

United Nations University

Institute for Integrated Management of Material Fluxes and of Resources

Responsible Resource Use in the Textile Industry

Reflections from the Textile Symposium organised by the United Nations University - Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES) held September 2023 in Dresden, Germany

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- [Technische Universität Chemnitz \(tu-chemnitz.de\)](http://tu-chemnitz.de)
- [About the Centre – International Center for Climate Change and Development \(ICCCAD\)](http://icccad.org)
- [Technische Universität Dresden — TU Dresden \(tu-dresden.de\)](http://tu-dresden.de)
- [Home - easer](http://easer.com)
- [Engelbert Strauss Workwear | STRAUSS.WORKS \(engelbert-strauss.de\)](http://engelbert-strauss.de)
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- [Homepage - Hochschule Niederrhein \(hs-niederrhein.com\)](http://hs-niederrhein.com)
- [SACHSENLEINEN | Natural Fibers at Work | Sachsenleinen.de](http://sachsenleinen.de)
- [STFI- Sächsisches Textilforschungsinstitut e.V. \(STFI\)](http://stfi.de)
- [Pfand Textilausrüstung \(pfand-textil.de\)](http://pfand-textil.de)
- [Retraced](http://retraced.com)
- [SOEX](http://soex.com)
- [UNEP - UN Environment Programme](http://unep.org)
- [UNU-FLORES | United Nations University](http://unu.edu)
- [VAUDE - Sustainable Outdoor Clothing & Gear](http://vaude.com)
- [Home - Asian University for Women \(asian-university.org\)](http://asian-university.org)

We would also like to express our condolences to the family of the late Prof Saleemul Huq. We deeply regret his loss and thank him for his contribution to the symposium and his warm and motivating words, which we will always carry with us to tackle climate change vigorously.

Responsible Resource Use in the Textile Industry
Textile Symposium, Dresden, 6 - 7 Sept 2023



Moderator - Overall Programme:
Franziska Stölzel
Research Associate, UNU-FLORES



Moderator - Panel Discussions:
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Session 1: Processes and Materials to Reduce Water and Chemicals Consumption

Tanvir Kabir
Counsellor from the Embassy of Bangladesh in Berlin



Dr. Holger Erth
CEO of Textilausrüstung Pfand GmbH (textile finishing), honorary Prof at TU Chemnitz

Session 2: Resource Nexus and Sustainability Assessment



Serena Caucci
Associate Programme Officer at UNU-FLORES



Zarmina Khan
Sustainability Researcher at easesr GmbH



Natascha van der Velden
Independent Researcher in the Textile Industry



Roman Houllbreque
Chief Customer Officer at retraced GmbH

Session 3: Social Innovation & Responsibility



Asilhan Memisoglu
Researcher at Hochschule Niederrhein University of Applied Sciences



Theresa Falter
Researcher at TU Dresden



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Tanja Strukelj
Researcher at TU Dresden



Kamol Gomes
PhD Student at TU Dresden/UNU-FLORES

Session 4: Promoting Circular Economy with Joint Efforts



Noor-E-Farzana Annesha
Lecturer at Ahsanullah University of Science and Technology (AUST)



Johannes Leis
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Md. Mazharul Haque
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Shirin Araghi
Designer at C&A, GIZ Consultant

Session 5: Nature & Textiles



Rony Khan
Co-founder of Eco Fresh Agro



Iffat Anannya
Lecturer at Ahsanullah University of Science and Technology (AUST)



Tamjida Islam
Lecturer at AUST



Kay Kötzig
Managing director at Sachsen Leinen GmbH



Acronyms and abbreviations

AUST	Ahsanullah University of Science and Technology
BELA	Bangladesh Environmental Lawyers
BTMA	Bangladesh Textile Mills Association
C&A	Clemens und August Brenninkmeijer (company name)
CCC	Clean Clothes Campaign
CE	Circular Economy
CEO	Chief Executive Officer
CO ₂	Carbon dioxide
CTO	Chief Technology Officer
EPR	Extended Product Responsibility
ESG	Environmental, social, and governance
ETP	Effluent Treatment Plant
EU	European Union
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GmbH	Gesellschaft mit beschränkter Haftung (engl. Company with limited liability)
ICCCAD	International Centre for Climate Change and Development
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
NGO	Non-governmental Organisation
OSH	Occupational Safety and Health
PEF	Product Environmental Footprint
QC	Quality Control
RMG	Ready-made garment
STEM	Science, technology, engineering and mathematics
STFI	Sächsische Textilforschungsinstitut e.V. (engl. Saxon Textile Institute)
SVHC	Substance of very high concern
TU Dresden	Technische Universität Dresden (engl. University of Technology Dresden)
UN	United Nations
UNEP	United Nations Environmental Programme
UNU	United Nations University

1 Background

1.1. Project Overview

The Textile Symposium on “Responsible Resource Use in the Textile Industry“ was held during 6-7 September, 2023, in Dresden (Kraftwerk Mitte), Germany. This event brought together representatives from academia, industry, international organisations, and government from Germany, Bangladesh, and beyond. In the forum, discussions centred on challenges, best practices, as well as sustainable and innovative solutions related to the responsible use of resources in the textile sector across supply chains in the Global North and South. The symposium served as a global platform for open exchanges on this pertinent topic. By gathering experts from diverse backgrounds, the event aimed to stimulate a change in global mindsets and identify key issues influencing bilateral policy recommendations, with a commitment to ensuring global equity and responsible resource utilisation in the textile sector. This event contributed to defining future research agendas for newly developed institutions in the Global North and Global South, fostering collaborative efforts to drive change.

This symposium was a key initiative under Phase 2 of the Chair for Sustainability and Textile Innovation project, which is funded by Engelbert Strauss GmbH & Co. KG from Germany to promote the quality of higher education in Bangladesh and supported by the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ). This project is implemented through a collaboration between Ahsanullah University of Science and Technology (AUST) in Bangladesh, and the Technische Universität Dresden (TU Dresden), and UNU Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES) in Germany. This project, grounded in a shared commitment to sustainability, endeavours to steer the textile industry toward a future characterised by responsible practices and innovative approaches. Within this context, the symposium represented a pivotal step in fulfilling the project's overarching objective: facilitating a seamless connection between the academic and industrial facets of the textile sector.

