. This overall picture of the risks, when combined with specific information on the company itself (production volumes, relationships with suppliers, etc.), can provide an insight into the most prevalent supply chain risks for a specific business. Based on this, a company can then take further steps. The HRRA enables an explicit weighting because an overall 'country-commodity specific risk score' is calculated based on a 'commodity-specific national risk score' and the 'commodity risk score' (for each of the human rights issues). This is an overall score for a specific combination of an issue, product and production region, which can then be compared with scores for other specific combinations of issues, products and production regions. A company can then prioritise the risks based on this.
- *Incentivising more sustainable behaviour:* an insight into human rights risks presented in a way that enables them to be compared with each other and paired with company-specific information can help with the prioritisation of risks to support company-specific impact assessments and the development of intervention strategies to stop, prevent, mitigate and remedy any negative impacts.

Our conclusion is that the specific strength of an HRRA is that it is a methodology that combines quantitative and qualitative indicators and provides an overview of 'hotspots' for different human rights issues at the country, regional, sectoral and product level, thereby enabling a prioritisation of human rights risks. The HRRA is particularly strong with regards to the transparency and weighting function as it provides an insight into the risk prevalence of human rights and also calculates an overall 'country-commodity specific risk score'. An HRRA does not directly incentivise more sustainable behaviour, but it can be used to achieve this, depending on how it is used.

3.4 Social and Environmental Life Cycle Analysis

As mentioned, a Social and Environmental Life Cycle Analysis, or Life Cycle Assessment – also referred to as an S/E-LCA – serves as a foundation for the TCA method, but an S/E-LCA can also stand on its own.

What is a Social and Environmental Life Cycle Analysis?
An LCA is a way of understanding the impact of products and human activities at the environmental (E-LCA) or social (S-LCA) level, using special calculation models. The entire life cycle of a product or activity can be considered, i.e. from the extraction of raw materials, production, usage, and the final phase, including waste processing, recycling and/or reuse. This is also referred to as 'cradle to grave'. In other words, it's a type of supply chain analysis. An LCA provides a score list for environmental and/or social effects and this is referred to as the 'environmental profile' and/or 'social profile' of the product. At present, environmental impact indicators are significantly further developed than social impact indicators. This is mainly due to the fact that environmental effects are easier to measure (e.g. the number of kg of CO_2 emissions) than social effects (e.g. the 'amount' of child labour). However, the use of S-LCA is increasing, given that the demand for holistic approaches (in which environmental, social and economic aspects are taken into account) is also

growing enormously. S-LCA is already being used by many private businesses to identify hotspots in their supply chains, and the research sector is working on standardisation, often with support from the EC.

The methodology of an LCA consists of four steps and is laid down in the standards of the International Organization for Standardization (ISO) 14040 and 14044. ISO 14044 specifies requirements for an LCA and provides guidance for life cycle assessments across four phases:

- Determining the purpose and scale (including identification of relevant impact categories based on materiality analysis)
- Life Cycle Inventory (LCI)
- Assessment of the environmental/social impact of the life cycle, also known as a Life Cycle Inventory Assessment (LCIA) and
- Interpretation of the environmental/social impact of the life cycle.

It's important to note that only the impact categories and system boundaries (the part of the life cycle that is included) that are selected in steps 1 and 2 are actually mapped out. The scope of the study therefore has a significant influence on the results of the analysis and therefore makes the outcome somewhat subjective. Work is being done at European level on a standardised method of measuring environmental impact in different sectors so that the results of LCA calculations can be properly compared. These are known as the Product Environmental Footprint Category Rules (PEFCRs) for the E-LCA[14] and the UNEP guidelines for the S-LCA.[15]

What is the purpose of a life cycle analysis?

The purpose of an LCA is to map the environmental and/or social impact of a product or activity throughout its life cycle. There are several reasons why businesses want to do this.

a. Product management or R&D department: an LCA can help demonstrate that the company complies with particular environmental and/or social regulations and can help determine the standards that new product developments must comply with. Where this pertains to statutory requirements, the organisation can use the LCA to draw up an Environmental Product Declaration (EPD). This is a statement from the manufacturer which communicates the environmental impact of the product. The EPD is a way for a producer to comply with the transparency requirements stipulated under the BREEAM[16] and LEED[17]certification systems regarding the environmental impact of a product.
b. Supply Chain Management & Procurement: an LCA can provide insight into the environmental and/or social impact of producing a particular product, and suppliers can then be selected based on this.
c. Marketing & Sales: based on the insights generated by the LCA, a company can determine which opportunities it might take advantage of to become more sustainable, while also gaining an insight into where it has an edge over its competitors. This is also a way for the company to raise market awareness of its activities with regard to sustainability.
d. Executive level & Strategic management: high-level engagement is important if a company is to make strategic choices about how it can have a more positive environmental impact. An LCA must therefore always provide actionable insights for the top level of management.

What is the role of an S/E Life Cycle Analysis in the management cycle?

The added value of the S/E-LCA lies mainly in the fourth step of the management cycle: measuring. An S/E-LCA clarifies the social and/or environmental impacts of a product or activity throughout the entire life cycle. A range of different impacts are quantified, providing a basis for evaluation and communication. The measurement phase of social or environmental LCA analyses will ideally use as much primary data as possible. However, businesses can also use these tools in step 1 of the management cycle by conducting LCA analyses based mainly on secondary data, in order to identify sustainability risks (hotspots) and opportunities.

[14] Environmental Footprint methods - European Commission (europa.eu).
[15] Guidelines for social life cycle assessment of products | UNEP - UN Environment Programme.
[16] BREEAM = Building Research Establishment Environmental Assessment Method: a sustainability label for the realisation of sustainable buildings with minimal environmental impact.
[17] LEED = Leadership in Energy and Environmental Design: a globally recognised system used to determine the sustainability of buildings.

What are the functions of an S/E Life Cycle Analysis?
Functionally, an S/E-LCA fits seamlessly with the applications called for by the private sector, as described in Chapter 2.

- *Creating transparency:* implementing an LCA provides a quantitative insight into the environmental or social impact of a product or activity. With an E-LCA, the analysis transparently shows the impact of the production and consumption of a product: how many inputs (water, energy, raw materials) are needed, what the environmental emissions are, and what impact this has on the environment as a whole.
  An S-LCA assesses the social impact of products and services over the entire life cycle, for example the use of child labour, underpaid labour or the safety of living conditions.
- *Applying weighting:* the detailed information about different impacts can be applied to an explicit weighting, which happens in step 3 of the LCA process. If it's clear how much land use, water use, CO_2 emissions etc. are associated with the production of product A, this can then be compared with products B and C so that you can analyse which impacts have the greatest (negative) environmental effects.
- *Incentivising more sustainable behaviour:* at present, LCAs are typically used to monitor transitions (improvements at the company or supply chain level), and for scenario analyses (e.g. choice of supplier) and innovations (product improvement). Standardised methods for LCA calculations, such as the PEF, also enable comparisons of competing products. This can lead to interventions and improvements in the actual production process, as well as in the product portfolio, the purchasing strategy and in consumer communications.

