

02/2024

 **BRIGHTWOLVES**

# Life Cycle Assessment (LCA)

Whitepaper

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# LCA Whitepaper Series

## Foreword

Welcome to our LCA Whitepaper Series, each dedicated to a specific aspect of Life Cycle Assessment (LCA). As a critical tool in the field of sustainability, LCA provides a comprehensive view of the environmental impacts associated with all the stages of a product's life, from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling. This series aims to delve into the intricate aspects of LCA, shedding light on the various methodologies, standards, and frameworks that guide its application.

In each whitepaper, we will focus on a specific topic, be it ISO standards that govern LCA, industry-specific standards such as Global Feed LCA Institute (GFLI), various allocation methods, ReCiPe method vs. Product Environmental Footprint (PEF), and many more. Our goal is to provide a clear, comprehensive, and accessible understanding of these complex topics, enabling you to apply this knowledge in your sustainability journey.

Whether you are a seasoned professional in the field of sustainability or a newcomer looking to understand the intricacies of LCA, these whitepapers will serve as a valuable resource. We invite you to join us in this exploration of LCA, as we strive to contribute to a more sustainable future.



# ISO Standards & Industry-Specific Standards

## Introduction

In this first whitepaper of our series, we delve into the world of ISO standards and industry-specific standards, focusing on the Global Feed LCA Institute (GFLI). Both ISO standards and GFLI are two pivotal elements in the realm of Life Cycle Assessments (LCA). ISO standards provide a universally accepted framework for conducting LCAs, ensuring consistency, reliability, and comparability across assessments. On the other hand, GFLI offers a specific application of these standards, focusing on feed industry-related LCAs. Through this whitepaper, we aim to clarify the role and significance of these two entities, enhancing your understanding and application of LCA in the pursuit of sustainability.

## ISO Standards

The ISO – short for International Organization of Standardization – is an international standard-setting body that promotes worldwide comprehensive, industrial, and commercial standards. The body was founded in 1947 and has ever since created over 25.000 international standards covering almost all business-related topics, such as manufacturing and technology. With more than 165 national bodies as members of the ISO, the organization's coverage is nearly all-inclusive.

ISO creates market-relevant standards based on the knowledge of experts throughout the whole value chain of a certain industry. For example, food safety standards are guidelines to ensure the safety and quality of food products throughout the entire food supply chain, from the safe transport of dairy products in case of a distributor, to the safe display in the supermarket by the retailer. One of the most well-known ISO standards is ISO 9001. ISO 9001 is the standard for Quality Management System. This standard ensures that goods and services consistently meet the (potential) customers' requirements related to quality and that an organization uses a systematic workflow to continuously improve its operations. A manufacturing company can, for example, obtain the ISO 9001 certification to communicate high-quality products to its customers and thus potentially increase its competitive advantage. The ISO 9001 certification is used by more than 1.5 million companies worldwide and is seen as the foundation for many other ISO standards.



## Getting certified

While ISO creates and develops different standards, it does not issue the certifications following its guidelines. The certification is done by 3<sup>rd</sup> parties, which have been appointed by country-specific accreditation bodies. In general, an ISO certification includes the following steps:

1. Choose the type of ISO certification your business wants to apply for.
2. Choose the right ISO Certification Body (CB). Make sure you identify the national standard body in your country that the International Accreditation Forum recognizes.
3. Create an ISO standard application with the CB.
4. Documents review: an ISO auditor will review your manuals and documents related to various policies.
5. Prepare an action plan to eliminate the existing gaps in your operations or policies detected by the ISO auditor.
6. Communicate your action plan to your employees and inform them about the new procedures that will be put into plan to increase efficiency and quality
7. Identify the developments and check possible non-conformities after the evaluation of changes by the ISO auditor. Subsequently, a final certification audit will be held.
8. Complete your ISO Certification, which will be valid for three years

The benefits of ISO certifications are endless. They will save you time, and therefore money, improve the efficiency of your systems and processes, and make you more competitive. Current customers will be more satisfied and potential ones will recognize your products or services as qualitative and safe. ISO certifications are in some countries required by law or contracted. In Belgium, for example, some of the mandatory ISO Certification Standards are ISO 9001, ISO 14001, and ISO 45001, among others.

