

Strategic Insights: Best practices from the textile sectors of Germany and Pakistan

Key learnings and policy recommendations for sustainable growth

The paper is based on an Exposure Visit to Germany 26 – 30 August 2024 initiated by WWF Pakistan and co-hosted by the Centre of International Postgraduate Studies of Environmental Management (CIPSEM) and United Nations University (UNU-FLORES).

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List of acronyms

ABCD Centre	The Global Water and Climate Adaptation Centre (Aachen, Bangkok, Chennai, and Dresden)
AUTEX	Association of Universities for Textiles
BAT	Best Available Techniques
BMZ	German Federal Ministry for Economic Cooperation and Development
CIPSEM	Centre of International Postgraduate Studies of Environmental Management
CSR	Corporate Social Responsibility
DSS	Decision Support Systems
EU	European Union
EU-CSDDD	European Corporate Sustainability Due Diligence Directive
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GDP	Gross Domestic Product
IED	Industrial Emissions Directive
ILES	International Labour and Environmental Standards Application in Pakistan's SMEs
ITM	Institute of Textile Machinery and High-Performance Material Technology
LCA	Life Cycle Assessment
LNS	Learning Needs Assessment
LkSG	German Supply Chain Due Diligence Act
NAP	National Adaptation Plan
NGO	Non-Governmental Organization
SME	Small and Medium-sized Enterprises
STFI	Saxon Textile Research Institute
TUD	TUD Dresden University of Technology
UBA	German Environment Agency
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNU-FLORES	United Nations University, Institute for Integrated Management of Material Fluxes and of Resources
WWF	World Wide Fund for Nature

Preamble

The strategic paper presents insights and policy recommendations for sustainable growth in the textile sectors of Germany and Pakistan, based on an exposure visit to Germany from August 26th to 30th, 2024, a pivotal step in the joint effort to transition towards a climate-neutral and resource-efficient economy. The visit, initiated by WWF Pakistan and co-hosted by the Centre of International Postgraduate Studies of Environmental Management (CIPSEM) and the United Nations University for Integrated Management of Material Fluxes and of Resources (UNU-FLORES), brought together key stakeholders from Pakistan's Ministry of Climate Change and Environmental Coordination, leading textile industries in Pakistan, WWF-Pakistan and key stakeholders from Germany.

The report focuses on exchanging lessons learned and exploring best practices in the textile sector of both countries. The exposure visit was an integral part of an WWF Pakistan's eight-year EU-funded project focused on implementing international labour and environmental standards in Pakistan's textile and leather industries. The textile sector plays a crucial role in Pakistan's GDP, contributing approximately 8.5% and employing 40% of the workforce. The primary objectives of the visit were to increase understanding of sustainable and circular practices in the textile sector, encourage the adoption of sustainable materials and recycling techniques by Pakistani textile manufacturers, integrate circular design principles in product development, and enhance collaboration among stakeholders.

The report provides a detailed overview of the key challenges and recommended actions identified during the visit, aiming to foster a more sustainable textile industry in both Germany and Pakistan. It serves as a valuable resource for stakeholders seeking to contribute to the sustainable transition of the textile industry, particularly in Germany and Pakistan.

Introduction

This exchange was a pivotal part in our joint global efforts to transition towards a climate-neutral and resource-efficient economy. It is imperative to integrate diverse perspectives and leverage global expertise to achieve sustainable and impactful outcomes. The Co-Organizer United Nations University, Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES) together with TUD Dresden University of Technology (TUD) and [CIPSEM's UNEP/UNESCO/BMUV training programme](#), invited participants to an open dialogue on behalf of WWF-Pakistan.

The week-long exposure visit, held from 26-30 August 2024 in Dresden, focused on exchanging lessons learned and exploring best practices in the textile sector of Germany and Pakistan. The visiting delegation from Pakistan had a strong interest in circular economy and sustainability in the textile sector and included key stakeholders from the Ministry of Climate Change and Environmental Coordination, leading textile industries in Pakistan and WWF-Pakistan. The exposure visit was part of an eight-year EU-funded project on implementation of international labour and environmental standards in the textile and leather sector of Pakistan. The textile sector contributes approximately 8.5% to Pakistan's GDP and employs 40% of the workforce¹, making it crucial for both environmental and socio-economic sustainability. Expected outcomes of this in-person exchange were increasing understanding of sustainable and circular practices in the textile sector, adoption of sustainable materials and recycling techniques by textile manufacturers in Pakistan, integration of circular design principles in product development and enhancement of collaboration among stakeholders for a more sustainable textile industry. With a mix of various formats such as roundtables, discussions and field trips, we aimed to provide as much insight as possible into the local industry, regulations, common challenges, best practices and facilitate knowledge sharing, including:

- Short impulses and panel interview with UNU-FLORES, TUD, GIZ, WWF-Pakistan, Pakistan and German ministries and many more.
- Presentation of research projects targeting common challenges and their potential solutions by local institutions.
- Visionary perspectives on future textiles during excursions to NOON GmbH, Esche Museum, and the SOEX Group.
- Exchange at the German Environment Agency in Dessau on environmental governance and standards for the textile and shoe sector.
- Dialogue and feedback session with Adelphi on the German Supply Chain Act and the European Corporate Sustainability Due Diligence Directive and its impact for textile producers in Pakistan and importers in Germany.