1.2. Symposium Overview

The symposium was structured around five thematic sessions with inputs in diverse formats such as the presentation of scientific academic research, pre-recorded impulse talks with key practitioners, keynote speeches, and panel discussions bringing in a wide range of perspectives from both industry and academia while providing ample opportunities for the attendees to participate in discussions. The thematic areas and the corresponding activities are as follows:

Responsible Resource Use in the Textile Industry
Textile Symposium, Dresden, 6 - 7 Sept 2023

Welcome Reception
5 September
2023

Welcome Reception with focus on "Research, Education & Capacity Building for Sustainable Development", held at the Dresden International University and moderated by **Dr. Christina Frömder**, UNU-FLORES.

- **Md. Mosharraf Hossain Bhuiyan**, Ambassador, Embassy Bangladesh Berlin
- **Prof. Dr. Muhammad Fazli Ilahi**, Vice Chancellor, AUST
- **Prof. Dr. Edeltraud Günther**, Director, UNU-FLORES
- **Rashed Al Mizan & Noor-E-Farzana Annesha**, AUST
- **Shirin Araghi**, Designer C&A / GIZ Consultant

The Textile Symposium was held at Kraftwerk Mitte Dresden, and moderated by Franziska Stölzel, UNU-FLORES, and Lavinia Muth, independent consultant.

Welcome Note: **Prof. Lal Mohan Baral**, Head of Department of Textile Engineering, Ahsanullah University of Science and Technology (AUST)

Keynote "Botanica – STRAUSS' first completely biodegradable workwear": **Friederike Hoppe & Sophie Deuerlein**, Engelbert Strauss

Day 1 of the Textile Symposium
6 September 2023

Session 1: Processes and Materials to Reduce Water and Chemicals Consumption

Video Insights from UNU-FLORES's Webinar on "Beyond the Threads: Navigating Planetary Boundaries with Sustainable Textile Engineering and Chemical Practices" (held August 2023)

Panel Discussion with **Amira Jehia** from Drip by Drip, **Tanvir Kabir** from the Embassy Bangladesh in Berlin, and **Dr. Holger Erth** from Textilausrüstung Pfand GmbH (Textile Finishing SME)

Session 2: Resource Nexus and Sustainability Assessment

Academic Input: **Dr. Serena Caucci**, UNU-FLORES
Panel Discussion with Serena Caucci, **Zarmina Khan** from Easer, **Roman Houlbreque** from Retraced and independent researcher **Dr. Natascha van der Velden**

Session 3: Social Innovation & Responsibility

Video Insights from UNU-FLORES's Webinar on "The Importance of Social Justice and Sustainability for Textile Engineers" (held May 2023)

Academic Input by **Aslihan Memisoglu** from University of Applied Science Niederrhein; **Tanja Strukelj & Theresa Falter** from TU Dresden

Panel Discussion with all academics, **Kamol Gomes** from UNU-FLORES, and **Adiba Afros**, independent consultant

The event day was rounded off with a tour, input talks and a drinks reception at the Institute of Textile Machinery and High Performance Material Technology (ITM) of the TU Dresden, followed by a Dresden Sightseeing Tour.

Welcome Note: **Prof Edeltraud Günther**, Director, UNU-FLORES

Keynote "Sustainability and Circularity in the Textile Value Chain - A Global Roadmap": **Dr. Robert Reinhardt**, Sustainable Business & Strategy Consultant, UNEP

Day 2 of the Textile Symposium
7 September 2023

Session 4: Promoting Circular Economy with Joint Efforts

Pre-recorded Interview with **Thomas Ahlman**, CEO of the NGO FairWertung e.V. and **Dr. Christina Frömder**, UNU-FLORES

Academic Input: **Henrike Schmitz & Johannes Leis**, SOEX/ TU Chemnitz & Sächsisches Textilforschungsinstitut e.V. (STFI); **Noor-E-Farzana Annesha & Md. Mazharul Haque** from AUST; Panel Discussion with all academics above and **Shirin Araghi** from C&A / GIZ

Session 5: Nature & Textiles

Pre-recorded Interview with **Prof Saleemul Huq**, Director of the International Centre of Climate Change and Development (ICCCAD), and **Prof Edel Günther** and **Prof Daniel Karthe**, UNU-FLORES

Academic Input: **Isabell Rzepecki**, Intern Sustainability & CSR, VAUDE Sports GmbH; **Iffat Anannya & Tamjida Islam** from AUST
Panel Discussion with all academics, **Kay Kölzig** from Sachsen Leinen GmbH, and **Rony Khan** from Eco Fresh Agro

Further Impulse Talks on "The Future of Textiles" by **Prof. Rubana Huq**, Vice-Chancellor of the Asian University for Women (AUW), **Md. Rajibul Hoque & Md Mahbub ul Alam**, Bangladesh Institute of Management (BIM) and **Md. Ruhul Amin**, AUST, rounded up the Symposium. In a final reflection workshop, we digested all the important presentations and discussions and summarised the most important findings and lessons learned for the next events and joint collaboration.

2 Symposium Highlights

2.1. Keynotes

The keynote on Day 1 was delivered by Friederike Hoppe and Sophie Deuerlein from Engelbert Strauss about “Botanica – STRAUSS”, their first completely biodegradable workwear. Strauss is producing their articles with production partners from about 25 countries around the world. Aiming for the lowest environmental impact by producing such clothing, Strauss developed a biodegradable collection made from 100% natural raw materials. As an example of the production of work trousers, all usually used non-organic materials and fabrics were replaced by organic ingredients: organic cotton fabric, reinforcements made of e.g., banana plants, cotton seams, bamboo accessories, soya ink. The manufacturer faced several challenges in the transition phase when using new materials, which they saw as part of the learning process, but were able to adapt to all challenges in close cooperation with their suppliers. With natural colours you do not always gain the exact colour, so Strauss decided for a certain shade range to be accepted for the large-scale production. To ensure biodegradability, Strauss works with Hohenstein to ensure that the garment meets industrial composting conditions.

Day 2 has started with insights from the sustainable business expert Prof. Dr. Günther, director of UNU-FLORES, highlighting various sustainable business practices but also emphasising on own life choices, e.g., following the sustainable dress code of the conference and making conscious choices about personal decisions as well. The 9-R framework is there to rethink current practices and favour refuse, reduce e.g., material usage to increase circularity, or extending the products lifespan through reuse, repair, refurbish, remanufacture, repurpose, before recycling or recovering materials comes into place (Source: [Potting et al., 2017](#)). The ISO standard 14007 (reflection on 14000er standards available [here](#)) has been mentioned as an example of valuable guidelines for determining environmental costs and benefits.

