LIFE CYCLE INITIATIVE PROGRESS REPORT 2022

Life Cycle Initiative

WHAT IS THE LIFE CYCLE INITIATIVE?

The Life Cycle Initiative is a public-private, multi-stakeholder partnership enabling the global use of credible life cycle knowledge by private and public decision makers.

Hosted by the United Nations Environment Programme (UNEP), the Life Cycle Initiative is at the interface between users and experts of Life Cycle approaches. It provides a global forum to ensure a science-based, consensus-building process to support decisions and policies towards the shared vision of sustainability as a public good. It delivers authoritative opinion on sound tools and approaches by engaging its multi-stakeholder partnership (including governments, businesses, scientific and civil society organizations and individuals).

The Initiative facilitates the application of life cycle knowledge in the global sustainable development agenda in order to achieve global goals faster and more efficiently.

Cover image references
Left: Single-use face masks Meta-Study
Middle: #TurnOffThePlasticTap by Benjamin Von Wong at UNEA 5.2
Right: Pilot Studies for the S-LCA Guidelines

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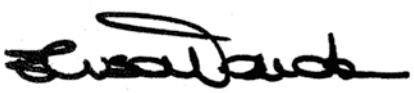
FOREWORD

2022 has been a monumental year, with countries around the world coming together at the resumed session of UNEA 5, to endorse a landmark resolution to End Plastic Pollution. The year marked the 50th anniversary of UNEP and the 20th anniversary of the Life Cycle Initiative. Life-cycle thinking as an approach to inform decisions, received unprecedented attention in the global policy arena, as reflected in the UNEA 5.2 resolution which initiated the process of negotiation of an international legally binding instrument to address the full life-cycle of plastic. Within UNEP also, life-cycle approaches have provided the scientific foundation for the organization's focus on delivering change in high-impact sectors including plastics, textiles, buildings, and construction, and mining.

The Life Cycle Initiative continued applying life-cycle approaches to inform decisions and policymaking with the publication of "Single-use face masks and their alternatives: Recommendations from Life Cycle Assessments" and "Single-use supermarket food packaging and its alternatives: Recommendations from Life Cycle Assessments". The Initiative also released the report on the nine pilot projects on Social LCA, provided policy support in the areas of national environmental footprints with SCP-HAT used in developing the 2nd NDC of South Sudan, co-hosted a side event with Global Alliance for Buildings and Construction: 'Pathways to Sustainable Markets through credible, comparable Lifecycle-based information' in COP27, and supported the first session of the intergovernmental negotiating committee on plastic pollution (INC-1).

All of this would not have been possible without the contribution of our committed Life Cycle Community that continued to bring life-cycle thinking to the forefront in conversations with both businesses and policymakers. We also acknowledge that the successes we achieved in 2022 would not have been possible without the contribution of our Steering Committee and the generous support of our funding partners.

Looking ahead to 2023, we will be finalizing the recommendations of our flagship project on the Global Life Cycle Impact Assessment Method (GLAM), developing indicators for a comparison of sectors across countries in SCP-HAT, and, focusing on raising awareness and data interoperability challenges to improve the received and used number of LCA datasets under GLAD. These projects will continue to deepen our impact and provide the decision makers from government and businesses with science-based information that enables sustainable development pathways.



Elisa Tonda
Chief, Resource and Market Branch
UNEP

OUR ORGANISATION

The Life Cycle Initiative partners with governments, businesses, academia and civil society to support public and private decision makers. The main goals are to generate consensus on life cycle assessment methodologies and to provide technical and policy support. A Life Cycle Approach can benefit organisations as they can see the impacts at each stage along their value chain and strategize accordingly to improve their efficiency and reduce their negative environmental and social impacts. For policymakers, this approach is beneficial as it gives a holistic view of their country or region and the sectors which need to be focused on the most. The goal of this is to help achieve the 2030 Agenda of Sustainable Development faster and more efficiently. For example, we have seen governments make use of Life Cycle data when developing their green recovery plans post-pandemic, and when enhancing their Nationally Determined Contributions to ensure their most effective contribution to the Paris Agreement. In the recently concluded Intergovernmental negotiating committee (INC 1) on plastic pollution, the instrument in discussion will address the full life cycle of plastics. The Initiative is guided by a Steering Committee and supported by a wide and diverse membership base.