¹ Naeem, J., Siddique, A. (2024). Sustainable Consumption and Production Trends of Textiles and Apparel Industry in Pakistan. In: Sadhna, Kumar, R., Memon, H., Greeshma, S. (eds) Consumption and Production in the Textile and Garment Industry. SDGs and Textiles. Springer, Singapore. https://doi.org/10.1007/978-981-97-6577-5_2

- Discussion and brainstorming on education and capacity building initiatives for the technology-based solutions of key challenges faced by textile supply chain under new global sustainability requirements .

Furthermore, participants had the opportunity take part in a series of informative exposure visits to local industries in Saxony, aimed at highlighting practical implementation of best practices under local perspectives and fostering international collaboration opportunities. Given the importance of this event, we appreciate the participation of diverse stakeholders from public and private sector of both the countries, whose contributions ensured a focused and impactful dialogue. During the visit, actionable recommendations were formulated through discussions on how each participant, representing diverse stakeholders, can contribute to the sustainable transition of the textile industry, particularly in Germany and Pakistan. These recommendations, along with key challenges, are presented in the following sections.

Challenges, exploring solutions and recommended actions

Challenges in the textile sector

- **Compliance issues:** Lack of adherence to national and international laws and differences between objectives and priorities at national, regional and global level.
- **Data management:** Absence of a digital dashboard or database to identify compliant and non-compliant entities and their level of compliance.
- **Policy environment:** Current policies still prioritise the conventional linear economical and holds dominant share in overall global economy .
- **Disconnect between stakeholders:** There is a notable communication gap between the government, industry, and universities, hindering effective information exchange.
- **Multiplicity of standards:** The market has too many standards, creating confusion about which one's companies should comply with as many of the companies still think these standards and requirement as a marketing tool instead of adopting these as a tool to incorporate the sustainability features in their managed operations and processes. Additionally, each standard requires individual compliance checks, consuming significant industry resources.
- **Equity in decision-making:** Decisions are often made by a few policymakers with very limited dialogue between the stakeholder community especially the challenges are cross border.
- **Financing for sustainable initiatives:** Many textile businesses, particularly SMEs, may lack the financial resources to invest in sustainable technologies or practices, hindering the transition toward more sustainable operations
- **Post-consumer waste management:** The textile industry contributes significantly to post-consumer textile waste, with millions of tons of discarded clothing ending up in landfills each year. In Pakistan, recycling and repurposing textile waste is still underdeveloped.
- **Access to sustainable raw materials:** Sourcing sustainable raw materials, such as organic cotton or recycled fibers, can be challenging due to limited availability, higher costs, and lack of local suppliers.

Exploring solutions to key challenges

1. Innovation and adaptation

- The textile industry must innovate for improved economic efficiency through mitigation initiatives for decoupling it from environmental degradation triggering climate changes and at the same time adapt to the impacts of climate change.
- Establishing a Chair for textile sustainability in Pakistan was proposed, with potential support from UNU-FLORES, CIPSEM, and GIZ as a collective action.
- Tools for decision support systems (DSS) on sustainability helping stakeholders to take informed decisions contributing to sustainability, such as LCA and data tools, local database streams to gather data from textile producers need to be developed and with developing required capacity of stakeholders.

2. Consumer behaviour and education

- Consumer behaviour must change, particularly regarding fast fashion and its effect on environment and climate, to balance supply and demand. And sensitizing consumers how they can contribute for the common good.
- The school education curricula should be reviewed to discourage consumerist behaviour influenced by linear economy models.
- There is a need for clear guidance from authorities on sustainability compliance requirements that are implementable rather than idealistic and devising a pathway based on the principles of continual improvement.

3. Industry and government roles

- The industry needs to move away from a mindset of "self-pity" and actively learn about and implement sustainability measures for economic reasons and adopt these as tools for improving the long-term sustainability.
- The government must step in to educate consumers, as industries are profit-driven and often prioritize short-term gains over long-term sustainability and public interest. Governments must also develop harmonization across different standards offering common claims so that implementing textile factories can use their resources in optimum way.

4. Product and skill development

- Product diversification and skill/technology upgradation are necessary to keep pace with global trends leading to circular economy.
- Retailers in Germany and Europe have more advanced product lines, indicating the need for improvement and value addition in a bigger segment of Pakistan's market.