Dr. Robert Reinhardt, sustainable business & strategy consultant at UNEP, followed with a talk on the recently published UNEP report “[Sustainability and Circularity in the Textile Value Chain – A Global Roadmap](#)”. Shifting consumption patterns, improving sustainable practices and incremental global infrastructure investment are key priorities which have been identified by UNEP where little progress has been made so far on global scale to turn the value chain in a more sustainable one. Business models are also the focus of the discussed topics, where the value proposition must be more sustainable: “As a textile business, when I offer a value proposition to the customer, I also need to put forward a sustainable value proposition to the environment and the society that have become an integral part of the wider stakeholder value network – in other words, innovation only makes sense if it is focused on sustainability and circularity principles,” underlines Dr. Robert Reinhardt. He concluded his intervention by emphasizing that the recently published roadmap report underpins the One UNEP Textile Initiative. Together with partners, UNEP will work to carry forward key recommendations, including leveraging its position to encourage coordination across the textile value chain towards circularity.

Related resources: [UNEP Intex](#), [UNEP Eco-innovation Manual](#), [Global LCA Data Access network](#), [Sustainable Fashion Communication Playbook](#), [UNEP Circularity Platform](#).

2.2. Panel Discussions

(Day 1) Session 1: Processes and Materials to Reduce Water and Chemicals Consumption

The first session of the symposium featured a panel¹ discussion on "Processes and Materials to Reduce Water and Chemicals Consumption," with Tanvir Kabir, Counsellor from the Embassy of Bangladesh in Berlin, and Dr. Holger Erth, owner and manager of Textilausrüstung Pfand GmbH, a textile finishing company in Chemnitz.

In the context of the Bangladeshi textile industry, one of the most pressing challenges is the proper implementation of effluent treatment plants (ETPs). The Water Act of 2013 defines water pollution and measures to ensure compliance, but the majority of factories in Bangladesh do not implement ETPs. To address this issue, local stakeholders must take greater responsibility and shift their mindset towards environmentally friendly production practices. Microplastic contamination is also a growing concern, impacting groundwater reserves, agriculture, and local communities' access to water. The lack of local monitoring exacerbates these challenges, highlighting the need for both local and international-level environmental protection legislation to control businesses' impact on the environment and local communities in supply chains.

Germany faced similar water contamination concerns in the past, although its industrial landscape differs from Bangladesh. Dr. Erth emphasised that Germany successfully addressed these issues through political pressure and legislation, discontinuing the use of substances of very high concern (SVHCs) and adopting technologies that allowed for the reuse of up to 95% of chemicals used in production.

Collaboration between academia, industry, and civil society is essential to tackle these challenges. In Germany, infrastructure changes and shifting mass production to the Global South facilitated change. Tanvir stressed the importance of a holistic and locally tailored approach for Bangladesh, suggesting collaboration between Bangladeshi academics and researchers and access to laboratories in the Global North. Exploring local fibres like jute and fostering North-South collaborations in research, development, and technological transfer can be beneficial. Sourcing countries can also support such efforts by hiring young graduates or students as interns, promoting a just transition in the textile industry. Overall, this panel discussion highlighted the importance of multifaceted approaches and global cooperation to reduce water and chemical consumption in the textile industry.

Key Learnings from Session 1

Local Responsibility and Mindset Shift:

In the Bangladeshi textile industry, proper implementation of ETPs is a major challenge, despite regulations. Addressing the challenge requires a shift in local stakeholders' mindset toward eco-friendly production practices and increased responsibility.

¹ A third panellist, Amira Jehia, from the Bangladeshi-German NGO Drip by Drip could not attend the event due to personal reasons.

Microplastic Contamination Impact:

Microplastic contamination adversely affects groundwater, agriculture, and local communities' water access, necessitating robust environmental legislation.

Learning from other Practices:

In the 90s, Germany effectively addressed water contamination through new policies, laws, and discontinuing toxic and other harmful chemicals. Successful strategies included adopting chemical reuse technologies, but also outsourcing mass production to the Global South played a role. Now, a united global approach is needed to address current environmental challenges.

Importance of Collaboration and Holistic Approach:

Collaborative efforts between academia, industry, and civil society are essential. Bangladesh should adopt a holistic approach, including North-South collaborations and exploring local fibres like jute. Sourcing countries can contribute by supporting a just transition in the textile industry.

Session 2: Resource Nexus and Sustainability Assessment

The second session started with an academic input by Serena Caucci (UNU-FLORES) on „Barriers to Implementing Industrial Water Reuse”, where she highlighted the obstacles and incentives from a recent research study for promoting water circularity in industry due to the increasing need for efficient water usage. Governments and the private sector are motivated to explore global water reuse options, considering both general strategies and technological feasibility. The research aims to enhance water sustainability, applying the Resource Nexus approach to manage natural resources more efficiently. The team examined case studies in India and Bangladesh. Interviews with stakeholders highlighted barriers like capital expenditure, cost comparison of recycled and freshwater, end-user requirements, water quality concerns, and limited trust in technology, particularly in emerging countries. Economic differences between India and Bangladesh impact technology adoption and awareness of wastewater reuse potential. Policy regulations emerge as drivers to overcome barriers, emphasizing the need for monitoring and regulating water release. The recommended solutions include adjusting pollutant discharge standards, advanced treatment for high-pollution effluents, exploring small-scale options for developing countries, and involving all stakeholders for successful water recycling schemes.

Project links: [Organisational Decision-Making in Water Reuse for Smart Cities \(SMART-WaterDomain\) - UNU - Institute for Integrated Management of Material Fluxes and of Resources](#)

The academic input was followed by a panel discussion with Serena Caucci, Zarmina Khan (eeaser GmbH), Roman Houlbreque (retraced GmbH) and Natascha van der Velden (independent researcher) looking behind the definition of the Resource Nexus and how the approach can benefit industries, the generic understanding of a sustainability and life cycle assessment, how it is applied in industry, what the difference is between primary and secondary data usage and also the importance of social part to be considered as a value resource in such evaluation of systems.