To summarise, we contend that the specific strength of an S/E-LCA lies in its ability to provide a quantitative insight into the impact of a product or activity based on social and/or environmental impact indicators. We also conclude that the S/E-LCA has a strong transparency and weighting function, given that the social and/or environmental impact indicators are quantified and thus enable transparency and weighting.
An S/E-LCA does not directly incentivise more sustainable behaviour, but it can be used to achieve this, depending on how it is used.

3.5 Sustainability labels

Sustainability labels are becoming increasingly well known, but are also increasingly subject to debate in terms of the reliability of the claims they make. For example, a consumer survey conducted by the Dutch consumers' association (Consumentenbond) in 2021 showed that 41% of consumers pay attention to logos on packaging and 55% to sustainability labels, but only 8% of consumers think that the claims are correct while 55% suspect that manufacturers put misleading information on their packaging (Consumentenbond, 2021).

What are sustainability labels?
Sustainability labels are a way of conveying information about the properties of products that cannot be directly ascertained or checked in the way that colour and freshness can. For example, you can see if an apple has a nice red colour and no bruises, but you can't tell whether the apple was produced in an environmentally friendly way. A sustainability label is a way of communicating properties such as this which aren't immediately visible, and it's often done by way of a specific logo on a product.

Sustainability labels can be divided into three categories, depending on (i) the way they formulate their requirements and (ii) the way that compliance is monitored. These are first, second and third-degree sustainability labels.

- *First-degree sustainability labels* meet the requirements of the Dutch Accreditation Council; these are set at the international level and are also known as certificates. The requirements for these labels are drawn up by independent experts and often go beyond the statutory minimum requirements. These requirements are also made transparent and are independently monitored. A first-degree sustainability label is issued by a party independent of the actors in the supply chain in order to guarantee trustworthiness and minimise the risk of greenwashing. This means that anyone who meets the requirements of the sustainability label can apply for it. Examples in the agri-food sector are EU Organic, On the way to PlanetProof, Fairtrade (formerly Max Havelaar) and Rainforest Alliance. All of the 12 top brands identified by the Milieu Centraal foundation are examples of these 'first-degree labels'.

- *Second-degree sustainability labels* are those that are developed by industry-wide organisations. The requirements for these labels are set by the industry or sector itself, which also carries out the monitoring. These requirements are set out in a Regulation that the holder of the sustainability label must include when the brand is registered. The owner of the collective label must be impartial to ensure its trustworthiness. A company can therefore not simply determine the requirements itself, but the monitoring is not wholly independent. An example of this is the 'Keurslager' sustainability label for meat.
- *Third-degree sustainability labels* are also known as 'umbrella logos' or 'company logos'. Umbrella logos are always displayed on packaging in combination with one or more sustainability labels and do not impose any additional requirements in relation to those labels. Examples include Fairtrade Original and Nature and More, as well as the green check mark. Company logos are logos that are managed by the company itself, which means that they impose additional requirements for their products or suppliers. Such a logo can therefore not be used by other businesses. An example of this is Cocoa Life, a logo that belongs to Mondeléz International, the parent company of brands such as Milka, Côte d'Or and Toblerone.

The above information is based on information provided by Milieu Centraal, which has also drawn up a Sustainability Label directory.[18]

For the purposes of this report, we are not considering the third-degree sustainability labels as they neither involve third parties in the formulation of the requirements, nor organise independent verification of compliance. This makes them less reliable – even in terms of public debate with the government. Any mention of sustainability labels in the rest of this report therefore refers to first and second-degree sustainability labels. The first-degree sustainability labels are particularly relevant, given that they:
- involve third parties – often experts – in the formulation of the requirements, so that they are socially relevant and broadly supported, and
- are independently monitored and are therefore more trustworthy. This also makes them useful to the government as an indicator of sustainable production.

What is the purpose of sustainability labels and to whom do they apply?
The purpose of sustainability labels is to provide the consumer or the company with transparent information about the production method for a product with regard to one or more aspects of sustainability, depending on the scope of the sustainability label. There's often also a secondary goal, such as ensuring the payment of a fair price for a product. With Fairtrade this is an explicit goal; other sustainability labels may or may not have agreed on a premium. When there's a premium, it means that consumers pay a higher price for the product. Costs of production are often higher if they take account of the environment and of human and/or animal issues, and if the external costs are partly or fully internalised in the production costs. The result is that social costs are reduced and private costs are increased. Explicit agreements are sometimes made about the additional costs and additional revenues – e.g. with the Beter Leven ('Better Life') sustainability label used by supply chain actors – and sometimes it's left entirely to the market (e.g. with On the way to PlanetProof).

Sustainability labels are optional, which means that businesses or producers can choose whether they want to apply for a sustainability label for a product. The requirements for sustainability labels are stricter for certain aspects of production than the legal minimum requirements set for products.

What is the role of sustainability labels in the management cycle?
Most of the added value of sustainability labels applies to communication with consumers (step 6). A sustainability label should enable consumers to see at a glance how the product performs with regard to specific aspects of sustainability. This should then enable the consumer to make an informed choice about their purchase. The trustworthiness of the claims is crucial if companies are to maintain their credibility. When it comes to creating incentives (step 3 of the management cycle), a sustainability label is a good example of a tool that can do that. This is because a sustainability label provides an incentive to businesses or producers: in order to be eligible for the sustainability label, they must adopt certain measures to meet the requirements and by doing so they can achieve a higher price, for example. This is classified as a regulatory incentive. Sustainability labels of course also provide consumers with an information-based

[18] Recognising reliable sustainability labels or logos | Milieu Centraal.

incentive because they raise awareness and improve transparency for consumers. For consumers who want to act more sustainably, sustainability labels create an incentive to buy a product that carries such a label.

What are the functions of sustainability labels?