Recommended actions

1. Action Points for UNU-FLORES and CIPSEM

- **Establish a chair for textile sustainability:** Collaborate with local universities and institutions in Pakistan to establish a Chair for textile sustainability, focusing on integrating sustainability into textile manufacturing processes and policies.
- **Facilitate knowledge exchange:** Organize workshops, webinars, and training sessions to share global best practices in textile sustainability, particularly focusing on sustainable product design and manufacturing techniques.
- **Develop tools for decision support systems:** Assist in creating and implementing tools such as Life Cycle Assessment (LCA) and data management systems that can help the textile industry in Pakistan make informed, science-based decisions regarding sustainability.

2. Action Points for the Government of Germany and at the EU Level

- **Strengthen import regulations on sustainability:** Implement stricter sustainability standards and compliance requirements for textile imports, encouraging suppliers, including those in Pakistan, to adopt sustainable practices in line with EU environmental and social standards.
- **Provide financial and technical support for sustainable transitions:** Create funding mechanisms, grants, or technical assistance programs to support partner countries in transitioning to sustainable textile production, focusing on areas like renewable energy use, sustainable resource management, and waste reduction.
- **Promote international collaboration and best practice exchange:** Facilitate platforms and forums that allow EU-based companies and their supply chains in partner countries to exchange best practices on sustainable production and compliance, including guidance on the latest sustainable manufacturing technologies and approaches.
- **Encourage consumer awareness campaigns:** Invest in EU-wide campaigns to raise consumer awareness about the impacts of fast fashion and promote sustainable consumption choices, encouraging demand for sustainably produced textiles.
- **Establish science-based sustainability targets for the textile sector:** Lead by example in setting ambitious, science-based targets for textile sustainability across the EU, creating a benchmark for the industry globally and signalling commitment to sustainability to partner countries.

3. Action Points for the Government of Pakistan

- **Develop and implement clear sustainability guidelines:** Issue clear, actionable guidelines for the textile industry to ensure compliance with national and international sustainability standards. These guidelines should be practical and enforceable. Moreover, these guidelines must offer a performance tracking internally and disclosure to stakeholders ensuring transparency and continual improvements. These guidelines should adopt short-, medium- and long-term goal achieving perspective with starting

point of low hanging easy to achieve targets. Create localized certification program with recognized international partners to help boost product credibility.

- **Capacity development:** Develop pool of experts for effective implementation of sustainability measures across the supply chain in the country. Develop industry specific training programs, ensuring the development of expertise at different stages of the supply chain (e.g., from raw material sourcing to retail distribution).
- **Facilitate Collaboration Between Stakeholders:** Initiate platforms or councils to improve communication and collaboration between the government, industry, and academia at national, regional and global level, ensuring that all voices are heard in policy-making processes improving chances of adoption and improvement in sustainable manner throughout supply chains, existing associations and chamber of commences could be starting points.

4. Action Points for the Textile Industry in Pakistan

1. **Invest in Skill and Technology Upgrading:** Focus on upgrading skills and technologies within the industry to improve product quality and process efficiency, making the sector more competitive globally with low environmental footprint of products and processes. Development of partnerships with international technology providers (with special focus on Sustainable technologies) and educational institutions for knowledge transfer and access to cutting-edge technologies.
2. **Embrace product diversification:** Expand and diversify product lines to meet the demands of both local and international markets, ensuring competitiveness with advanced markets. Also develop strategy to target the eco-conscious consumers to tap into high value niche markets.

Recommended actions	Responsible entity	Timeline
Establish Chair of Textile Sustainability	UNU-FLORES, CIPSEM, Pakistani universities	2-3 years
Organize knowledge exchange events	UNU-FLORES, CIPSEM	Ongoing
Develop decision-support tools (LCA, data management)	UNU-FLORES, CIPSEM, local stakeholders	2-3 years
Strengthen import sustainability regulations	German & EU regulatory bodies	1-2 years
Provide financial & technical support	German & EU funding bodies	2-4 years
Promote best practice exchange	German & EU trade organizations	Ongoing
Conduct consumer awareness campaigns	German & EU consumer agencies	2-3 years
Set science-based sustainability targets	EU Commission, national governments	3-5 years

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Develop & enforce sustainability guidelines	Ministry of Commerce & Textile	1-2 years
Build expert capacity	Government, academia	2-3 years
Facilitate industry collaboration	Government, industry associations	Ongoing
Upgrade skills & technology	Textile industry, associations	Ongoing
Diversify product lines	Textile industry, export councils	2-4 years

Conclusion

The exposure visits to Germany provided critical insights into the challenges and opportunities for sustainable transformation within Pakistan's textile industry. The discussions and site visits underscored the need for policy coherence, stronger stakeholder collaboration, and industry-wide adoption of sustainability measures. Key challenges such as compliance gaps, lack of digital data management, multiplicity of standards, and the disconnect between stakeholders were identified as major barriers to progress. Addressing these issues requires a multifaceted approach, integrating regulatory reforms, financial and technical support, and enhanced knowledge-sharing mechanisms.

The visit reinforced the urgency of shifting from a linear to a circular economy, emphasizing innovation, education, and capacity building. Establishing a Chair of Textile Sustainability in Pakistan, developing decision-support tools, and implementing harmonized sustainability guidelines are among the strategic actions that can drive change. The textile sector must also invest in skill and technology upgrades to enhance product quality, competitiveness, and environmental responsibility.