Natascha kicked off the discussion by advocating for the importance of including results of life cycle assessment studies early in the design process. Zarmina presents here one of the industry members in the diverse panel and explains the challenges faced by the textile industry, including the sheer number of

thousands of facilities globally that will be built in the near future to reach the demand of fast fashion and whether these can be reached to be assessed on their resource consumption. The company eeaser GmbH provides energy assessments for industries throughout the world and promotes energy efficient industries. Retraced, represented by Roman, provides a tool “getting to the solution” that collects, assesses, and discloses data, working with various stakeholders throughout the textile industry. Roman already mentions in his introduction words, and these have been repeated from all panellists several times in the discussion; collaboration is key to reach the goals! Before diving into deeper discussions around data management and different methodologies, Serena gave further information on the Resource Nexus approach, which is for industry still sometimes unknown or used in different terminology, as the moderator indicated. The Nexus approach was born to uphold the need for integrated resource management to be more of a centralized approach, but one that should incorporate trade-offs and synergies between material flows and make them quantifiable. More and more industry and other stakeholders are now picking up (and should even more in the future) on this approach by including it in their strategies and resource management. Overall, it’s interlinked with sustainability assessment methods, where life cycle assessment is one example, and aims to avoid valuing individual resources in silos as they are always dependent on or related to others. Such methodologies are powerful to compare products and processes, identifying hotspots within the supply chain and production line and plan for product development including its e.g., environmental impact. All data-based methodologies are of course also dependent on its data quality with the overall aim to improve its resource efficiency and decrease its environmental impact. For example, eeaser GmbH uses algorithms developed in-house to check data for energy consumption, energy savings and cost-saving measures. Their aim is to simplify data usage and identify the required data along the textile supply chain on global scale with networks from e.g., industry, international organizations, and brands. In between the thematic discussions, the moderator points out that the amount of data available is already enormous, but that it is becoming increasingly important to analyse and contextualise the data properly, and you are not able to define actual sustainable and long-term solutions. Retraced on the other side works on the need for traceability and transparency measures in the textile and garment industry, providing a cost sensitive tool to help collecting primary data. As for a proper compliance management you need to trace every order in highly complex and dynamic supply chains. With diving into data management retraced is discovering more and more that there are still large gaps in the supply chain traceability. Companies and suppliers almost always know their direct partners, but rarely know others further down the chain up to scope three. And this is where the difficulties of gathering direct and meaningful data for the evaluation of sustainability come into play. However, with new upcoming regulations, there is a massive push on European level (e.g., digital product passport, harmonised PEF standard, etc.) to overcome such lack in transparency in the textile sector. However, there are several standards on the market, and there is still confusion as to which should be used to ensure comparability and to follow a consistent approach.

After the input of the individual panellists, a discussion was sparked on the topic of data quality and primary versus secondary data usage. It was said that secondary data should be only used for a first rough estimate but is still quite vague for analysing real in-house production cycles. Secondary data can be exemplary used to e.g., compensate flight CO₂ footprints, but not to analyse exact material flows. Working on corrective and preventive actions within companies must use primary data to make a real difference, Roman underlines. Whereas Natascha adds to the discussion that when we start designing a product or process, we should emphasize first on the need and requirements, based on secondary data, to get an estimate. And overall, highlighted by the moderator, without a 100% transparent supply chain we cannot define sustainability parameters and measures/indicators at the design stage. Let’s keep that in mind when working on global scale and a fair and united approach! Serena is pointing out here that with a standardised approach we could speed up sustainability assessments and to analyse the global current conditions, as

well as working on primary data but within her research projects on water reuse options she also identified challenges in data collection of small medium enterprises.

All in all, data management must be standardised, easily accessible and understood to efficiently assess sustainability indicators. The discussion has been finalised on the social assessment topic, where people shall be also included as valuable resources in the overarching sustainability assessment approaches. Natascha explained that social life cycle assessments (Social-LCAs) have been used to evaluate the social and economic costs of textile production, and they have identified garment workers in Bangladesh as a hotspot for social and economic costs back in 2015 in a research project. After finalizing the panel discussion, the Symposium participants had great interest and highlighted first that sustainability is not just about human behaviour or mindset but also should always involve the assessment of the social aspects of the life cycle assessment, which includes the values and well-being of people involved in the process. Here, Prof Wegge, Professor of Work- and Organizational Psychology at TU Dresden, also criticised the focus on environmental assessment alone and suggested the need for more psychologists in Bangladesh and other countries to help change the mindset and working conditions of people involved in the sustainability assessment. This brings us back to the Nexus approach, as highlighted by Serena, where next to ecological and economic assessment the social aspects are also taken into consideration within research projects at UNU-FLORES. And the entire panel agrees that the social aspects must be considered in reporting and resource measurements for companies. They emphasize that a people-centric approach is essential for long-term sustainability. With further questions from the audience, the discussion was directed to the topic area around regional data comparisons. Roman highlighted that with digital twins of the textile industry or specific supply chains on regional level you can also do forecasts and scenario planning on e.g., change in product materials, sourcing countries or downsize factories. However, neutrally verifying data is still a challenge. But let's start anyway with an open-source guide to assess your own products and get more details about your product flows and environmental impacts if you haven't already done so. Once we go into more detail, we can more accurately produce a robust impact assessment with high-quality data.

Key Learnings from Session 2

The Resource Nexus Approach goes hand in hand with sustainability assessment:

The integrated resource management goes beyond initial sustainability and was born in response to the need to measure the progress and managing various resources, their synergies, and trade-offs. The approach is flexible, adaptable to regions and resource access, and can consider implementation factors like government policies.

Life Cycle Assessment (LCA) as one important exemplary Methodology:

LCA as a standardized methodology for environmental and social impact assessment and applicable at product and factory levels. Challenges include data quality but seen as a powerful tool to assess progress on sustainability assessment and identifying hotspots.

Primary versus Secondary Data Quality:

Partnerships and collaboration for sustainability assessment is key to collect all required data and enhancing better data quality. Using primary data for conducting the product or process impact assessment is the overall aim, but secondary data can be used initially for a first overview.

Standardisation of Data Management:

All in all, data management must be standardised, easily accessible and understood to efficiently assess sustainability indicators. In general, contextualising data and defining sustainable solutions is crucial.

Social Assessments are Possible but require more Attention:

A people-centric approach is essential for long-term sustainability. Social aspects can and must be considered in reporting and resource measurements (e.g., Social-LCA) for companies.

Session 3: Social Innovation & Responsibility

The third session featured insights from two academic experts and a panel discussion involving key stakeholders in the textile industry. Aslihan Memisoglu, a research associate at the Hochschule Niederrhein University of Applied Sciences, shed light on sustainability measures derived from the [EnaTex Project](#) in Indonesia. EnaTex, which stands for Energy and Sustainability in the Textile Industry, aims to enhance energy efficiency, and promote renewable energies for climate protection. Of particular focus was occupational health and safety (OSH) and the pursuit of Vision Zero, striving to eliminate factory-related accidents. Notably, the project employs innovative approaches such as 'information nuggets'—brief 10-minute training sessions—to bolster safety awareness among textile factory workers. Currently, they are conducting ESG surveys across Indonesia, Bangladesh, and Tunisia to gain insights into reporting, certification, and management systems within these factories.