- *Creating transparency:* sustainability labels provide the consumer or the company with transparent, reliable and clear information about the characteristics of a product. Of course, a first-degree sustainability label is more reliable than a third-degree sustainability label, as explained above.
- *Enabling communication:* the communication function is an extension of transparency. If a product has a sustainability label, it means that the product meets socially relevant requirements. Because a sustainability label is often presented as a single logo or brand, it provides a simple and clear way of communicating certain aspects of sustainability to the consumer. This makes it easier for the consumer to make a different, and possibly more sustainable, choice.
- *Incentivising more sustainable behaviour:* sustainability labels set an example and can therefore stimulate behavioural change. Sustainability labels can make consumers more critical of products that don't come with a sustainability label, thereby incentivising the producers of those other products to improve their sustainability. Businesses or producers may also want to have certain products certified by a particular sustainability label, and will then align their company or product development process accordingly.

The use of sustainability labels as described above largely corresponds to the applications called for by the private sector, as set out in Chapter 2 of this report. Sustainability labels deliver on creating transparency and incentivising more sustainable behaviour, but they don't really provide weighting. Transparency is the feature that sustainability labels deliver best, in the sense that they transparently reflect the requirements that the sustainability label sets for the product. However, many sustainability labels still don't measure the impact of the label, i.e. the extent to which the requirements actually have a positive effect on, for example, greenhouse gas emissions or child labour. Sustainability labels are also sometimes one-dimensional, which means that only one aspect of sustainability is taken into account. As a result, all other issues are implicitly given a weighting of 0, because there's no indication of how one aspect performs compared to another. There's an implicit weighting process at work when the criteria for a sustainability label are established, but there's little clarity about what method would have been used to do that.

To summarise, we contend that sustainability labels mainly respond to consumer preferences and in this way they try to stimulate behavioural change among consumers. The presence of sustainability labels can also drive producers towards more sustainable behaviour. They might focus their product development more around the requirements set by the sustainability label, either because retailers or consumers demand it or on their own initiative. The specific strength of a sustainability label therefore lies in the way it can tell consumers something about a product's characteristics that the consumer would otherwise not be able to immediately ascertain or check.

3.6 Eco-rating label

What is an eco-rating label?

An eco-rating label (hereafter referred to as an eco-label) in principle sits in the same category as sustainability labels, but we consider the eco-label to be a specific sustainability label, i.e. a harmonised standard to provide an insight into the sustainability of products with regard to natural capital. This refers to eco-label systems that are based on the Life Cycle Assessment method for food and that make it possible to obtain information on the environmental impact of food, and to communicate that information. Eco-labels are different to traditional labels in terms of scope. Labels such as Fairtrade and Organic only apply to the products that are certified according to that specific label, but eco-labels are expected to apply to all products. It's similar to the Nutriscore label which gives an indication of the nutritional value of a product for the entire range of products. This tool is also based entirely on measuring impact (e.g. greenhouse gas emissions, land use, water consumption) rather than process indicators such as having a management plan for fertiliser use.

However, one disadvantage is that an eco-label does not provide an overall picture of the sustainability of a product, because only environmental indicators are included in the calculation and communication performed

through the label. There are also many options for the LCA calculation method, and differences in outcomes can occur depending on the data used (i.e. whether it's primary or secondary). Product Environmental Footprint Category Rules (PEFCR) are currently being developed for the various sectors and sub-sectors as a way of solving that problem.

Many eco-labels are currently under development. They're being developed by private parties, governments and NGOs, and they all have different classification methods and designs. This can be confusing, which is why a European project called Eco Food Choice has been launched with the aim of developing a harmonised EU-wide methodology for developing an eco-label. However, there is still no commitment from the European Commission that this will indeed result in a harmonised European eco-label that could eventually apply to all European products. If that were to be the case, the eco-label could become the new standard and an important driver of a more sustainable food system for Europe and elsewhere.[19]

What is the purpose of eco-labelling and to whom does it apply?
The purpose of an eco-label is to make it possible to show at a glance the impact of a particular product on the environment and thereby make it easier for consumers to choose. An eco-label can facilitate informed comparison within and across product categories. It also encourages producers to improve the environmental impact of their product, so that their product ends up in a better class and thereby becomes more appealing to consumers.

The eco-label programme was born out of an aim to define what is meant by a fully ecologically responsible product. This is because producers and retailers currently can use one individual ecological aspect of a product as a marketing tool. That specific aspect is magnified while other non-sustainable aspects are glossed over. This can cause confusion among consumers and can lead to greenwashing.

What is the role of an eco-label in the management cycle?
Like sustainability labels, eco-labels can play an important role in steps 3 and 6 of the management cycle. As described above, an eco-label serves two purposes, namely communication to consumers (step 6) and creating an incentive for producers to reduce the environmental impact of their products (step 3). The idea is that an eco-label (e.g. A to E) ought to enable consumers to quickly make a conscious choice based on the sustainability performance of a product, and also provide producers with an insight into the environmental impact of their product (compared to similar products). For this to happen, it's vital to standardise the calculation methods for the eco-label and to be transparent about how classification is determined.

What are the functions of an eco-label?
The functions of an eco-label are actually not that different to first-degree sustainability labels. Nevertheless, here is a brief explanation of the various functions:

- *Creating transparency:* an eco-label provides the consumer or the company with transparent, reliable and clear information about the characteristics of a product with regard to its environmental impact.
- *Enabling communication:* the communication function is an extension of transparency. An eco-label can show at a glance the environmental impact of the product and enable a comparison of products both within and between product categories. Because all products are given the same label, with many environmental issues integrated into a single weighted score, it becomes easier for consumers to make an alternative, and possibly more sustainable, choice.
- *Applying weighting:* an eco-score is based on an LCA calculation and arrives at a total absolute score by weighing up the various impact indicators.
- *Incentivising more sustainable behaviour:* because all products are given a score, other additional incentives can be used in addition to the label itself to nudge consumers towards more sustainable choices. For example, receipts can show the total score of everything a consumer has bought in a store. The Belgian retailer Colruyt awards green points to consumers who buy products with a high eco-score. Apps have also been designed with games that allow you to compare the average score of your products with those of your friends or neighbours. A wide-ranging and well-supported eco-label can spur businesses to compete on sustainability. They all want to be the best in their class and won't want to see their product languishing somewhere at the bottom when it comes to the eco-score. Because the eco-label provides an

[19] First steps towards European eco-label for food - WUR.

absolute score (from 0-100, for example), businesses will be encouraged to continuously improve.[20] A company that already scores very well (e.g. with 95 points) will still want to make it 96 or more. There's also a chance that the eco-label will apply to all European products, creating a level playing field.