To ensure meaningful progress, coordinated action from governments, academia, industry, and international partners is essential. Strengthening sustainability regulations, fostering consumer awareness, and facilitating industry-wide collaboration will play a crucial role in accelerating the transition. This report provides a roadmap for the key stakeholders to implement these recommendations, fostering a more sustainable, resilient, and globally competitive textile sector in Pakistan.

Annexures:

Annexure 1: Participants of the exposure visit

Sr. #	Name	Organization
1	Aqsa Liaqat	Pakistan Ministry of Climate Change and Environmental Coordination
2	Mian Saqib Sohail	Artistic Milliners
3	Mirza Kamran Zia	Naveena Exports limited
4	Dr. Masood Arshad	WWF-Pakistan
5	Ifrah Kamil	WWF-Pakistan
6	Dr. Anna Goerner	CIPSEM, TUD Dresden University of Technology
7	Dr. Daryna Dechyeve	CIPSEM, TUD
8	Dr. Christina Froemder	United Nations University (UNU-FLORES)
9	Waseem Ashraf	UNU-FLORES
10	Asha Verma	UNU-FLORES
11	Prof. Edeltraud Guenther	UNU-FLORES
12	Sonja Hahn-Tomer	UNU-FLORES
13	Natalia Ruiz Morato	UNU-FLORES
14	Thato Masire	UNU-FLORES
15	Prof. Serena Coetzee	UNU-FLORES
16	Prashant Kumar	UNU-FLORES
17	Vaibhav Aggarwal	UNU-FLORES
18	Kamol Gomes (joined online)	UNU-FLORES
19	Dr. Matthias Walz (joined online)	UNU-FLORES
20	Dr. Andre Lindner	TUD Dresden University of Technology
21	Dr. Firas Aljanabi	The Global Water and Climate Adaptation Centre (ABCD Centre), Representative at TUD
22	Dr. Hassan Saeed	Institute of Textile Machinery and High-Performance Material Technology (ITM), TUD
23	Felix Kunzelmann	ITM, TUD Dresden University of Technology
24	Prof. Kyosev	ITM, TUD Dresden University of Technology
25	Dr. Kathrin Pietsch	ITM, TUD Dresden University of Technology
26	Dr. Andre Matthes	TU Chemnitz - Chemnitz University of Technology
27	Johannes Leis	Saxon Textile Research Institute (STFI)
28	Marc Luginsland	Fraunhofer/ Circular Saxony
29	Tony Schuetze	RKW Sachsen
30	Dr. Katharina Schoeps	RKW Sachsen
31	Dr. Stephanie Stange	SMWA
32	Ute Roericht	SMEKUL
33	Eva Howitz	Lokaltexil
34	Marcus Pester-Weissbach	Lokaltexil
35	Tino Zobelt	Noon GmbH
36	Gabriele Pabstmann	Esche Museum
37	Christian Bochmann	GIZ Bangladesh
38	Johannes Foerster	GIZ Germany
39	Magdalena Lenhart	BMZ

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40	Dr. Juergen Hannak	Adelphi
41	Carolin Gruening	Adelphi
42	Claudia Meier	SOEX GmbH
43	Brigitte Zietlow	German Environment Agency / UBA

Annexure 2: Agenda and key takeaways

Key activities and learnings are summarised in this section for each day.

Monday, 26 August

09:00 – 09:30	Greeting by UNU-FLORES and CIPSEM and informal round of introduction of all participants	13:00 – 14:00	Introduction to UNU-FLORES and its UN mandate by Prof. Edel Guenther (UNU-FLORES).
09:30 – 09:40	Overview of the week and introduction of post-graduate trainings for decision makers (Centre for Postgraduate Studies in Environmental Management – CIPSEM, TUD Dresden University of Technology)	14:00 – 16:30	Presentation of research projects and local initiatives related to sustainability in the textile industry each as short input (up to 12 min) with the opportunity for discussion afterwards (5 min) (including 14:45 coffee break)
09:40 – 10:00	WWF Pakistan: Introduction of work on textile sector in Pakistan , including progress and associated challenges	16:30 – 17:00	<i>Biobreak</i>
10:00 – 10:15	<i>Coffee break</i>	17:00 – 18:00	Panel interview as an interactive opportunity to address questions on sustainability in the textile industry with “Focus on Technical Aspects Towards a more Sustainable Industry”
10:15 – 11:55	Short impulses from other partners and delegation members (5 minutes each) followed by discussion rounds		with Dr. Christina Frömder (UNU-FLORES), Dr. Hassan Saeed (ITM), Johannes Leis (STFI), Industry representative from Pakistan (Saqib Sohail, Artistic Milliners); moderated by Waseem Ashraf (UNU-FLORES)
11:55 – 12:05	<i>Group picture</i>		
12:05 – 13:00	<i>Lunch break (set-up of presentations)</i>		