Following this, Tanja Strukelj and Theresa Falter from TU Dresden, contributors to the [INNO-LEAD@WORK research project](#), shared their perspective. The project, centred around fostering innovation, performance, and resilience through leadership and modern work design, addresses the challenges facing Bangladesh's textile industry, the world's second-largest textile exporter. The research explores how innovation, wellbeing, and sustainability can be nurtured through modern work design and leadership.

The session culminated in a dynamic panel discussion involving academics and two additional participants: Kamol Gomes, a PhD student at UNU-FLORES, specialising in water and wastewater management in the Bangladeshi textile industry, and Adiba Afros, an independent consultant and researcher specialising in gender and labour rights within the apparel supply chain. Kamol Gomes shared critical insights from his visits to textile factories in Bangladesh and interactions with neighbouring communities. Communities expressed mistrust, believing that these factories neglect proper operation of ETPs, leading to river pollution and the extinction of nearly 40 fish species. Furthermore, farmers faced challenges in accessing clean water for irrigation, affecting crop quality.

Adiba Afros highlighted key distinctions between working conditions in the textile and ready-made garment (RMG) sectors in Bangladesh. Textile work is primarily machine-intensive and employs majority male workers, while RMG, encompassing cut-make-trim functions, involves predominantly female workers in more labour-intensive processes. In addition to the highlighted OSH concerns, the textile sector also has low female representation in technically skilled roles, and lower wages, governed by a separate minimum wage scale compared to the RMG sector. Addressing these social challenges necessitates engaging diverse stakeholders, including employers' associations like the Bangladesh Textile Mills Association (BTMA) and environmental-focused civil society organisations like the Bangladesh Environmental Lawyers Association (BELA). Furthermore, addressing social issues in the Bangladeshi textile sector requires consideration of the global value supply chain and establishing equal, long-term partnerships between

supply chain stakeholders, particularly sourcing companies and suppliers, to tackle systemic concerns associated with low wages and precarious working conditions.

Key Learnings from Session 3

Occupational Safety Through Innovative Training:

Implementing brief and targeted training sessions has been identified as an effective way to enhance safety awareness among textile factory workers. This innovative educational approach can contribute to significant reductions in factory-related accidents and is aligned with the broader goal of eliminating workplace hazards.

The Role of Leadership in Fostering Sustainability:

The textile industry's innovation, resilience, and sustainability are closely linked to leadership quality and workplace design. It is suggested that creating a supportive and progressive work environment, coupled with strong leadership, can lead to improved worker well-being and environmental stewardship within the sector.

Environmental Stewardship and Community Relations:

Research highlights the negative environmental and social impacts resulting from inadequate waste management practices in the textile industry. Local communities are affected by pollution, which undermines trust and can lead to biodiversity loss. There is a clear need for improved environmental management practices that prioritize community health and ecosystem sustainability.

Social Equity and Labor Rights Challenges:

The industry faces challenges related to gender representation, wage disparity, and working conditions. Addressing these issues requires a comprehensive strategy that encompasses equitable treatment of workers, fair wage practices, and increased representation of underrepresented groups in technical and skilled positions.

Collaborative Efforts for Systemic Improvement:

Tackling the complex social and environmental issues in the textile industry demands engagement from a broad range of stakeholders. Collaborative efforts are necessary to reform labor practices and environmental policies, requiring commitment from all levels of the supply chain to create sustainable and equitable working conditions.

(Day 2) Session 4: Promoting Circular Economy with Joint Efforts

Johannes Leis, researcher at the Saxon Textile Institute, and Henrike Schmitz, research partner at SOEX, gave some insights of their work, including challenges and best practices when it comes to closing the textile material loop with particular focus on textile recycling. The new [European Strategy for Circular and Sustainable Textiles](#) envisions new business models coming into practice, making durability and recycled material content key product requirements with the overall aim to make fast fashion out of fashion. This can be not also seen as important guidance to become more sustainable, but also as an opportunity for supported financial initiatives pushed by the European Commission. SOEX tries to react to the market demand with their global textile sorting and recycling business, with its continuously growing capacity from processing 85000 tonnes of textiles per year. After re-sale, the recycling and incineration process is followed as waste management processes, where the textile sorting is done manually. With the decreasing

quality but increasing volume of textiles due the fashion market and consumer demand, also the demand for textile recycling is expanding. In terms of value, the resale market is the most prominent, followed by recycling of textile waste into secondary raw material. Nearly 100 different materials are detected and with the help of collaboration from other research institutions such as STFI, the industry is supported in the decision-making process to determine the best new material combinations for market need, best value and properties. However, fibre shortage and several intermediate processes make the process still costly and lead to lower product quality as well as simple products, e.g., nonwoven textiles. Still, yarn-to-yarn recycling is gaining interest in the post-consumer waste market to achieve higher product quality. Thermochemical recycling is used for production waste, and chemical recycling is currently under the scrutiny of many and can help separate organic from non-organic fibres and recycle them cleanly. The latter two processes still cover smaller parts of the market. Higher prices are the result of all the mentioned processes but must be accepted by the market and end-consumer to support the trend and closing the loop.

Noor-E-Farzana Annesha and Md. Mazharul Haque (AUST) gave some insights in their current research work with students. One example includes flock printing, which can be used to process microfibre waste (generated in e.g., washing process or uncontrolled disposal) for printing. The samples have been collected from filters in dyeing machines and dried accordingly, followed by electrostatic printing. Mechanical tests showed similar fabric properties to commercially oriented fabrics, but the waste material was processed, and the number of dyes needed for the starting material was reduced. Another case study investigated production waste (e.g., fabric, dyes, chemicals, water) during the denim manufacturing process. The created offcuts were shown to be reused as interlay for common shirts and excluding any high-energy intensive processing (usually fusible interlaying uses a waxing stage) and rather sewing the material together. Such small but practical research projects showed great examples and learnings for students and industry partners emphasising on more sustainable initiatives in any step of the product line.