Steering Committee

The Initiative's Steering Committee (see Table 1) provides guidance and technical advice and makes the necessary decisions to deliver the mandate of the Initiative. It is comprised of ten members from the Life Cycle Initiative's membership and includes UNEP. Each year, members elect three new representatives to the Steering Committee at the annual General Assembly. The General Assembly is a great opportunity to showcase the Initiative's achievements to all members, to get important feedback from members, and to discuss future activities and vision. Results of the General Assembly Survey show the satisfaction of our members. Like every year, in 2022, the General Assembly was held online, showing great engagement with the elections.

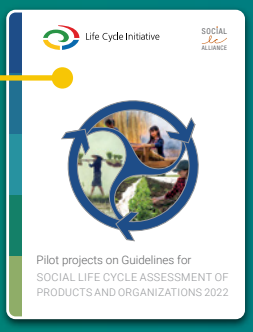
Members

The membership of the Initiative is made up of governments, businesses, civil society organisations and individuals- like the Steering Committee. These members come from a broad range of disciplines and regions.

2022 HIGHLIGHTS

March | UNEA5.2 brings the application of life cycle approaches to a whole new level. The resolution covers all types of plastic pollution, including in the marine environment, including microplastics, and crucially it covers the full life cycle, promoting sustainable consumption and production.

May | The final report on the nine Pilot projects of Social LCA published in May 2022, only a few months after the translation of the UNEP 2020 Guidelines of Social Life Cycle Assessment of Products and Organizations into French, Dutch and Italian, and the publication of the UNEP 2021 Methodological Sheets.



March | The COVID-19 pandemic created a surge in the demand for face masks as a way to prevent the spread and contracting of the virus. To understand the environmental impacts of face masks, not only at the end of life but throughout their life cycle, the meta-study entitled "Single-use face masks and their alternatives: Recommendations from Life Cycle Assessments" is released.

June | The Life Cycle Initiative turned 20! Over 240 attendees discussed how the Initiative, and the life cycle community can improve the application of the knowledge and tools to speed up the transition to sustainable consumption and production patterns using circular approaches without unintended trade-offs.

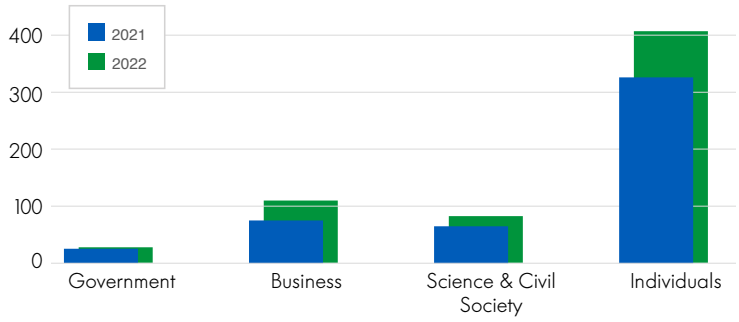
20 Years of the Life Cycle Initiative

Table 1: Composition of the Life Cycle Initiative Steering Committee for 2022 – 2023

Region	Government	Business	Science/Civil Society/ Individuals
Africa		Talent Upgrade Global Concept [mandate until 2025]	Dcarbon Egypt [mandate until 2024]
Asia and Pacific	Thailand – NSTDA [mandate until 2024]		
Europe	European Commission – DG Environment [mandate until 2023]	EcoInnovazione [mandate until 2023]	World Resources Forum [mandate until 2023]
Latin America and the Caribbean		HUB EPD of Latin America [mandate until 2024]	Red Iberoamericana De Ciclo De Vida [mandate until 2025]
North America	United States – Department of Agriculture (USDA-ARS-NAL) [mandate until 2023]		

In 2022, we saw rapid membership growth, with four new governments, 25 new businesses, 20 new science and civil society institutions, and more than 70 new individual members — a record-breaking year for the Initiative that demonstrates our growing relevance.

Graph 1: Comparison of membership levels in 2021 vs 2022



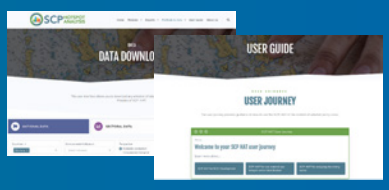
September | The Life Cycle Initiative hosts its 6th online General Assembly, updating members on the achievements of the past twelve months and discussing future activities.