To summarise, we contend that the specific strength of eco-labelling lies in the way that it enables clear and informative communication to consumers about the environmental impact of a product. We also conclude that the eco-label supports the applications of creating transparency, applying weighting, and incentivising more sustainable behaviour. Most eco-labels weigh up all the underlying themes into one overall score. The incentive for sustainable behaviour is also strong because a wide-ranging and well-supported eco-label promotes competition in this area and therefore provides a strong incentive to both consumers and producers to improve their sustainability.

3.7 Social cost-benefit analysis

The origins of the social cost-benefit analysis (SCBA) lie in the public sector. It's an important tool in the policy preparation phase, but can also be used ex-post to reflect on policies that have been implemented. Originally, it was often used in large spatial/infrastructural projects, but nowadays it's also used in the private sector to measure sustainability impact.

What is a social cost-benefit analysis?
A social cost-benefit analysis (SCBA) calculates the social costs and benefits of a concrete policy change over a longer period of time. The situation without the policy change (the reference) is compared with the situation with the policy change. The positive and negative effects of the policy change are identified and expressed in euros (costs and benefits). In addition to the financial/economic costs and benefits (as in a business case), an SCBA identifies, quantifies and monetises the social effects such as environmental pollution, damage to health, and the quality of the living environment.

The SCBA is similar to the TCA method. Both methods aim to quantify and monetise effects. In principle, both the SCBA and TCA can be used at different levels: for a product, organisation, investment or project. However, in practice we see that the SCBA is mainly used to assess the effects of a project, measure or[21] policy option on our well-being, while TCA mainly focuses on a product as an object of research. TCA is also more of a snapshot, asking: what are the impacts of the production of this product? Any behavioural changes over time are therefore not taken into account. An SCBA considers a set period of time and does take into account any behavioural changes.

According to the *General Guidelines for social cost-benefit analysis* written by Romijn and Renes (2013), an SCBA consists of 5 steps and is characterised by several basic principles.

An SCBA consists of 5 steps (Segerik, V., 2022):
- Analyse the problem that the project/policy/measure is trying to solve
- Describe the counterfactual and policy alternatives
- Identify relevant effects
- Monetise effects
- Recalculate future costs and benefits using the discount rate.[22]

[20] At present, the available data isn't comprehensive enough to achieve this, but the potential is there. In future, secondary data will increasingly be replaced with primary data, as large organisations and businesses start to face 'requirements' for accurate reporting and must then ask their upstream suppliers to provide the right information.
[21] A good example of an SCBA in the food industry is the SCBA research by Max van der Sleen and Menno van Benthum. They conducted an SCBA on the various scenarios for reforming livestock farming, which concluded that the social benefits of reform would outweigh the costs in ten years, but that such a reform would require substantial investment.
[22] The discount rate is a measure of the social return required of public investments (rwseconomie.nl).

The basic principles of SCBA are (Bos et al., 2022):

- The effects are calculated on the basis of market prices, shadow prices or shadow costs and then added up.
- Important effects that have not been/cannot be monetised are also prominently included. They are included as a token entry: a qualitative assessment, without assigning a monetary value to them.
- The monetary weighting of effects does not take into account the question of who receives or pays the costs or benefits and whether the person/organisation in question is poor or rich. SCBA therefore does not take into account how the added value of more money decreases as we become richer.
- The monetary weighting of effects is based on the principle that 1 euro is 1 euro, regardless of who benefits or is disadvantaged by that, whether they are rich or poor and whether those who make a loss are compensated or not. An SCBA balance can therefore be positive, even if some people or groups are disadvantaged (i.e. make a loss). This can still be interpreted as a 'potential' Pareto[23] improvement in well-being if the 'winners' of a measure compensate the 'losers'. This is known as the 'Hicks-Kaldor compensation criterion'.[24]

What is the purpose of the social cost-benefit analysis and to whom does it apply?
The aim of an SCBA is to compare alternative measures or projects on the basis of consequences for the well-being of society as a whole. This makes this method extremely suitable for policy makers. In the Netherlands, SCBA is often used in infrastructural projects, such as of the construction of dikes and roads andinvestments in public transport and windmills. In principle, SCBA is widely applicable and its use can extend to social domains such as healthcare or education. However, it's more difficult to use as a calculation method in some settings because effects aren't always easy to estimate or express in euros. Nevertheless, an SCBA can still be useful in such situations, because it can then serve as a structuring framework for how to approach the issue (Romijn and Renes, 2013).

What is the role of a social cost-benefit analysis in the management cycle?
A social cost-benefit analysis (SCBA) calculates the social costs and benefits of a concrete policy change over a longer period of time. The situation without the policy change (the reference) is compared with the situation with the policy change. This makes the tool very suitable for the evaluation step (step 5) of the management cycle. The SCBA can also be widely used as a reporting tool. All of the insights acquired as part of an SCBA are meticulously reported. This enables it to serve as an internal source of information, and means it can be used as a basis for carefully considered decisions.

What are the functions of the social cost-benefit analysis?
As mentioned above, the SCBA is mainly used in the policymaking sphere. It's a method for analysing the effects of a policy measure or group of measures. It serves the following distinct functions:

- *Creating transparency:* an SCBA provides a transparent overview of the positive and negative effects of a particular policy measure
- *Enabling communication:* the analysis can be used to inform policy makers about the outcomes of particular policy instruments
- *Supporting decision-making*: the insights provided by the SCBA can enable policy makers to make an informed decision on whether to introduce or abolish a particular policy measure.

In conclusion, we contend that the specific strength of an SCBA is that it can quantify and monetise social effects, taking into account a period of time and any behavioural changes. This makes external effects (i) transparent and (ii) means they can be compared with each other in order to determine their relevance (explicit weighting is possible) and (iii) based on this, it's also possible to determine which strategic choices in policy or operational management will produce the best results. However, there is a proviso to be made here. An SCBA compares two or more scenarios, but this doesn't necessarily tell us much about the social

[23] Pareto efficiency is an important concept in the socio-economic sciences and describes a situation in which resources (which may be scarce) are allocated in such a way that no one can be better off without someone else being worse off. From a socio-economic perspective, Pareto efficiency is important because it ensures that resources are allocated fairly and that everyone has access to the resources he or she needs to live a fulfilling life.

[24] The Hicks-Kaldor theory says that an outcome can be Pareto-efficient if those who benefit from the measure can compensate those who are disadvantaged by the measure.

relevance of particular topics. Still, a search for alternatives is almost always based on some social need, so it can be assumed that the issues being analysed are of social value.