Impactful, global developments such as digitalization and environmental responsibility force ISO standards to continuously grow and adapt. One of those examples is the ISO 14000 family, which is a relevant category for the performance of LCAs. In the next paragraph, we dive deeper into this family and the impact it has on businesses.

## ISO 14000 Family and Its Impact

The ISO 14000 family of standards is a set of internationally recognized guidelines and frameworks for the environmental management of a company. It exists to help organizations actively manage their environmental responsibilities and reduce their environmental impact. The ISO 14000 family addresses various aspects of environmental management, such as



guidelines for incorporating ecodesign, communications, or material flow cost accounting. The ISO 14001, for example, is in line with the ISO 9001 discussed above, as it entails the criteria for an environmental management system (EMS).

The current relevance of ISO 14000 standards lies in the increasing global focus on sustainability and corporate social responsibility (CSR), as one can observe in Figure 1. Many companies these days are recognizing the importance of integrating environmental initiatives into their operations and policies to minimize their ecological footprint and meet more stringent stakeholder expectations. For instance, the manufacturing company mentioned above that has already implemented ISO 9001 for quality management may decide to introduce ISO 14000 guidelines to enhance its environmental performance. By adopting the ISO 14001 standard, the company can establish an environmental management system that complies with regulations, identifies, and mitigates environmental risks, and improves operational efficiency. There are several standards within the ISO 14000 family for which you can get certified, such as ISO 14001 for environmental management systems, ISO 14006 for a commitment to sustainable product design practices, and ISO 14064 for everything that addresses greenhouse gas (GHG) accounting and verification.

The ISO 14040 and 14044 standards are relevant for this whitepaper, as these standards provide guidelines for conducting life cycle assessments (LCAs) of products and services throughout their entire lifecycle. ISO 14040 focuses more on the principles and provides a framework for LCAs, whereas ISO 14044 guides you in the different requirements needed to perform an LCA. The guidelines include the different phases of an LCA study, advice on how you define the scope, the creation of an inventory analysis, and the conduction of an impact assessment. Furthermore, they also contain reporting tools as well as the limitations of an LCA.

“In theory, there is no difference between theory and practice. In practice, there is.” The ISO guidelines for performing an LCA are a good start but putting them into practice is a whole different story. A lot of companies – although they have a clear theoretical framework – struggle with defining the right system boundaries for their LCA, obtaining the right data, and calculating consistently the right environmental impact of their products. Garbage in, garbage out. With the wrong data or the wrong calculation method, the decisions you make based on a wrong LCA can lead to disastrous consequences. A flawed LCA can underestimate the environmental impact of your product, or even damage your reputation with different stakeholders. Some entities go further than just guidelines and frameworks. They create specific databases to perform an LCA and provide you with the necessary tools to quantify the



environmental impact of your products. An example of such an entity is the GFLI, which we will discuss more in-depth in the next paragraph.