October | The UNEP's newest report on "Single-use supermarket food packaging and its alternatives: Recommendations from life cycle assessments" released during the 13th International Conference on Life Cycle Assessment of Food held in Lima, Peru. It draws recommendations for policy makers and LCA practitioners on what are the supermarket food packaging solutions that have the least environmental footprint.

September | The SCP-HAT launched a module examining impacts induced at the supply chain level. It will point policy makers to hotspots brought about by consumption and production activities of a specific supply chain.

November | Side Event COP27: Pathways to Sustainable Building Markets through life-cycle based Information.

December | New sections: "Guided user journey" & "SCP-HAT toolbox" launched on SCP-HAT.



JOIN US!

Join the Life Cycle Initiative and become a part of the team! We welcome participants from governments, businesses, civil society institutions and individuals and the unique experience and perspective you can bring to the Life Cycle table! An active contribution is all that is required to be a member. There are many benefits to becoming a member of the Life Cycle Initiative, such as tremendous networking opportunities, access to the latest information and events on Life Cycle Thinking and participation in a like-minded community driving this science-based approach.

Become a member

The Life Cycle Initiative relies on generous funding partners and projects to fund for our Initiative and activities. Core funding is needed to run the Secretariat of the Initiative and to provide seed funding to get projects running. Direct project funding represents the largest share of the Initiative's budget. Become a funding partner today and support us in advancing the projects that promote the uptake of sustainable consumption and production patterns worldwide.

Benefits of being a funding partner

Become a funding partner

- Gain VISIBILITY as a supporter – through conferences, reports, our website and newsletters.
- Exert INFLUENCE – maintain close links to the debate, the discussion spaces and Assembly.
- Access ADVICE and EXPERTISE – through a global forum of experts and practitioners.

COMMUNICATIONS ENGAGEMENT

Engagement and interest in our information and project activities continued to rise throughout 2022. With most of the work still taking place online this year, we leveraged the LC Net newsletter, our website, and our social media networks to share important news, webinars, reports and upcoming publications.

Social media networks

Our social media channels witnessed significant engagement this year.

Our LinkedIn followers increased by nearly 40% from about 3100 in 2021 to over 4300 by the end of 2022, with a significant number of these new followers coming from France and Brazil.

Our Twitter engagement has also hit an all-time high reaching over 1,500 followers. We will continue to recognise the importance of social media networks to spread our research in 2023.

LC Net newsletter

Interest in the Inititiative's newsletter "LC Net"also grew over the year, with increased open rates (+38,4%), click rates (+15,6%), and 168 new subscribers.

Publications and reports

Publications and reports are one of the most important outputs of the Initiative.

The series of reports on Single-use Plastic Products have been downloaded more than 11,000 times in total until the end of 2022. The meta-study released in 2022 on Single-use face masks and their alternatives: Recommendations from Life Cycle Assessments was downloaded 600 times. The Pilot Projects on Guidelines for Social Life Cycle Assessment of Products and Organizations released in 2022 had 773 downloads.

2022 ACTIVITIES

The Life Cycle Initiative delivers on three broad activity areas:

1. Technical and Policy Advice

The Initiative collaborates with many partners towards mainstreaming Life Cycle Thinking and approaches into both decision and policy making. This collaboration takes a diversity of forms, such as the creation of a global forum for life cycle user groups, a repository of best practices and global guidance, tools and position papers developed collaboratively by life cycle experts and users.

2. Capacity Development

For life cycle approaches to gain widespread adoption, skills and capacity must be developed. Diverse channels and products are provided for the various audiences of capacity development programmes, such as policy makers, practitioners, and business decision makers.

3. Knowledge and Consensus Building

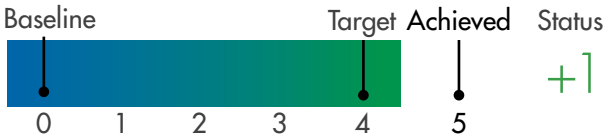
The Life Cycle Initiative ensures science-based, global consensus building for the basic knowledge necessary to underpin life cycle approaches. Access to Life Cycle Knowledge is a public good and endorsed by the Initiative.

The following sections outline the progress made in each of these three areas in 2022.

Progress on goals at end-2022

Life cycle knowledge-based technical and policy support delivered through dialogue platforms in joint projects with the LC Initiative.