3.8 True Cost Accounting

What is True Cost Accounting?
True Cost Accounting (TCA) is a methodology for calculating the external effects of production and consumption that are not reflected in the market price and expressing these in monetary terms as social costs or benefits (Galgani et al., 2021). At present, TCA is mainly used as an application for a specific product, but it can also be used more broadly, such as for calculating the external effects of a particular investment or identifying and monetising social and ecological risks. External costs and benefits include costs and benefits to natural, social and human capital, such as environmental costs, health care costs, but also social costs such as the costs of underpaid labour. These unpriced effects of production and consumption can be both positive and negative, though at present TCA calculations mainly work out the negative effects. One reason for this is that positive effects are often more complicated to quantify and it's better to avoid offsetting positive and negative effects if they don't apply to the same impact.

Galgani et al (2021) identify the following steps as a way of calculating the true, unpriced costs:
- 'Framing', or target formulation: formulate what the implementation of the TCA is expected to achieve.
- 'Scoping': define system and analysis boundaries by identifying the external effects of the production and consumption of a product, and decide which indicators are most suitable for the consideration of those external effects, in order to enable a quantitative impact measurement (e.g. an LCA for natural capital).
- 'Measure and value': the selected external effects are then monetised using objective and standardised valuation models, so that external effects become 'countable' and 'comparable'.
- 'Report': validation, interpretation and reporting of the results.

What is the purpose of True Cost Accounting and to whom does it apply?
True Cost Accounting is a method that provides a comprehensive view of the economic and sustainability aspects of the production and consumption of a product (True Price, 2015). In other words, the purpose of TCA is to provide an insight into the external, unpriced effects of production and consumption. This information can be used to provide an understanding of the negative or positive effects of food products on the environment and society. Because TCA is a means of expressing different units in a single monetary unit, it also enables the different external effects to be weighed against each other.

TCA can be used by a variety of food system actors, including businesses, supply chains as a whole, consumers and NGOs, financial institutions and policy makers. TCA is not something that businesses, NGOs and financial institutions are obliged to do, but it can be a way for them to make transparent their impact on the environment or social domain, to communicate that impact to their customers or their suppliers, and to make choices based on it. Some businesses also use TCA to calculate the 'true price gap' and charge this premium to their consumers. The additional money this brings in can then be allocated by the company to a specific measure or group of people in order to improve sustainability within the production chain.

What is the role of True Cost Accounting in the management cycle?
TCA adds most value to the first and fifth steps of the management cycle. It plays a role in identifying relevant sustainability risks and opportunities by clarifying the external costs of business operations. This provides an insight into which activities generate the greatest external costs, thereby providing a basis for identifying relevant risks and opportunities in a transparent manner. TCA is also ideally suited to the fifth step in the management cycle, namely evaluation of the sustainability targets set by the company. When making such an evaluation, it's important to be able to weigh up and compare overall scores, and this is easiest to do if they are expressed in the same (monetary) unit for each target or measure.

While TCA adds the most value to steps 1 and 5, it can also be helpful to other steps within the management cycle. For example, while the TCA method doesn't prescribe or perform the setting of targets and measures, it can support the selection of targets (step 2) and measures (step 3) by means of the insights it provides. However, this doesn't mean that TCA directly incentivises more sustainable behaviour. TCA offers points of

entry for establishing measures, but does not directly lead to concrete measures that describe how more sustainable behaviour can be achieved. An additional step is required for that. This was confirmed by De Vos (2024) and Taufik et al. (2023) who looked at whether and how TCA can encourage other supply chain actors and/or consumers to behave in a different, more sustainable way. De Vos (2024) clearly states that while TCA provides an insight into the issues that are crucial to improving a sustainability profile, it does not help with identifying the root causes so that those factors can themselves be addressed. As a result, TCA has limited value as a way of encouraging other actors in the chain to change their behaviour. The TCA approach could potentially also serve as a basis for communication to consumers (step 6), for example as part of the labelling process (e.g. the A to E used by Nutriscore) or for calculating a true price. This would however still require a substantial effort. Indeed, research (Reinders et al., forthcoming) shows that consumers find TCA complicated and complex.

Figure 3.1 summarises the value of TCA in the various steps of the management cycle, with the greatest added value in steps 1 and 5.

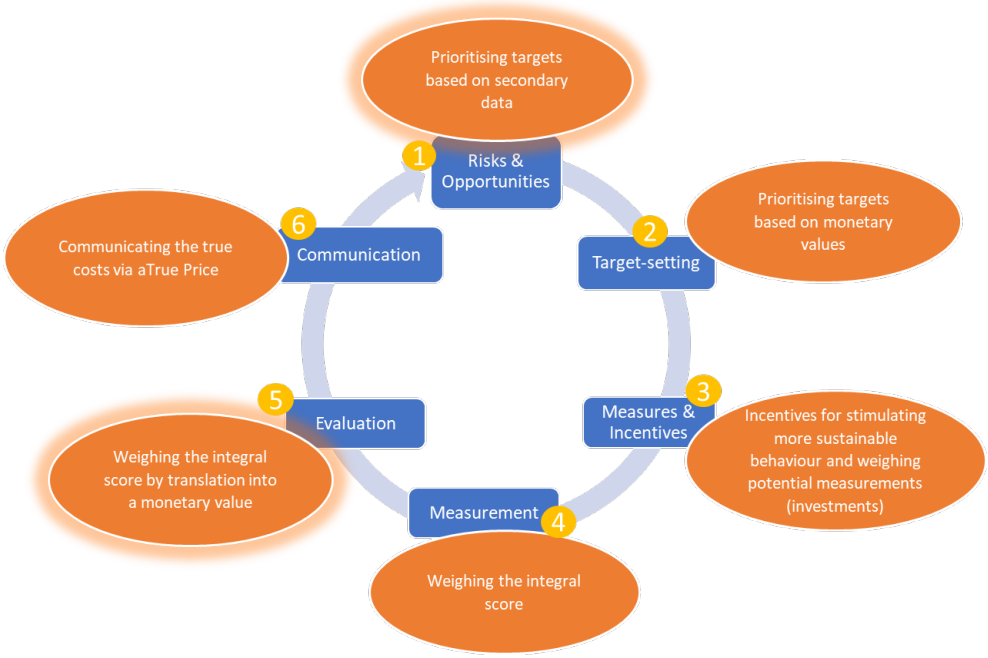

Figure 3.1 *Management cycle describing the added value of TCA for the relevant steps.*

What are the functions of True Cost Accounting?
TCA can perform the following four functions:

- *Creating transparency:* TCA provides information on hidden external costs and benefits associated with production and consumption factors that are not priced into the market price;
- *Applying weighting:* by measuring and expressing external impact in a single, overall monetary unit, different issues can be weighed against each other in an objective way.
- *Incentivising more sustainable behaviour:* the information provided by TCA can encourage the production and consumption of products with lower hidden costs or the adaptation of production methods, thereby reducing negative external costs. However, this requires additional effort, as mentioned above.