The following panel was joined by all academic presenters and Shirin Araghi, designer at C&A, GIZ Consultant. The round of discussion was opened with their definition of sustainability described in one word, with the terms "connection", "complexity", "culture", "mindset" and "change" already giving a very good basis and already summarising current key issues well. Looking at the end-consumer who is overloaded with advertisements from various brands on "circular products" has been clarified. Whilst a circular product is defined as a product without waste streams and end-of-life stages in theory, the real world already gives limitations in terms of control, transparency, and traceability. The latter describes the biggest challenge within a circular economy approach, as after the consumption stage we lose the product flows with current business models. All other initiatives such as recycling strategies, biodegradability, life cycle extension, are limited by losing control and the infrastructure is not yet in place. Circularity is not looking into single products but relates to an entire system where stakeholders have to collaborate and engage the (end) consumer to re-function current systems. Brands that engage in greenwashing give simple answers to complex questions of e.g., recycling and waste management, in order to convince more customers of their products. But consumers also use a similar strategy themselves, trying to soothe their good conscience and taking their things to an old clothes container without thinking about the following steps. Responsibility must be emphasised in a new culture, mindset and approach to the use of our clothes. The [Digital Product Passport](#) (part of the EU Strategy and the Green New Deal, and compulsory from 2025 onwards) was mentioned as one of the upcoming initiatives in the EU, but the way we use it and discuss it with consumers is important to achieve a change of mindset and completely new approaches to the clothing market and use. However, the reforms are recommendations and guidelines for the future, but what can we do now? And how can we address issues on a global scale? An overall reduction in consumption, a global approach to circular systems, longer useful life of products, reusing and repairing things before they go to waste are key topics for further discussion. A second-hand clothing fair will be one of AUST's academic initiatives to

remind students of the cultural mindset in (re)using their clothes, which can be copied to all student projects out there.

In Bangladeshi industry, similar challenges but also benefits can be seen when looking at circular economy (CE) practices. There has to be a willingness for new sustainable processes, which also stands for change. Compromising on quality and not necessarily generating the exact colours (when working with traditional unique colour codes mixed garments have no chance to pass the QC) and being able to reuse resources along the chain. As already mentioned, several times, cooperation along the supply chains is necessary to make this a reality, but also having sorting and recycling facilities and knowledge in place. But all these challenges also create a market for lots of innovation and job creation.

Symposium participants also addressed the topic around overconsumption, which has been related to overproduction of brands where raw materials are used in an unnecessary way. Here we could de-couple the economic growth from resource use and volume of production connected to company success, as also [Ellen MacArthur Foundation](#) is advocating for, one of the origin initiatives where CE principles have been established. What can design do for circularity? Material choice, longevity of designs, quality requirements, and combining functions and being repairable is already a good start to design longer lasting clothes, was one suggestion. Is the [Extended Producer Responsibility](#) (EPR) transferable in a global context? It will be a key requirement to actually apply all the ideas and suggestions above, it was said, to make it a global market, but also governmental incentives are required to support the change. Culturally, there was also encouragement from the audience to take forward more projects at the student level to share more thoughts on behaviour change and to collaborate further at the student level to find innovative cross-cultural solutions for the complex fashion industry. And technically, material purity for reprocessing is still a challenge and modularity for design comes into place and brings up new opportunities. All in all, closer exchange of innovations and state-of-the-art processing brings players of the value chain closer and the loop sooner to close on a global scale, but education, capacity building and knowledge exchange remain key.

Key Learnings from Session 4

Textile Recycling Challenges and Initiatives:

Facing challenges in manual sorting due to the increasing volume and decreasing quality of textiles, must be overcome. The European Strategy for Circular and Sustainable Textiles emphasizes business models focused on durability and recycled material content, aiming to move away from fast fashion. Yarn-to-yarn recycling gains interest for higher product quality in the post-consumer waste market.

Academic Research Initiatives:

AUST researchers explore sustainable practices, such as flock printing for microfiber waste and reusing denim manufacturing offcuts as interlay for shirts, providing practical case studies for students and industry partners. Encouraging initiatives at the student level can promote behaviour change and collaboration for innovative solutions.

Circular Economy Challenges and Opportunities:

The complexity of achieving true circularity includes challenges in control, transparency, and traceability after the consumption stage. Greenwashing by brands and consumer behaviour contribute to the need for a cultural shift and responsible approaches to clothing use. Initiatives like the Digital Product Passport (EU Strategy) aim to drive change, but current reforms are recommendations, emphasizing the need for a global reduction in consumption, longer product lifecycles, and circular systems.

Global Perspectives on Circular Fashion:

In Bangladesh, similar challenges and benefits in circular economy practices exist, requiring a willingness for sustainable processes, cooperation across supply chains, and sorting and recycling facilities. Overconsumption and overproduction in the fashion industry are addressed, with the suggestion that design choices, quality requirements, and governmental incentives are crucial for achieving circularity on a global scale.

Recommendations for Industry and Education:

The symposium participants call for a global application of EPR and encourage initiatives at the student level to promote behaviour change and collaboration for innovative solutions. Challenges such as material purity for reprocessing and the need for education, capacity building, and knowledge exchange are emphasized as crucial for advancing the global circular fashion agenda.

Session 5: Nature & Textiles

In the last session of the Textile Symposium, Nature and Textile Industry, Isabell Rzepecki, an intern from VAUDE, opened up the session with academic inputs on VAUDE's measures for biodiversity promotion and deforestation-free supply chains. In her presentation, she pointed out how biodiversity has long been put in focus in VAUDE's operational site and beyond, which leads to the topic of her Master's thesis to develop recommendations for ensuring deforestation-free supply chains based on science-based targets for nature. The results of her thesis show that VAUDE has a relatively low risk of deforestation due to materials used for production; however, risks still exist since it has wide production sites that go beyond Europe. Several recommendations for risk mitigation are proposed, which are, for example, enhancing transparency in supply chains, engaging stakeholders, and increasing the know-how through external support. This presentation also shows a successful business-academic partnership in advancing on the nature topic. Following the exciting presentation, two lecturers from AUST, respectively, Iffat Ara Anannya and Tamjida Islam presented their supervised student research. Iffat's research focuses on decolorizing discharge water in the textile industry using the absorbent property of the celery plant, whereas Tamjida's research sheds light on reusing the waste of green tea leaves for the improvement of light-perspiration fastness properties of fabrics. Both inputs indicate the potential of nature-based practices using natural substitutes to scale up achieving environmental sustainability in the textile industry and perfectly open the floor for a panel discussion to allow exchanges on further innovative ideas.