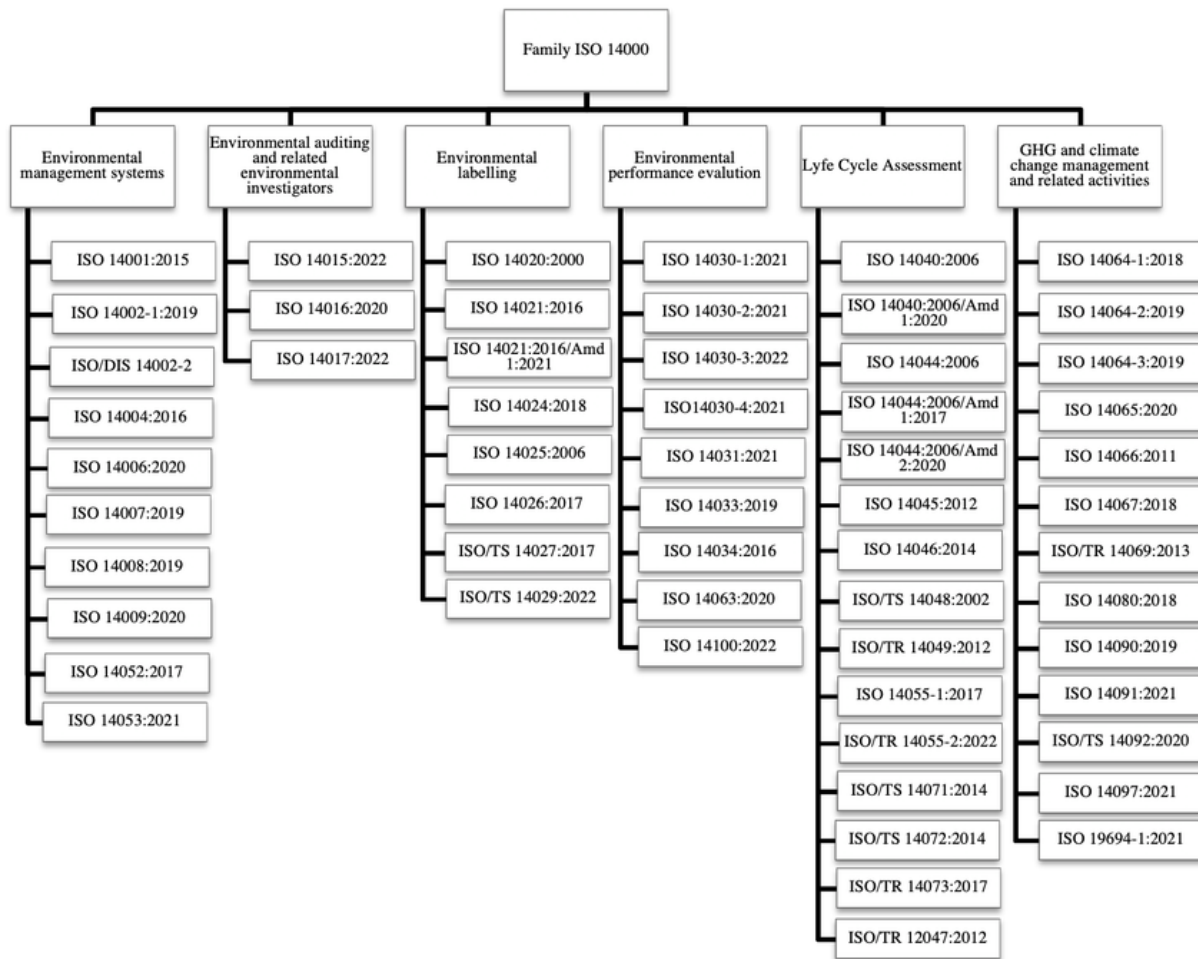


Figure 1: Family ISO 14000 standards as a tool for achieving sustainability of enterprises, Karaeva et al. (2023)

## Global Feed LCA Institute (GFLI)

When the ISO standards and the LCA methodology are brought together, industry-specific standards can be developed. One example is the Global Feed LCA Institute (GFLI) standard. The GFLI is a renowned animal nutrition and food industry institute, that has made significant strides in advancing the field of LCAs in its industry. The independent organization is committed to gathering precise and dependable data, developing standardized methodologies, and providing the necessary tools and resources to perform LCAs in an effective way within the feed sector.

GFLI developed its own LCA methodology, based on the internationally recognized feed LCA methodology by the FAO-led Livestock Environmental Assessment and Performance (LEAP) Partnership. With its 'Feed Life Cycle Analysis (FLCA)', the institute provides a methodology that enables feed companies from all over the world – see Figure 2 – to calculate their footprint



similarly and consistently, creating a natural benchmark for other companies in the industry. The FLCA methodology provides both 'cradle-to-farm gate' and 'cradle-to-processing gate' system boundaries, in addition to fifteen different impact categories, for which feed companies can establish the environmental impact of their product(s). This means that feed companies can calculate the global warming potential (GWP) or water usage for one of its products starting with the extraction of the raw materials used until the feed product reaches the farm gate or leaves the manufacturing process.