Various stakeholders gathered on the first event day to present insights into their work in Germany and Pakistan. Prof. Guenther welcomed the participants, emphasizing the alignment between WWF-Pakistan and UNU on environmental challenges and the potential for collaboration. She highlighted the importance of strategic documents for guiding future partnerships and the need for research on recycling, resource use and implementing decisions at the design stage. Anna Goerner from CIPSEM introduced the agenda and participants, and their work as Centre for postgraduate studies with focus on Global South participants. WWF-Pakistan introduced the EU-funded project titled “International Labour and Environmental Standards Application in Pakistan’s SMEs (ILES)” which aims at contributing to improved environmental sustainability and livelihoods in Pakistan by supporting sustainable economic growth and development. Other introductions included TUD’s textile institute, ITM, which is organizing the AUTEX 2025 conference in June next year and is open for collaboration on research level but also welcomes international guests on its MSc course. The School of Civil and Environmental Engineering was also introduced, as was the leading role of TUD as University of Excellence.

The ABCD Centre is one example of a systematic approach to the global challenge of climate change with a particular focus on water security and climate change. What unites the five project partners is the shared idea that global problems need global solutions and that scientific cooperation between North and South is the need of the hour.

Naveena Export Ltd mentioned some of their sustainable initiatives which include a significant social and environmental commitment, with 5% of total profit directed towards such efforts. Notable achievements include annual water savings of 64 million litres and the installation of 1.5 MW of solar power and a 50 MW wind project. Additionally, there is a focus on recycling with a capacity of 500 tons per year and caustic recovery of over 350 tons annually. The production of hemp denim is also part of these initiatives. However, challenges persist, including issues with legislation, decarbonization efforts, and weak law enforcement. Technology-related issues include the need for advancements in clean energy, addressing energy mix and insecurity, and

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improving carbon capture and storage, alongside problems related to captive energy. Artistic Milliners, represented by Saqib Sohail, focused on addressing key sustainability challenges. A major concern is consumer behaviour, particularly regarding fast fashion. The company also faces issues with energy regulation and data management. To advance their sustainability efforts, there is a recognized need for stronger collaboration and improved management practices.

Prof. Günther discussed UNU's role in advancing knowledge and partnerships, emphasizing the importance of practical implementation over new legislation and advocating for better collaboration and knowledge transfer through the exemplary Chair for Sustainability and Textile Innovation in Bangladesh and the global ABCD Centre. In doing so, she also highlighted the need to integrate sustainability education into curricula and the challenge of aligning courses with industry needs.

The discussions highlighted various projects, including resource nexus decision-making and the environmental impacts of fast fashion. Key issues identified included the need for effective policy and regulation, the challenges of consumerism, and the high costs associated with sustainability. The need for strong collaboration, practical research, and localized solutions was underscored throughout the day.



Photos: Victor Smolinski

Tuesday, 27 August

Site visits

- 07:45 Meeting in Pullman hotel lobby
- 08:00 departure by chartered bus to Limbach-Oberfrohna
- 10:00 – 12:00 visit to company NOON GmbH – **textile knitting made in Germany**
with Lokaltexil. Factory tour with focus on chemical use in the textile dying process and wastewater solutions.
- 12:15 – 12:30 transfer to Museum
- 12:30 – 14:00 lunch break at the Esche-Museum with **impulse talk** from Eva Howitz, Lokaltexil, and Waseem Ashraf, UNU-FLORES, with input from Mr. Mirza Kamran Zia, Executive Director at Naveena Exports Ltd., on the perspective of their current sustainable initiatives and challenges
- 14:00 – 15:30 visit of the Esche-Museum – **diving into the textile history of knitting**
- 15:30 – 16:30 Coffee break with local sweets
- 16:30 – 18:30 Transfer to Dresden by bus



A field visit to [Noon GmbH](#) in Limbach-Oberfrohna was organized, followed by a tour of the Esche Museum. This visit focused on gaining insights into the textile manufacturing process, especially knitting, and exploring how Noon GmbH effectively minimized resource wastage – specifically water and chemicals - throughout this process. The company is equipped with 100 circular knitting machines and 25 fully electronic seamless knitting machines as well as a dye factory and textile laboratory operated by approx. 200 staff members. The [Esche Museum](#) offered an engaging exploration of industrial and local history, showcasing nearly 300 years of textile heritage. Visitors journeyed through the origins of warp knitting and discovered how stockings and gloves were produced in Limbacher Land before the mass production of artificial silk spread from here to the rest of the world. An afternoon dialogue was held between experts from Germany and Pakistan by Eva Howitz from [lokaltexil](#) and Waseem Ashraf from UNU-FLORES. The discussion aimed to share the experiences and insights from both countries' textile industries, focussing on differences and opportunities for improvement.