Dialogue platforms



Global guidelines and tools

Sectoral/policy hotspots analysis

1. Technical and Policy Advice

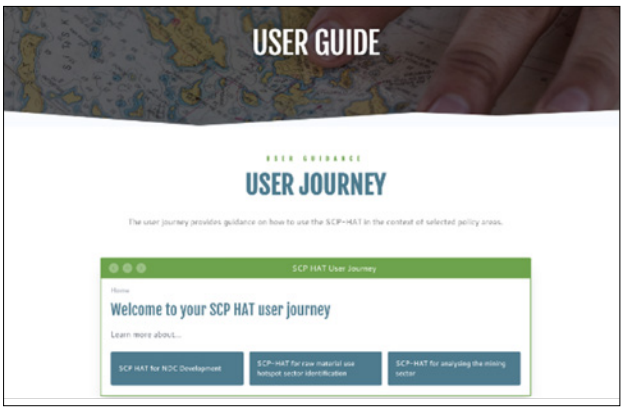
SCP Hotspots Analysis Tool (SCP-HAT)

2022 was a particularly exciting year for the SCP-HAT with Sustainable consumption and production being seen as the key to solving the three planetary crises. The SCP-HAT helps countries tackle the different crises through identifying 'hotspots' or high-impact areas, where action is needed.

In September 2022, a new analytical and visualisation tool went live as part of Module 2, "Hotspots Identification". Under the tab "Supply chains", users can examine which supply chains' final consumption in one country is inducing environmental pressures or impacts in the same country or abroad. It will point policymakers to hotspots brought about by consumption and production activities along individual supply chains.

In December 2022, a new section became available in the website toolbar. It contains a collection of features supporting the policy-oriented application of SCP-HAT. The first development stage encompasses two main parts: the "Guided user journey" and the "SCP-HAT toolbox". The "Guided user journey" is an interactive interface facilitating users' navigation through the different analytical options of SCP-HAT. It is also available directly in Module 2.

Also, since December 2022, the SCP-HAT contains a download module accessed via "Methods & Data" —> "Data Download", which allows users to download any selection of data as presented in the different Modules of SCP-HAT.



Life Cycle Thinking in Buildings and Construction Sector

In November 2022, the Life Cycle Initiative co-launched a side event with Global Alliance for Buildings and Construction: 'Pathways to Sustainable Markets through credible, comparable Lifecycle-based information'. The highlights of this event include:

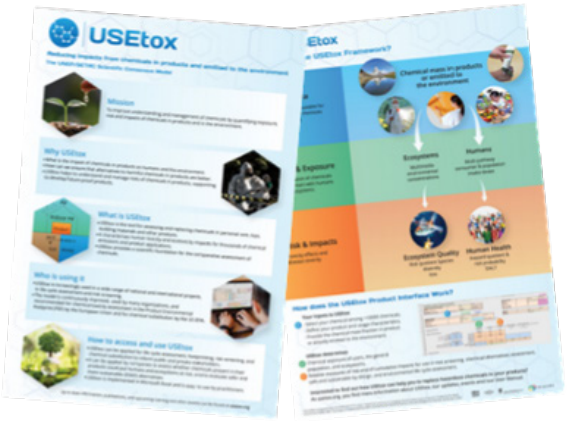
- The opportunities at the national and organizational level
- The importance of LCA for market transformation and building decarbonization
- LCA opportunities for buildings and construction in Egypt and developing countries
- Current status of LCA as applied to the buildings and construction sector in EPD in Egypt, MENA & Africa
- A strategy providing a clear-cut way forward (beyond COP27) for Egypt and neighbouring markets/regions.

USEtox

USEtox is the UNEP/SETAC global scientific consensus model for assessing human toxicity and ecotoxicological impacts of chemicals in life cycle impact assessment. This open and freely accessible tool provides a sound scientific basis for comparing the environmental performance of any activity or product, which is associated with chemical emissions over the entire life cycle. The main output includes a database of recommended and interim characterization factors including environmental fate, exposure, and effect parameters for human toxicity and ecotoxicity.