The link with the previously discussed ISO standards is very straightforward. The LCA methodology that is developed by GFLI, is in line with the international standards ISO 14040 and ISO 14044, which we discussed in the previous paragraph. Additionally, the ISO standards play an important role in the external data review of the GFLI methodology. Data review should be in line with ISO/TS 14071: 2014, which is an additional specification to ISO 14040. This specification provides requirements and guidelines for conducting a critical review of any LCA study and the competencies for the review. Furthermore, the GFLI methodology is in line with the Product Environmental Footprint (PEF) of the European Commission, which is based on ISO standards, and ReCiPe, the two most prominent methodologies for impact assessments. Finally, the GFLI allocation methods – the method of allocating emissions to a specific category in the case of a multifunctional process – are according to PEF guidelines, industry-specific cases, and PEF Category Rules.

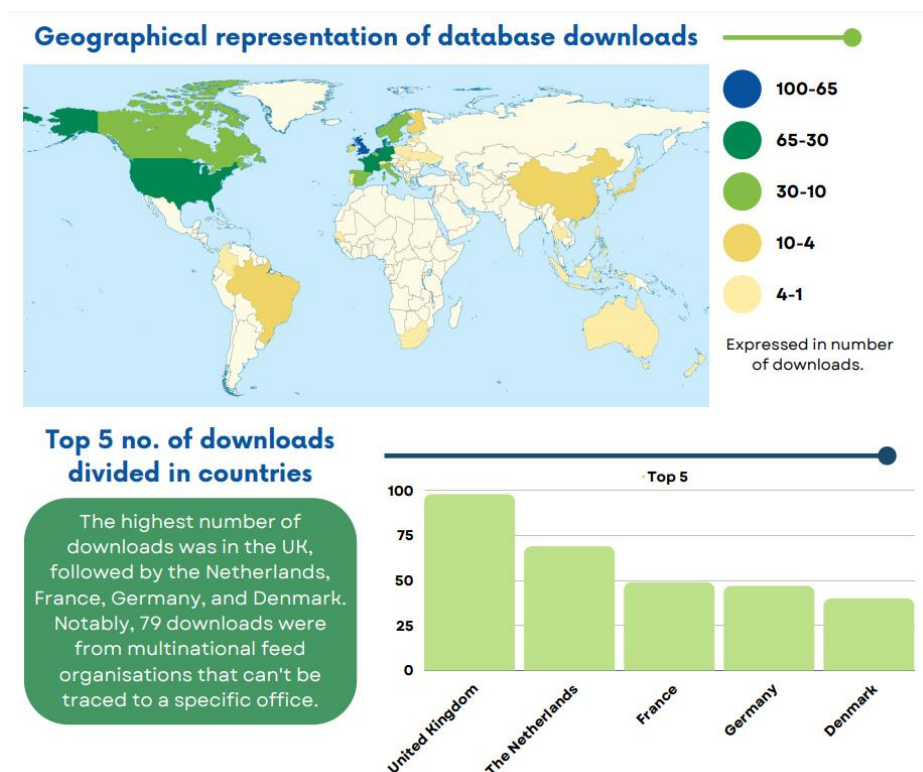


Figure 2: GFLI Database Infographic (source: Global Feed LCA Institute)





GFLI acknowledges that feed production poses unique environmental challenges and complexities, with significant impact on the entire food chain. This organization serves as an exemplary model for other industries and companies, highlighting the importance of industry-specific organizations in gathering sector-specific data, developing tailored LCA methodologies, and providing specialized tools. By following GFLI's lead, other sectors within the food industry and beyond can establish similar organizations to gather industry-specific data, drive sustainability, and make informed decisions that positively impact the entire value chain.

In the appendix of this paper, you can find a structural overview where the differences between an ISO certification and a GFLI certification are listed. We discuss the data quality requirements, scores/ratings that are used, and additional necessities to obtain either certification or verification.