These applications were part of the experiments we conducted in the context of the PPP 'True Price from insight to action'. Splinter (2022) concludes that TCA is mainly used for transparency in the supply chain, as a way of identifying where improvements could be made. This approach was applied by the catering company Hutten, the supermarket chain Albert Heijn, and university procurement departments, in studies conducted by Oosterwijk (2023) and De Jong (2023).

In short, the specific strength of TCA is that it makes the external, unpriced effects of production and consumption transparent and comparable by expressing them in the same monetary unit. The use of TCA as described above largely corresponds to the applications called for by the private sector as set out in Chapter 2 of this report, namely creating transparency, applying weighting (materiality analysis) and, to a lesser extent, incentivising more sustainable behaviour.

3.9 Conclusion

Based on the sections above, we can conclude that various tools are available for the purposes of creating transparency, applying weighting, and incentivising behavioural change. TCA is one such tool. In the table below, the characteristics of the different tools are summarised according to the three functions, and the specific strength of each tool is also mentioned in order to provide a thorough overview of the differences between them.

Table 3.1 Overview of how the various tools deliver the three functions (creating transparency, applying weighting, and incentivising more sustainable behaviour) and the specific strengths of each tool in order of their role in the management cycle.

Management cycle	Tool	Transparency	Weighting	Behavioural incentive	Specific strength
Starting point / step 0	CSRD (legislation)	Transparent sustainability reporting, mainly on qualitative intervention indicators.	No explicit weighting possible due to mainly qualitative intervention indicators.	Basing strategic choices on qualitative intervention indicators.	CSRD: provides transparency on a company's social impact.
Starting point / step 0	CSDDD (legislation)	Transparency about obligation to act on mainly qualitative intervention indicators.	No explicit weighting possible due to mainly qualitative intervention indicators.	Basing strategic choices on qualitative intervention indicators.	CSDDD: requires not just transparency on impact, but also the adoption of measures to address that impact.
Steps 1 and 4	HRRA	Detailed insight into the potential impact (or impact risk) of a particular product from a specific production region in terms of 8 different human rights issues. This risk is expressed as a score that is easy to communicate and compare.	Users can apply explicit weighting for the purpose of prioritising risks based on comparable information (risk scores) for specific human rights issues, products and production regions.	The insight provides an incentive for the company to make certain choices with regard to prioritising risks for further impact analysis and developing intervention strategies for impact prevention and mitigation.	Overview of 'hotspots' for different human rights issues at the country, regional, sector and product levels, enabling a comparison and prioritisation of human rights risks.
Steps 1 and 4	S/E-LCA	Provides a detailed insight into the environmental or social impact of a product or activity.	Explicit weighting possible by calculating quantitative impact indicators.	Insights gained from an LCA calculation can support decision-making with regards to the production process, product portfolio, purchasing strategy and communication to consumers.	Insight into the impact of a product or activity on environmental and/or social impact indicators based on a quantitative method.
Steps 3 and 6	Sustainability labels	Transparent, reliable and clear information delivered through a logo so that consumers can make quick, easy comparisons between products.	Implicit weighting in the selection of sustainability label criteria. It's not made explicit how this weighting/selection will have been done.	The sustainability label encourages consumers to buy the product and incentivises producers to certify themselves for the sustainability label.	Communication to consumers about product characteristics that the consumer would otherwise not be able to physically ascertain or check.
Steps 3 and 6	Eco-labelling	A harmonised way of instantly indicating the environmental impact of all relevant products.	Explicit weighting is possible because eco-labels are based on the quantitative LCA method.	Consumers can easily compare products and producers have a strong incentive to improve their performance.	Clear and informative communication to consumers about the environmental impact of a product.
Step 5	SCBA	Provides a transparent overview of positive and negative social effects.	Explicit weighting possible through quantification and monetisation.	Comparisons make it easier to consider options and make an informed decision.	Quantification and monetisation of social effects, while also taking into account a period of time and any behavioural changes.

Management cycle	Tool	Transparency	Weighting	Behavioural incentive	Specific strength
Steps 1 and 5	TCA	Closely comparable information on external costs and benefits expressed in the same monetary unit.	Explicit weighting possible, based on quantitative impact indicators expressed in a monetary unit.	Facilitates good investment decisions regarding the reduction of external costs. In principle can serve to steer other actors in the chain towards more sustainable production, but at present doesn't do that well enough. TCA can – after further development – help consumers make more sustainable choices, but that requires more than just information.	An insight into the external, unpriced effects of production and consumption by expressing those effects in the same monetary unit, so that effects can be weighed against each other.

Note: S/E-LCA and eco-labels often use weighting, but this does not necessarily have to be a weighting based on monetisation. Such weighting can also be based on expert knowledge or on the severity of the problems (e.g. it could be based on planetary boundaries, meaning the points at which environmental problems exceed the earth's capacity). The advantage of CSRD is that it prescribes reporting on a much broader set of information where each target group can focus on those indicators that are most important to them. Another advantage of CSRD is that a significant portion of the indicators are future-focused (targets, strategy, measures, opportunities) rather than being retrospective like TCA, and this makes the weighting of themes and indicators flexible.

4 What issues need further attention?

Chapter 3 described how the applicability of the tools depends on the intended objective, and how the various tools can play an important role in specific steps of the management cycle. This chapter discusses a number of issues that have been overlooked in the report so far, such as:

- Step 2 of the management cycle, which is about translating risks and opportunities into sustainability targets.
- The importance of good data collection and analysis; something that applies to almost every tool.
- The relationship between a number of sustainability tools and how they can reinforce each other.
- The role of TCA in the management cycle; we take a closer look at this, given that it is the main topic of this report.

4.1 Setting targets

Chapter 3 described the role that each tool can fulfil in the management cycle. The figure below gives a visual overview of the role of the various sustainability tools in the management cycle.