USEtox is constantly being improved and the next official version of the model is currently in preparation for release. This version will incorporate an extension from 400 to 8000 non-cancer chemicals for human toxicity and an indicator for reproductive/developmental effects. Further, the model will include more than 7000 chemicals for ecotoxicological impacts, based on a species sensitivity distribution (SSD) approach (Owsianiak et al. 2022). In addition, USEtox will be expanded to not only characterize chemical life cycle emissions, but also chemicals inside consumer products, such as children's toys (Aurisano et al. 2021), building materials (Huang et al. 2022) and many more.

In 2022, a downloadable leaflet and new user interfaces as part of a user manual were launched. The leaflet briefly introduces USEtox, how to use it, questions across stakeholders, and its results. The new user interfaces consider chemicals in different consumer products, including personal care, children's toys, building materials, food contact materials, indoor paints and direct emissions.



Linking UN SDGs (Sustainable Development Goals) to life-cycle impact pathway frameworks

The objective of this project is to develop a clear link between the top-down process that led to the creation of the SDGs and all the bottom-up knowledge, data and methodology in the life-cycle sustainability assessment. The main objective is to aid businesses and governments in integrating the SDGs into their decision-making processes.

This project was successfully finalized at the end of 2021 with positive outcomes for the industry partners. Because the method is now ready to be used by practitioners, the focus in 2022 has been on communication about the method (online and in conferences) and the preparation of a publication. Furthermore, supporting companies with the application of the SDG Screening method and SDG Assessment have continued. We expect similar activities for 2023, and we hope to organize a consultation round with experts for the publication.

Single-Use Face Masks Studies

Before reusable face masks became available, single-use face masks were widely used at the start of the pandemic. The single-use nature of these face masks means that they are disposed of often, further adding to the existing plastic pollution problem. To understand the environmental impacts of face masks, not only at the end of life but throughout their life cycle, UNEP, through the Life Cycle Initiative, released a meta-study entitled "Single-use face masks and their alternatives: Recommendations from Life Cycle Assessments".

When reused a sufficient number of times, reusable face masks generally have lower environmental impacts as compared to single-use face masks. However, several considerations should be taken into account before deciding on the best option, such as washing methods, material type of the face masks, guidelines set by the governments, and manufacturing and selling locations. The study focuses on the environmental impact of the face masks and not on their effectiveness in preventing the spread of the disease. Specifically, the study is only applicable to face masks used in the general public and not in the health care setting.

Single-Use Supermarket Food Packaging Studies

Our newest report on "Single-use supermarket food packaging and its alternatives: Recommendations from Life Cycle Assessments" draws recommendations for policy makers and LCA practitioners on the supermarket food packaging solutions with the lowest environmental footprint.

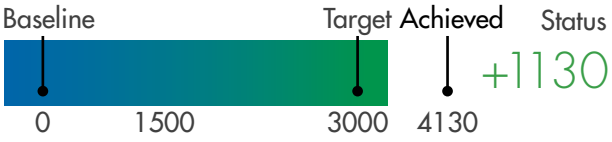
This report is the latest of a series of meta-analyses of LCA studies on 9 single-use plastic products and their alternatives, in response to Resolution 9 of the fourth United Nations Environment Assembly (UNEA 4) on "Addressing Single-use plastic pollution".

2. Life Cycle Capacity Development

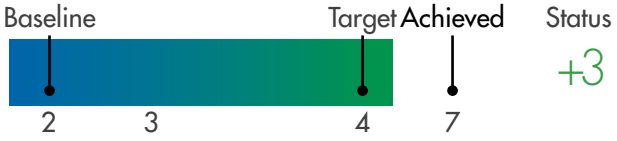
Progress on goals at end-2022

Life cycle capacity development products and delivery of capacity for policy makers, business decision makers and life cycle practitioners.

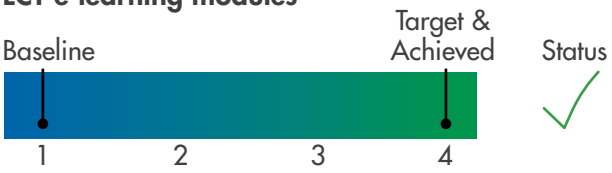
Trained individuals



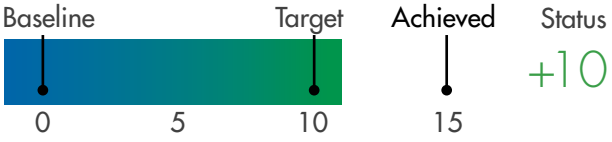
Governments/countries supported through technical helpdesk



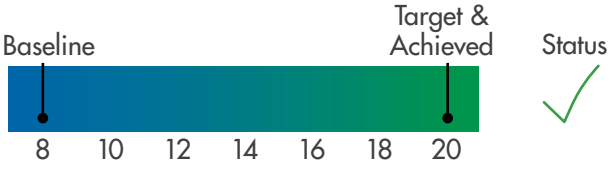
LCT e-learning modules



Pilot projects on LCT



Success stories



E-learning

The E-learning courses made significant progress in 2022.