The textile sectors in Germany and Pakistan differ significantly in scale, focus, and labour dynamics. In the 1960s, Germany had a thriving textile sector in both East and West; however, outsourcing began in the 1950s due to rising labour costs. East Germany's textile industry functioned similarly to today's Global South, exporting textiles and apparel to Western countries. However, after reunification in 1990, the industry in East Germany faced a dramatic decline, with employment plummeting from 360,000 to 16,000 almost overnight. Today, the industry in Saxony is small but specialized, consisting of approximately 500 companies and employing 12,000 individuals. These companies primarily focus on technical textiles for industries like automotive and aerospace. Most are small enterprises, with 90% employing fewer than 50 people. Cotton spinning has disappeared, and only a few spinning mills, mostly for synthetic fibres, remain operational.

In contrast, Pakistan's textile industry is significantly larger, employing around 15 million people, which accounts for 25% of its workforce. The country is home to approximately 8,500 textile companies, including 1,300 cotton ginning companies, which alone match the total number of textile companies in Germany. Additionally, Pakistan is a major producer of knitted goods, with 2,500 companies in that sector. The significant difference in labour costs is evident, with

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Germany's minimum wage at €12.41 per hour, compared to just €120.90 per month in Pakistan. Overall, Pakistan's textile industry is not only much larger but also more labour-intensive than Germany's smaller, more specialized, and high-tech-focused industry.

Wednesday, 28 August

07:45	<i>Meeting in Pullman hotel lobby, transfer of delegation to CIPSEM</i>	10:15 – 10:30	<i>coffee break</i>
08:30 – 09:30	Input on the Partnership for Sustainable Textiles (Textilbündnis) and other relevant projects by Johannes Förster, GIZ, including discussion	10:30 – 12:00	Discussion round on "Advancing Sustainability in the Textile Industry with Focus on Global Education and Capacity Building Initiatives" , with UNU-FLORES (Prof. Dr. Edel Günther), German Federal Ministry for Economic Cooperation and Development - BMZ (Magdalena Lenhart), WWF Pakistan (Dr. Masood Arshad), moderated by CIPSEM (Dr. Anna Görner)
09:30 – 10:15	Tertiary education towards sustainability in the textile industry: Presentation of the Bachelor of Science (BSc) in Textile Engineering curriculum at Ahsanullah University Bangladesh, developed jointly with TUD Dresden University of Technology by Christina Frömder, Asha Verma, UNU-FLORES	12:00 – 13:00	<i>Lunch break</i>
	Input from delegation for fine-tuning a higher education in-classroom and online course on Sustainability in the textile industry that is being prepared as an output of a project in Bangladesh; Discussion on capacity building needs as a contribution towards follow-up activities of the exposure visit, conversation guided by UNU-FLORES	13:00 – 17:00	Input and exchange on German Supply Chain Act + European Corporate Sustainability Due Dilligence Directive with Dr. Jürgen Hannak and Carolin Grüning, adelphi <i>(including coffee break)</i>
		17:00 – 18:00	<i>buffer time, optional: Dresden walk</i>
		19:00	<i>Joint dinner (Vapiano at Frauenkirche)</i>

Following a comprehensive overview of the initiatives behind the Partnership for Sustainable Textiles presented by Johannes Foerster from GIZ, Christina Froemder from UNU-FLORES provided insights into their joint project, which aims to enhance the capacities of future university graduates entering the labour market. This project includes establishing the first university Chair for Sustainability and Textile Innovation in Bangladesh. Project activities encompass academic training and course development for BSc textile engineering students, as well as industry training with local suppliers. A final component will be the creation of an e-learning course on the Resource Nexus in the Textile Sector, which will compile insights and lessons learned throughout the project. This course is informed by a Learning Needs Assessment (LNA) conducted with project partners and external stakeholders, including the Pakistan delegation, which identified a significant need for educational and capacity building initiatives in the region. The LNA engaged a wide range of learners, including sourcing, finance, production, and design teams, as well as farmers, ginners, logistics, utilities, marketing teams, policymakers, decision-makers, research institutes, think tanks, NGOs, environmentalists, and technical staff across the supply chain. Key knowledge areas identified for these learners include understanding customer perspectives, recycling processes, international best practices, emerging technologies, relevant legislation, compliance requirements, responsible design, raw material and lifecycle assessments, and energy/environmental evaluations. The goal is for learners to feel heard, appreciated, confident, and empowered to make informed decisions. Ultimately, they should apply these learnings by improving supply chains, sourcing strategies, implementing circularity and best practices, contributing to product design, transferring knowledge, and raising awareness within their sectors.