With a warm welcome from the session moderator, Lavinia, Rony Khan, CTO of Re-Root Tex Solution, and Kay Kölzig, Chairman of the Sachsen-Leinen e.V., joined the stage and shared their respective relationship with nature and the textile industry. Rony has dedicated himself to developing new sustainable materials from agricultural wastage, e.g. pineapple fibre from wastage leaves and banana fibre from plant stalks. He set up a pineapple fibre factory in Bangladesh to give new lives to the natural wastes and the workers, aiming to produce chemical-free, biodegradable fibres that create low environmental impacts but high social influences in the rural areas of Bangladesh, which inspire all the audiences very much. Sharing a similar objective, Kay has developed his passion for natural fibres in high-performance applications and sees the potential of producing sustainable fibres using hemp. He mentioned that hemp has much economic and environmental-friendly potential and the climate in Germany and throughout Europe is suitable for its growth. A project has; therefore, been carried out in Leipzig in cooperation with diverse actors to develop an innovative technology to produce high-performance hemp fibres. Besides, Isabell confirmed from her academic background that hemp is the plant that has one of the lowest risks from deforestation and is

positive for its environmental contributions to the textile industry. From pineapple and banana fibres to hemp, the spotlight went next to the natural fibre that is so-called Bangladesh's "golden fibre", jute. Iffat and Tamjida both agreed that jute plays an important role in their daily life and is already used in replacing disposable plastic packaging. Interestingly, Tamjida carried a made-in-Bangladesh jute bag with her, which successfully caught the audience's eyes with its beauty. Furthermore, both of them see great potential in commercializing jute as the natural fibre next greatly used in the textile industry and know projects working on its feasibility. Innovative thoughts and amazing ideas have been non-stop throughout the discussion, which ended with the audience's question regarding existing Bangladeshi-German cooperation in this research field.

Key Learnings from Session 5

Minimize Negative Environmental Impact

Businesses and academia are working on solutions to minimize (potential) environmental risks posed by the textile industry.

Increase Multi-Stakeholder Collaborations

Business-academic cooperation can decrease knowledge gaps between both sides and open up new sustainable practices/ research areas.

Diversify

There is a potential for making greater use of diverse natural fibres (e.g. hemp, jute, pineapple and banana fibres) in the textile industry, which can serve as a solution to lower its environmental impacts.

Building Base for Nature-Positive Future

Synergies are found in existing research of AUST and UNU-FLORES in the area of nature and the textile industry, which can be further built on for further cooperation to foster a nature-positive future collectively.

2.3. Impulse Talks

The symposium featured three insightful 'Impulse Talks' in the form of pre-recorded interviews with prominent industry experts from Bangladesh, shedding light on crucial aspects of sustainability in the textile industry.

In the [first session](#), titled "**Environmental sustainability and the textile industry in Bangladesh,**" **Professor Saleemul Huq**, the Director of the International Centre for Climate Change and Development (ICCCAD) and a Professor at the Independent University Bangladesh (IUB), engaged in a conversation with Dr. Edeltraud Guenther (Director, UNU-FLORES) and Professor Daniel Karthe (Head of Research Programme, UNU-FLORES). Professor Huq, a respected voice on climate mitigation, adaptation, and justice, shared several key takeaways. Firstly, he emphasised the importance of incentivizing good practices in the industry. While Bangladesh boasts over 200 LEED certified green factories, the majority

remain non-green. These greener factories face significant costs and investments, yet they compete under the same cost pressures as their non-green counterparts, without any increase in the price of their products. Secondly, Professor Huq highlighted the need for a two-way shift in mindsets between Bangladesh and Germany. He stressed the importance of enhancing awareness among German consumers about Bangladeshi products and their willingness to pay a premium for better quality and sustainable goods. Thirdly, he called for investor support in transitioning to greener factories that offer decent working conditions and wages, asserting that Bangladesh must move beyond "cheap production" to value-added products. Lastly, Professor Huq advocated for increased people-to-people exchanges, especially among younger generations and students, to foster innovation and solutions addressing environmental and social challenges in the textile industry.

In the [second interview](#), titled "**The Future of Textiles,**" **Dr. Rubana Huq**, Vice-chancellor of the Asian University for Women (AUW) Bangladesh and former president of BGMEA, as well as owner of the renowned Mohammadi Group, engaged in a discussion with Dr. Christina Froemder (Project Manager, UNU-FLORES) and Kamol Gomes (PhD Student, UNU-FLORES). Dr. Huq emphasised the integral role of sourcing practices in sustainability and highlighted the need for collaboration among all stakeholders in the global supply chain. She underscored the global issue of excessive resource consumption, calling for a transition to a circular economy that closes the loop and promotes reuse. Dr. Huq advocated for the development of a national circular economy policy in Bangladesh to incentivize local businesses. She stressed that sustainability goes beyond compliance checkboxes and requires a collective mindset shift. She also highlighted the importance of local innovation and capacity building, urging collaboration among NGOs, workers, management, and the government to develop a comprehensive circular policy and its implementation. Dr. Huq acknowledged the unique challenges faced by the textile sector compared to the RMG sector and called on the government to address them. She emphasised the need for Bangladesh to move toward higher-value-added items and cater to niche, high-quality markets. Additionally, she stressed the importance of supporting women's participation in technically advanced and engineering courses, citing international academic collaborations through AUW as a means to empower women in STEM fields and underlining the fundamental role of quality education in women's empowerment within the industry.

The [third interview](#), also conducted by Dr. Froemder, was held with Thomas Ahlmann, CEO of the NGO FairWertung e.V., which is a nationwide network of textile collecting and reuse companies, primarily driven by charitable purposes. Ahlmann's extensive experience in the used textiles industry offered valuable insights into the challenges and opportunities associated with circular economy models within the context of used textiles. Ahlmann stressed the significance of transparency in the network's operations, as not all collected clothing can be repurposed for recycling. In such cases, the collected textiles are sold to larger sorting companies. The key goal is to ensure that 60-70% of textile waste is genuinely reused, preferably within local contexts, rather than being discarded. Additionally, Ahlmann underscored the necessity of partnerships and collaboration among various stakeholders to make circularity effective. He emphasised that circularity is all about teamwork, and alignment is essential among collectors, textile producers, brands, and consumers. Each group has distinct objectives, and establishing common ground is an ongoing process. While Germany is witnessing a growing trend of purchasing second-hand clothing, the market for new products, especially in luxury and ultra-fast fashion segments, continues to expand and thus encouraging sustainable customer behaviour remains a challenge.

Regarding regulations, Ahlmann pointed to the European Union's Textile Strategy as a significant step toward achieving a circular economy for textiles. He highlighted the importance of extended producer responsibility requirements in enhancing collection, sorting, and recycling processes. However, he also emphasised the need for design regulations and mandatory recycling content as part of the legislative

approach. In the future, recycling will serve as a crucial source of raw materials for new products, creating competition for these resources. This presents a significant opportunity for Europe to embrace green production practices and potentially bring production back to the region due to the proximity of waste generation and the environmental advantages of recycling locally, as opposed to in Asian countries. Overall, the interview provided valuable insights into the complex landscape of textile recycling and its vital role in achieving sustainability in the textile industry.