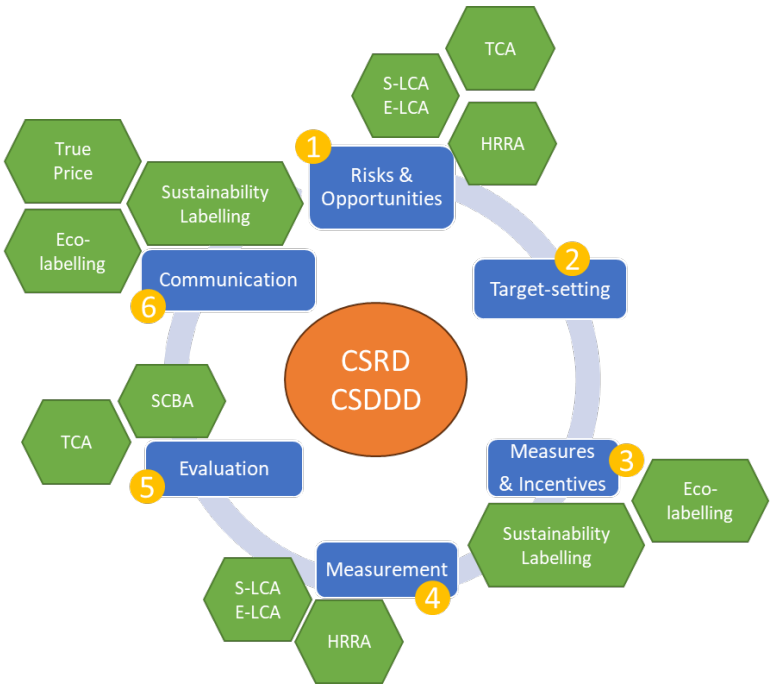

Figure 4.1 *Management cycle with the various sustainability tools positioned where they add the most value.*

This figure shows that step 2 of the management cycle – the translation of risks and opportunities into targets – has not yet been discussed. None of the tools particularly stand out compared to the others in this respect, and we have also found no other tool that works for multiple sustainability issues including business model criteria such as risk, costs, turnover, profit and dividend.[25] Targets are often broken down into process and impact targets. Process targets, also known as intervention targets, mainly focus on the internal organisation. Impact targets, on the other hands – also known as quantitative targets – depend on the

[25] For greenhouse gas emissions, there is the Science Based Targets initiative (SBTi), but that hasn't been included in this report because we are looking at tools that can be used to address a variety of sustainability issues.

environment. This latter category is often based on the S/E-LCA, TCA and SCBA methods as they aim to express impact in a quantitative unit (e.g. CO_2, euro). Sustainability labels also set clear targets that products must meet in order to be allowed to bear the label. However, for the most part they don't measure impact based on the requirements set by the sustainability label. The CSRD prescribes a combination of process and impact targets (e.g. Scope 3 greenhouse gas emissions).

4.2 Data collection & data analysis

Data collection and analysis are crucial when it comes to impact measurement in relation to sustainability.[26] All tools involve data collection and data analysis to a greater or lesser extent. The quantity and quality determine the depth and reliability of the analysis.

Data quantity
Data collection is a crucial part of the process for every tool. However, the amount of data to be collected and the way in which the data collection takes place is different for every tool. The LCA, TCA, SCBA and eco-labelling methods collect only quantitative data while the CSRD and CSDDD also require a lot of qualitative data. A lot of data is required for conducting an LCA because all the different impact indicators[27] have to be reported on. This requirement is even greater for the TCA and SCBA methods because as well as collecting data for the impact indicators themselves, you also need additional data for the monetisation. This leads to a greater requirement for data and at the same time creates more room for subjectivity because as yet there's no harmonised way of expressing quantitative impact indicators in monetary terms. The data required for the sustainability labels varies for each label, but in general they have a limited number of requirements and do not measure the impact over time. This means that businesses such as food retailers that sell products with a sustainability label only have to check on one or possibly a handful of variables from their suppliers for many of those labels – i.e. whether they are certified and the audit has been completed promptly and correctly – and they only have to do that at one particular moment in time. Also, the data that suppliers have to collect is more easily available because sustainability labels often only pertain to a single issue, or are limited in scope at least.

Data quality
The distinction between primary and secondary data is relevant to determining data quality. It's preferable to use as much primary data as possible, as such data will be most specific to the application and circumstances. Primary data relates to the company itself (its own energy use, for example) and provides the best insight into the effects of the product, activity or service, provided that the data is complete and reliable. However, this kind of data isn't always available and it's often too expensive to collect. In those circumstances, secondary data will be used. This refers to data collected by external parties (such as research organisations) and which provides average impact data pertaining to a particular product, machine or activity. In practice, almost every LCA is a combination of primary and secondary data. Primary data is important for the hotspots (energy consumption, fertiliser use, yield per ha). Secondary data is often used for generic supporting processes (such as the impact of the production of a tractor used by a farmer in agricultural production, or the impact of constructing a storage facility for products). There's also a distinction to be made between global, national and regional weighting factors. Different scopes will be relevant depending on the topic, but the availability of data will also determine what sort of scope is used for the calculation.

Tools for measuring impact
Broadly speaking, the tools used for measuring environmental impact are more harmonised and more databases are available for generic/secondary data. When it comes to impacts in the social and human

[26] For TCA, we refer specifically to the study by Snoek et al. (2024).
[27] For the E-LCA, Europe is designing Product Environmental Footprint Category Rules (PEFCR) which aim to harmonise the calculation rules for different sectors. These PEFCR include 16 different environmental indicators: global warming (climate change), ozone depletion, soil and water acidification, eutrophication (fresh water, terrestrial, marine), photochemical ozone formation, depletion of abiotic agents: elements and fossil fuels, human toxicity, freshwater aquatic ecotoxicity, marine aquatic ecotoxicity, terrestrial ecotoxicity, water pollution, air pollution, land use, water use (ecochain.com).

domain, the methods are less developed and there's also less generic data available. It's therefore generally considered sufficient to provide an insight into measures that have been taken to reduce risks rather than measuring the impact itself (for example, the measures have been taken to prevent child labour rather than determining the extent to which child labour has actually been prevented).

For both social and environmental impacts, the more advanced and precise the impact methods, the greater the need for data. Large-scale measurements therefore often use simpler tools (or more secondary data) compared to smaller-scale implemention, because otherwise the data collection becomes too complex and expensive.

4.3 The relationship between LCA, TCA and a true price

The S/E-LCA methodology is regarded not just as a sustainability tool in its own right, but also as a crucial part of the application of TCA. This is because LCA clarifies and calculates the externalities, and those calculated impacts can then be expressed in monetary terms using the TCA method. A possible extension of TCA would then be the translation into a true price (TP), whereby the costs of the externalities become included in the price charged to consumers. This was mentioned earlier in the report as a possible application of TCA for which additional effort is required. True price is indeed not seen as an independent tool and is therefore not included as such in this publication. For SCBA and eco-labelling, measuring impact through an LCA can also be a first step before further translation into costs (SCBA) or a score (eco-label). This framework is represented in Figure 4.2.