### Key takeaways

- The ISO (International Organization of Standards) is an international standard-setting body that creates comprehensive standards for various industries. ISO 14000 is an important family of standards regarding guidelines and frameworks for the environmental management of a company.
- ISO 14040 and 14044 standards within the ISO 14000 family provide guidelines for conducting life cycle assessments (LCAs) of products and services. LCAs help companies understand and reduce the environmental impact of their offerings throughout their entire lifecycle.
- The Global Feed LCA Institute (GFLI) is an industry organization dedicated to advancing LCAs in the feed sector. Feed companies can quantify their environmental impacts using GFLI's LCA methodology, which is based on internationally recognized standards.
- GFLI serves as a model for industry-specific organizations to gather sector-specific data, develop tailored LCA methodologies, and provide specialized tools for informed decision-making across the value chain.

Are you inspired by the topic of LCAs or curious to know more about Digit Mint and its LCA tool? Stay tuned for our next paper of this LCA Whitepaper Series or do not hesitate to contact Peter-Jan Roose or Vincent Govaers!



# Appendix

## Glossary

- ISO 9001: Quality management system - Requirements
- ISO 14001: Environmental management system - Requirements with guidance for use
- ISO 45001: Occupational health and safety management systems - Requirements with guidance for use
- ISO 14006: Environmental management systems - Guidelines for incorporating ecodesign
- ISO 14064: Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals
- ISO 14040: Environmental management - Life cycle assessment - Principles and framework
- ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines
- ISO 14071:2014: Environmental management - Life cycle assessment - Critical review processes and reviewer competencies



## Structural overview between ISO and GFLI certification regarding LCAs

# Structural overview: ISO certification vs. GFLI certification

## Difference between obtaining an ISO verified versus a GFLI certified LCA

Specifications / Industry standard	ISO	GFLI
1 <b>Data quality</b> (Indices, categories, goals, ...)	<p><b>10 key categories</b> for addressing data quality:</p> <ul style="list-style-type: none"> <li>• Time related coverage</li> <li>• Precision</li> <li>• Completeness</li> <li>• Consistency</li> <li>• ...</li> </ul> <p>Define your own <b>Data Quality Goals</b> (DQGs):</p> <ul style="list-style-type: none"> <li>• Temporal DQG</li> <li>• Geographical DQG</li> <li>• Technological DQG</li> <li>• ...</li> </ul>	<p><b>Data Quality Requirements (DQR)</b> – which are <b>aligned with the PEFCR</b> – are based on four predefined criteria:</p> <ul style="list-style-type: none"> <li>• <b>TeR</b>: Technological Representativeness</li> <li>• <b>GR</b>: Geographical Representativeness</li> <li>• <b>TiR</b>: Time Representativeness</li> <li>• <b>P</b>: Precision</li> </ul> <p>→ Valued on a <b>scale of 1</b> (very good) <b>to 5</b> (very poor)</p>
2 <b>Certification</b> (possible or not)	No certification possible, only a “ <b>verification statement</b> ” from ISO	<b>Certification possible</b> , along with Data Quality Rating (DQR)
3 <b>Score/Rating</b> (based on the data quality)	<b>No predefined score</b> from ISO. However, the <b>DQI Pedigree Matrix</b> is recommended to be used	<b>GFLI rating</b> between 1 and 5, based on the <b>four criteria</b>
4 <b>Additional requirements</b>	A <b>sensitivity analysis</b> needs to be included: <ul style="list-style-type: none"> <li>• Qualitative report on how data is collected and processed</li> <li>• Results should be explained linked to this analysis</li> </ul>	<p>A <b>Data Needs Matrix (DNM)</b> should be included for every product</p> <ul style="list-style-type: none"> <li>• <b>Evaluate</b> which <b>data is needed</b> and shall be <b>used</b></li> <li>• Based on <b>three situations</b> with different <b>data accessibility</b> and the <b>influence</b> of the company on specific processes</li> </ul>
5 <b>Renewal period</b>	Needs to be renewed <b>every three years</b>	Needs to be renewed <b>every three years</b>
	The lack of a single DQS requirement has spawned a <b>wide range of approaches</b> from capturing data quality	The scoring of the DQR is determined <b>based on a rating system</b> derived from the DQR system of PEF

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Figure 3: ISO certification vs. GFLI certification



# References

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<https://www.iso.org/standards.html>
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- Global Feed LCA Institute:  
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