2.4. Digital Exhibition

The [digital exhibition](#) featured during the symposium showcased the work of local civil society actors and innovative entrepreneurs from both Bangladesh and Germany, offering a platform to share their contributions and insights on sustainability in the textile industry. Ten organisations participated in the exhibition:

1. **Aranya Crafts:** A women-owned, eco-sustainable fair-trade brand promoting traditional crafts in Bangladesh through designer craft products using natural materials and dyes.
2. **Fashion Revolution Bangladesh:** A voluntary group focused on skill development, research, and education to promote sustainable fashion practices in Bangladesh's fashion sector.
3. **Aabha Ltd.:** A female-led business empowering former women garment workers to become CEOs and agents of change.
4. **Recycle Raw:** A company working with post-industrial textile waste to redirect it from landfills and incineration towards recycling and upcycling plants.
5. **Reverse Resources:** Addressing textile waste by mapping and redirecting off-cuts and production leftovers towards textile-to-textile recycling.
6. **Design In Global:** Empowering designers worldwide to redefine the fashion industry and collaborate on products designed in Bangladesh and made in Europe.
7. **Tarango:** A non-profit organisation improving the socio-economic conditions of marginalised women in Bangladesh through handmade craft products and development projects.
8. **Clean Clothes Campaign (CCC):** A global network working to improve working conditions in the garment industry and ensure respect for employment rights.
9. **Fair Wear Foundation:** An independent multi-stakeholder organisation collaborating with garment brands, workers, and industry influencers to enhance labour conditions in garment factories.
10. **FEMNET e.V.:** An organisation committed to improving gender equality and women's rights within the global textile and garment industry, addressing challenges faced by women workers.

These organisations shared their perspectives on sustainability, their organisational missions, activities, and challenges, contributing to a comprehensive dialogue on the future of the textile industry, both in Bangladesh and globally.

3 Moving Forward: Promoting Responsible Resource Use and Strengthening Industry-Academia Collaborations

During the symposium, we immersed ourselves in all the topics along the SDGs and the fruitful discussion between various stakeholders under the umbrella of "Responsible use of Resources" was very enriching. While the main take-aways have already been summarised for each thematically focused session in the previous section, here are some overarching themes that you should take into account in your next decision-making process.

- **Global approach for global supply chains:** The new EU directives are important to curb overconsumption and to regain a sustainable awareness of resources. However, a global approach is necessary to avoid maximising further inequalities between the Global North (mainly consumer) and the Global South (mainly producer) and to balance them in a fair and responsible way.
- **Knowledge exchange across borders and sectors:** The transition to a more sustainability industry comes with challenges but also opportunities. Key for such transition must be knowledge exchange between industry as reinventing the wheel is cost-intensive and time-consuming, which we might not have. For example, a company collaboration on a broader technological level (e.g., production or recycling facility), could focus on sharing experiences and best practices, but can then be customized to local infrastructure, resources (e.g., cotton, hemp or jute depending on region) and other requirements, ensuring its unique selling proposition.
- **Circular products require circular systems:** It is not enough to develop a potentially circular product; we need completely new approaches to restructure supply chains and entire systems. And this can only be achieved with international and cross-stakeholder partnerships, supported by governmental incentives to return secondary products to the cycle in an economical and sustainable way.
- **Measurability to track improvements:** Sustainability assessment is becoming an essential criterion and still needs a standardised approach to make this measurable in a meaningful way for everyone involved in the supply chain. The data must then also be visible and evaluable. It is important to know which data needs to be collected and why, and how it can be analysed in a meaningful way. Here, social aspects must be considered and reported as well to follow a holistic approach.
- **Shifting mindsets:** Consumers should be made more aware (or transparently informed) of what is behind the purchase and high consumption of their products, what they automatically support with the purchase of new clothing and also hide when they donate items to the used clothing donation to preserve their good conscience. In addition, people in the producing countries (e.g. workers and community members) should be given more of a voice and the chance to share their opinions in order to draw attention to local problems and challenges. Less is more should be the motto, but it should be balanced with corresponding fair value and following guidelines for responsible business conduct.

- **Valuing resources:** Natural resources are not infinite, human resources are essential and both should finally be treated appropriately and responsibly. If you outsource or relocate production to other countries without informing yourself about the local implementation (or without having an interest in it), you should reconsider your actions and take appropriate countermeasures, enter into deeper partnerships to ensure appropriate working conditions as in your country, promote cooperation and create transparency. The use of primary resources should be more controlled (e.g. including access to fresh water for industry) and the use of secondary raw materials should be emphasised and promoted. Taking into account the resource nexus approach, resources must not be analysed in silos but must be examined for their interrelationships and interactions with other resources, as water quality, for example, can have simultaneous impacts on soil, biodiversity and food production.
- **International multi-stakeholder education and capacity building programmes:** The transition to a more sustainable industry is happening fast and sometimes industry is ahead of research innovation, but industry can also gain a lot of knowledge from universities on sustainable production standards. Therefore, co-operation between universities and industry is key to sharing experience and knowledge. The (online) contact of students across countries and continents would also promote cultural exchange and create further exchange opportunities.

The symposium concluded with a 2-hour workshop, offering attendees the opportunity to reflect on the wealth of information shared during the two-day event and to share their key learnings and recommendations for advancing sustainability in the textile sector. Participants were divided into smaller groups to discuss and compile observations related to three main questions: What were the significant takeaways from the symposium? Which stakeholders should be involved in efforts to advance sustainability in the textile sector? Lastly, what recommendations can be made to enhance sustainability?

Following a 45-minute discussion, all groups convened to share their key observations. Some notable takeaways included the importance of ESG data quality and management, the need to foster an interdisciplinary understanding of the circular economy, bridging the gap between academia and industry, recognizing differing perceptions of 'innovation' between stakeholders in the Global North and South, emphasising systemic change, and involving smaller suppliers in sustainability discussions. Moreover, participants stressed the importance of nature-based solutions and highlighted key distinctions between the RMG and textile sectors.

In terms of stakeholder engagement, attendees encouraged the inclusion of a broader spectrum of stakeholders in such platforms, particularly representatives from workers and communities affected by the textile industry, civil society, manufacturers, industry association representatives, government officials, policy makers, social activists, and consumers.

Key recommendations included hosting events like the symposium to facilitate knowledge exchange between academia and industry. Academia should take a more active role in sharing innovative research with policy makers and entrepreneurs and creating opportunities for collaborative research projects involving students and experts from both the Global North and South. Another recommendation was to map key stakeholders and organise matchmaking events to promote networking and knowledge sharing; this can be particularly beneficial for smaller manufacturers lacking the resources and expertise to identify and implement costly sustainability measures. Legal regulations and their proper enforcement were also underscored as essential components.