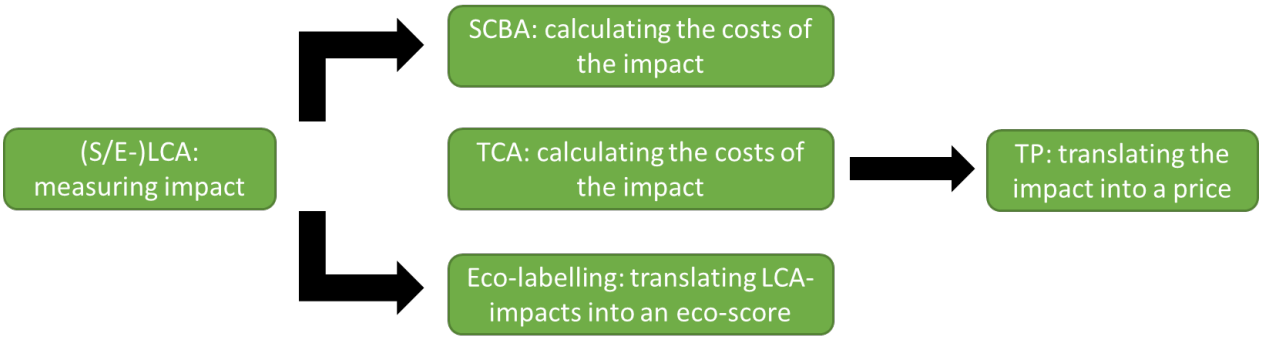

Figure 4.2 *Relationship between LCA, TCA and TP.*

The relationship between the other tools and LCA is less direct than it is with TCA, SCBA and eco-labelling. Sustainability labels are based on certain pre-established requirements and not so much on an LCA calculation. It's conceivable that in the future the impact of these requirements might be calculated and LCA could be a suitable method for this, depending on the type of requirements. The CSRD and CSDDD require companies to be transparent about issues and to report on their sustainability targets. That's something they can use LCA for. It's different for an HRRA because this has its own calculation method and can also be seen as a first step in an S-LCA.

5 Conclusions

This closing chapter provides a conclusion about where TCA stands in relation to other sustainability tools, both in terms of the management cycle and the provision of the three applications.

TCA can be an effective tool to support sustainable operational management in the private sector.
We conclude that TCA can be an effective tool for the private sector. It can help financial professionals and company management and/or executive boards to express external impacts in monetary terms and thus make the gravity of the problem transparent. Those insights can then support sound decision-making and strategic considerations regarding new investments, supplier analysis, their supply chain, etc. TCA can also complement the implementation of the CSRD and CSDDD within businesses by monetising some of the mandatory impact indicators that need to be reported.

True Cost Accounting is an effective tool for the provision of two applications: creating transparency, and applying weighting.
TCA is an effective tool when it comes to creating transparency and applying weighting. It provides information on external costs and benefits and expresses them in the same monetary unit, thereby facilitating comparisons. This enables explicit weighting based on quantitative impact indicators. TCA also provides points of entry for incentives to trigger more sustainable behaviour, but the approach itself can't do that on its own. De Vos (2024) explains that while TCA provides an insight into the particular areas that are crucial to improving a sustainability profile, it does not help with identifying the root causes so that those factors can themselves be addressed. As a result, TCA has limited value as a way of encouraging other actors in the chain to change their behaviour. TCA can also serve as a form of external communication towards consumers or provide the basis for a price-based incentive – either through further translation into an eco-label or a true price – but that isn't its core function.

True Cost Accounting can play an important role in steps 1 (risks and hotspots) and 5 (evaluation) of the management cycle when it comes to sustainability.
TCA adds most value to the first and fifth steps of the management cycle. TCA can play an important role in identifying relevant sustainability risks and opportunities by identifying the external, or social, costs of business activities. The extent of these external costs provides a basis for identifying relevant risks and opportunities. TCA also lends itself well to the evaluation step. Calculating overall scores that are easy to weigh up and compare with each other provides transparency when evaluating particular targets and measures.

True Cost Accounting has added value compared to other tools
The added value of TCA for the private sector is based on the following elements:
- TCA's use of monetisation provides explicit weighting based on welfare theory, damage costs, prevention costs or a rights-based approach and thereby facilitates informed consideration of strategic decisions. Quantitative impact indicators expressed in the same monetary unit simplify the work of decision-makers.
- TCA is a calculation system for measuring and valuing external (environmental, social, health and economic) costs and benefits, and it therefore fits well with existing accounting processes used in the private sector.
- The TCA approach has the potential to be widely applicable because it includes environmental, social and human impact indicators and can also serve as an external communication tool and as a way of creating incentives that trigger more sustainable behaviour. However, this isn't yet the case as the development of social and human impact indicators is still in its infancy and there's additional effort involved in translating TCA into a true price (see the key considerations below).

Key considerations for the TCA methodology

But there are also areas of concern for the TCA methodology that currently make it difficult to deploy it widely in the private sector. Key considerations are:

- There currently is a wide variety of calculation methods which is not ideal Researchers are working to achieve harmonisation at the EU level,[28] but at the moment TCA calculations can still deliver variable results due to the use of different methods.
- There's no agreement on the methods to be used to measure certain impacts, but a lot of research is currently being done in this area. While TCA includes both environmental and social indicators, the development of social and human impact indicators is still in its infancy. But it's still difficult to quantify and weigh a social impact indicator such as child labour. It's much more straightforward for environmental indicators.
- TCA requires an enormous amount of data. This means that conducting a TCA is often very costly, especially if the analyses are done on a larger scale or in long and complex supply chains. Proxy indicators or token entries have to be used because even when there's a generous budget, the data isn't available.
- TCA offers points of entry for intervention strategies to mitigate impact, but does not directly lead to concrete measures (which the CSDDD does require) to improve sustainability. This requires a greater insight into underlying causes.
- At present, TCA is still less suitable for communication towards consumers. Consideration needs to be given to how you might use TCA in this area. One possibility is to translate TCA into a true price that can be communicated to consumers.

[28] The relationship between damage and prevention costs or the rights-based approach needs to be determined. Damage costs are understood to mean the costs incurred to restore something to its original state. Prevention costs are understood to mean the costs incurred to prevent a certain impact, and the rights-based method is based on certain universal rights that may not be violated and the costs incurred should such violation occur.

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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 7,600 employees (6,700 fte) and 13,100 students and over 150,000 participants to WUR's Life Long Learning, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.