Throughout the year we saw more and more people taking advantage of the e-learning courses. In 2022, over 1415 participants completed the e-learning courses offered by the Initiative. This represented a 13% increase from the number of participants in 2021, which is to a large extent, thanks to the many partnerships with our University members using the modules as part of their formal education.

Three e-learning courses are available in different languages: Introduction to Life Cycle Thinking, Life Cycle Thinking in Business Decision Making, and Life Cycle Thinking in Public Policy Formulation. The e-learning courses are accessible through Learn Life Cycle Thinking. In addition to all the funding partners of the Life Cycle Initiative, the e-learning modules have been largely funded by the European Commission.

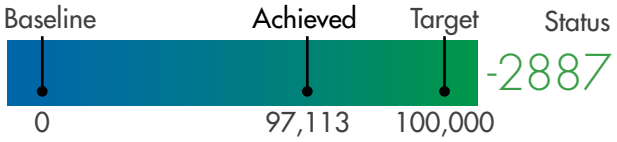
3. Knowledge and Consensus Building

Progress on goals at end-2022

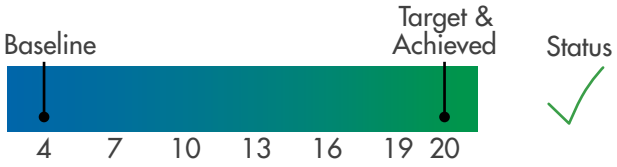
LC knowledge products (data, impact assessment factors) available and interoperable on a knowledge sharing platform.

Databases interoperable through Global LCA Data Access network (GLAD)

LCA datasets accessible



LCIA indicators available through e-platform linked through global nomenclature system



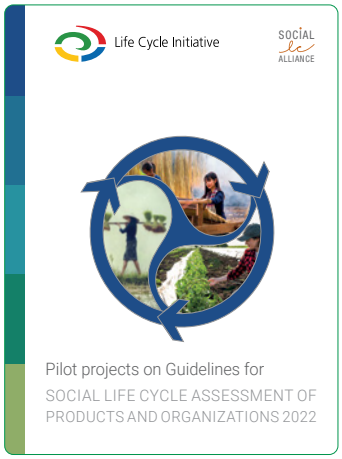
Social Life Cycle Assessment (S-LCA)

Over the years since its launch in 2009, the relevance of S-LCA has only increased. We have seen a plethora of initiatives promoting value chain due diligence positioning social issues as a central concern, for both the private and public sectors.

In 2022, two key activities were accomplished:

1. The completion of the S-LCA Pilot Testing Report

In 2022, we released the report on the nine pilot projects on Social LCA. The pilot projects were selected to be as diverse as possible, covering different geographic areas, different industrial sectors, and different dimensions of the company from micro to big multinationals.



2. Launch events of the methodological sheets, capacity building and dissemination of results of S-LCA activities.

In 2022, the 8th edition of the International Conference of Social Life Cycle Assessment was organized by INaB RWTH Aachen with the Social LC Alliance playing an important role. The conference was attended by more than 150 participants from different countries.

A specific session on the second day of the conference was dedicated to training where UNEP 2020 Guidelines and Methodological Sheets and a summary of the pilot projects were presented.

Global Guidance for Life Cycle Impact Assessment Indicators and Methods (GLAM)

The Global Guidance for Life Cycle Assessment Indicators and Methods (GLAM) aims to generate tangible and practical recommendations for different environmental and characterization factors used in Life Cycle Impact Assessments.

In 2022, GLAM started work on initial characterization factors for multiple impact categories, addressing human health, ecosystem quality, natural resources and ecosystem services.