The following panel discussion addressed the imperative of advancing sustainability in the textile industry through global education and capacity-building initiatives. The panellists explored key challenges and opportunities in integrating sustainability into educational frameworks, highlighted successful collaborations between stakeholders from Germany and Pakistan, and emphasized the necessity for practical, local solutions to enhance workforce skills and promote

responsible practices. Through sharing insights and experiences, the discussion underscored the significance of interdisciplinary approaches, knowledge-sharing, and the alignment of educational initiatives with industry needs to drive meaningful change across the textile supply chain. Prof. Guenther, UNU-FLORES, emphasised the key challenges in capacity building, highlighting the necessity of transferring knowledge effectively and understanding how to apply it within the supply chain. She stressed the importance for integrating sustainability into all areas of education rather than treating interdisciplinary approaches as an add-on. This integration should also be reflected in mandatory targets for professors. Additionally, fostering responsible consumer behaviour from an early age is crucial. Future trends in sustainability education should focus on making it a core part of all training, promoting positive engagement, and encouraging international exchanges to gain insights from both the Global North and South. This approach aims to create more informed and proactive solutions for industry challenges, ensuring that impact is considered from the outset.

Magdalena Lenhart from BMZ highlighted ongoing collaborative educational programs between Germany and Pakistan in the textile sector, with a strong focus on climate change and energy issues, particularly in Punjab. The German ministry is addressing environmental, social, and economic sustainability through partnerships, with GIZ acting as a key facilitator on the ground. GIZ supports initiatives such as the "[Dialogue on Sustainability](#)" program and is actively involved in curriculum development and industry training, tailored to meet industry needs and promote growth. Saqib Sohail from Artistic Milliners emphasized the importance of collaboration and knowledge-sharing to upskill the workforce in sustainable textile practices, moving away from a mindset of competition. He notes that all stakeholders must collaborate to avoid losses. To advance sustainable cotton sourcing at Artistic Milliners, key initiatives include partnering with WWF-Pakistan to educate 3,000 farmers on regulations and sustainable practices, ensuring they understand the consequences of non-compliance. This includes using technology such as apps to streamline these efforts. Artistic Milliners implements an internal "Sustainability Champion" program to empower staff and drive improvements, while collaborating with universities, NGOs, and start-ups on data analysis and interpretation, offering in-house training and lectures to staff. He also highlighted the challenges of interpreting data, particularly in life cycle assessment (LCA) evaluations.

Dr. Masood Arshad, WWF Pakistan, highlighted that sustainability is now a reality in the textile industry, though challenges remain. While there is an Environmental Sciences department at every university focusing on environmental topics, he pointed out that no formal policy exists specifically for environmental education; instead, it is integrated into various initiatives. To enhance effectiveness, he suggested developing stakeholders responsible for overseeing environmental sustainability education. Informally, stakeholders like WWF-Pakistan have initiated various activities related to climate mitigation. When asked if an educational policy is needed, Dr. Masood Arshad agreed, emphasizing the importance of cross-linking existing initiatives to amplify their impact. Other participants suggested integrating sustainability topics into all education rather than creating specialized courses, while the value of internships was also underlined. Aqsa Liaqat noted that in Pakistan, internships with companies, NGOs, and ministries are mandatory during the last six months, giving students exposure to different departments. Dr. Masood Arshad added that WWF-Pakistan offers internships and opportunities for students to continue working after their studies, citing examples like their eco-internship program. To ensure educational initiatives align with industry needs and global sustainability standards, Dr. Masood Arshad stressed the importance of collaboration, sharing best practices, and exchanging expertise, rather than just focusing on financial resources.

The panel discussion emphasized collaboration, practical solutions, and capacity-building for sustainability in the textile industry. Prof. Guenther advocated for replicating exposure visits across sectors, creating an alumni network as ambassadors, and establishing international internships with NGOs, industry, and ministries. She also highlighted the potential of reports influencing policy decisions and adapting the ABCD-Centre programme for internships. Saqib Sohail highlighted the importance of vocational training, clear guidelines for sustainability, and linking stakeholders through university-industry collaboration for practical research. He stressed the importance of local solutions and innovation. Dr. Masood Arshad proposed a two-tiered approach: international collaboration and local problem-solving, suggesting a national chair on sustainability. Magdalena Lenhart emphasized the need for action to implement ideas in factories, noting a gap between ambition and execution. Together, the panellists called for structured collaboration, practical education, and local solutions to drive sustainability across the textile supply chain.

Session on EU and German Due Diligence Legislation

During the afternoon presentation, Dr. Juergen Hannak and Carolin Gruening from Adelphi highlighted the key points of the European Corporate Sustainability Due Diligence Directive (EU-CSDDD) and the German Supply Chain Due Diligence Act (LkSG), which aim to enforce environmental and human rights standards in supply chains. They explained that companies must move from voluntary corporate social responsibility (CSR) to mandatory due diligence, with a strong focus on sustainability, human rights and environmental protection. These changes present both challenges and opportunities for suppliers, especially in countries like Pakistan where the textile industry is a major supplier to European markets.