The GLAM project enters its finalization in 2023, leading to the release of the global consensus GLAM Life Cycle Impact Assessment (LCIA) method. An intense testing phase was undertaken to ground truth the obtained characterization factors, evaluate the magnitude of impacts on total world emissions, and test the robustness of the developed methods on specific case studies. A systematic approach will be followed to enable easy use of these factors via implementation in LCA software and systematic documentation of the underlying data and models.

This first global LCIA consensus method will constitute an important and exciting milestone in the development and harmonization of the field of LCIA.

Global Life Cycle Assessment Data Access network (GLAD)

Since the launch of the Global LCA Data Access network (GLAD) in 2020, it has become the largest directory of Life Cycle Assessment (LCA) datasets from independent LCA database providers from around the world. The focus of GLAD is to achieve better data accessibility and interoperability and the network is comprised of independently operated LCA databases from around the globe.

In 2022, the strategic activities and priorities to improve GLAD included:

- Nomenclature and Data interoperability for a common mapping system governance
- Supporting nodes and continuous improvement of the self-registration facility (e.g., data maintenance use case)
- Conversion facility that works with the nomenclature resources available on GitHub
- Roll-out of the automated categories

- Integration of GLAD search function in commercial LCA software (as start SimaPRO Brightway)
- Increase the user base of GLAD
- Website frontend (search index) and backend
- Development of new guidance on metadata descriptors
- General maintenance
- Visibility at international conferences (e.g., Eco-balance conference 2022)
- Development of a communications strategy

Marine Impacts in LCA (MarILCA)

The Marine Impacts in Life Cycle Assessment (MarILCA) project aims to harmonise the development of environmental impact pathways and characterisation factors of marine impact assessment in LCA, specifically from marine litter.

During 2022, the research of MarILCA progressed in different areas. The impact category of physical effects on biota showed significant progress:

1. For the impact assessment of aquatic micro- and nanoplastic emissions, characterization factors (CFs) were proposed for nine different polymers, three shapes and five sizes. These CFs included newly developed fate factors and an update of the previous exposure and effect factor (Lavoie et al., 2021), and were tested in three case studies, which were included in the supermarket packaging report of UN Environment Programme.
2. For the impact assessment of marine macroplastic emissions, preliminary CFs were developed to cover entanglement effects. All CFs for physical effects on biota were submitted for consideration in the upcoming GLAM recommendations. Moreover, CFs for the impacts of plastic waste dissipation on resource depletion were also proposed and have been presented at international conferences in 2022. A publication on these is expected shortly.

The research results of MarILCA led to five peer-reviewed journal publications and a contribution to a UNEP report on recommendations for supermarket food packaging. Furthermore, the work of MarILCA was shared in around 15 conference presentations across the globe (32nd SETAC Europe, LCA Foods 2022, Macro 2022, Ecobalance 2022, ISSST22, LCIC 2022, 7IMDC, SUM 2022). As a first within the LCA Foods 2022 conference, MarILCA members established a session on marine plastic pollution. Moreover, MarILCA members organized and led the 82nd Swiss LCA Discussion Forum on addressing the issue of plastic pollution.

2023 OUTLOOK

In taking forward the renewed strategy of the Life Cycle Initiative (2022-2027) during 2023, we look forward to pushing our boundaries further with these new goals. We aim to expand our influence on both policy and business decision makers, including the Three Action Pillars of the UNEP Medium Term Strategy for 2022-2025 to see sustainability goals reached faster and more efficiently with life cycle approaches.

WHAT CAN YOU EXPECT TO SEE IN 2023?

- Progressive work on Plastic Pollution particularly with the considerations of a life cycle approach in INC meetings
- Release of the global consensus GLAM Life Cycle Impact Assessment (LCIA) method
- GLAD will continue to work on data interoperability challenges to improve the received and used number of LCA datasets
- Increased focus on sectoral social LCA guidelines, developing capacities, and awareness raising tools for decision-makers targeting policymakers in Social LCA.
- Finalization of the macro-, micro- and nano-plastic CFs (as part of the GLAM recommendations) in MarILCA.
- Indicators development for a comparison of sectors across countries and making the tool more policy-relevant in SCP-HAT.
- Stronger uptake of Life Cycle Thinking in both private and public sectors.

THANK YOU TO OUR FUNDING PARTNERS!

Work under the Life Cycle Initiative would not be possible without our funding partners.

Platinum Sponsors

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