For Pakistan, preparation involves several steps. Key recommendations include:

1. Understand the legislation: Pakistani companies need to familiarise themselves with the requirements of the EU CSDDD and LkSG, which include monitoring and mitigating risks related to human rights and environmental abuses throughout the supply chain.
2. Implement risk management systems: Companies need to assess their supply chain for risks related to labour conditions, environmental practices and human rights abuses. Establishing effective risk management and monitoring mechanisms will be essential.
3. Transparency and documentation: Pakistani suppliers should improve transparency by collecting data on their operations, including supply chain information, compliance and human rights impacts. This information will be crucial for reporting to EU and German buyers.
4. Collaboration and capacity building: Collaboration with European customers, NGOs and local governments will help Pakistan's textile industry adapt to the new regulations. Efforts should focus on worker training, compliance with environmental standards and the use of best practices from EU guidelines.

During an engaging discussion, Adelphi emphasised that early adoption and proactive compliance will give Pakistani suppliers a competitive advantage, particularly as the due diligence requirements become stricter over the coming years.

Thursday, 29 August

Site visits

- 07:45 Meeting in Pullman hotel lobby
08:00 departure by chartered bus to Bitterfeld-Wolfen
10:00 – 11:30 **visit to SOEX Recycling Germany GmbH**, pioneer in **textile recycling** (large sorting plant in Bitterfeld-Wolfen) with Johannes Leis (STFI), ITM
11:45 – 12:30 transfer to Dessau by bus
12:30 – 13:30 lunch break (canteen of German Environment Agency)
13:30 – 15:20 **Exchange** with Brigitte Zietlow (German Environment Agency – III 1.1. General Aspects of Product-related Environmental Protection, Sustainable Consumption, Innovation Programme) **on environmental standards in the textile and shoe sector, BREFS - best available techniques reference documents**
15:20 - 15:40 Perspective on Pakistan's recently approved National Adaptation Plan, insights to upcoming laws & policy by Ms. Aqsa Liaqat, representing the Pakistan Ministry of Climate Change and Environmental Coordination (tbc)
15:40 – 18:30 Transfer to Dresden by bus



Photo: Thato Masire

The delegation and the UNU-FLORES team visited a textile sorting and fibre-to-fibre recycling plant by the SOEX Group in Bitterfeld-Wolfen. SOEX, a pioneering company in textile recycling, manages one of the largest facilities of its kind in Europe, specializing in processing and recycling waste clothes into fibres. Claudia Meier from SOEX, along with Johannes Leis from [STFI](#), explained the company's process, which begins with the arrival of textiles collected from sorting boxes and take-back schemes across Europe. The collected clothes are then segregated and sorted for reuse, with material composition and colour identified for potential pure recycling. Of the collected textiles, 80% are prepared for reuse, 10% are recycled, and the remaining 10% is incinerated, marking the end of their life cycle. Before COVID-19, the plant operated across three shifts with nearly 400 employees, processing approximately 350 tonnes of material per day. However, due to the impact of COVID-19, global conflicts, political tensions, new regulations, and the increased sorting costs due to labour-intensive processes, production volumes have decreased significantly. The plant now operates only one shift per day at its location in Germany, with some operations outsourced to Dubai. The company invests in innovation of its machinery but has received limited support from universities in this area, highlighting an opportunity for further collaboration in innovation.

The second half of the visit was spent in the German Environment Agency (in German "Umweltbundesamt", UBA) office in Dessau. UBA is one of four agencies affiliated with the German Ministry of Environment. Dessau hosts the headquarter of the agency, 9 other offices and 7 measurement stations are spread across Germany, including rural areas. UBA's mission is to protect citizens by ensuring a healthy environment with clean air, water, and minimal pollutants. The agency gathers comprehensive data on the state of the environment, investigates environmental interrelationships, conducts research, and provides science-based policy advice to federal bodies like the Ministry for the Environment. UBA also helps develop environmental regulations and supports public education on sustainability. Brigitte Zietlow, a senior expert on sustainable production from UBA, presented the agency's work in various countries, focussing on Best Available Techniques (BAT). In the EU, BAT is guided by the Industrial Emissions Directive (IED), which mandates companies to obtain integrated environmental permits. These permits include emission limits, monitoring requirements, and operational conditions to protect the

environment. The textile and leather industries, like others, follow BAT standards, which are detailed in sector-specific reference documents (BREFs), with the [latest version for the textile industry issued in 2023](#). UBA also provides technical support to other national or sub-national governments, often developing Decision Support Systems (DSS) upon request. One example is the State of Gujarat in India where UBA collaborated with local stakeholders to adapt DSS for regional needs, particularly for applications relevant to the textile industry.

German textile facilities must comply with all regulations when opening and obtaining permits. Regular inspections are conducted, either annually or every three years, depending on the site's environmental impact and state regulations. Additionally, there are unannounced spot checks. Companies also engage in self-monitoring to ensure compliance with legal regulations, maintaining records that may be submitted to authorities or used during annual inspections, depending on the region. In contrast, in Pakistan's industry, it was noted that audits, inspections, and other visits to ensure compliance with regulatory requirements from brands, the EU, other customers, and independent agencies can occur on as many as 300 out of 365 days a year.

In further response to the presentation by UBA and other discussions throughout the week, the representatives of the Pakistan delegation shared their perspectives and provided an update on the best practices within their institutions. Artistic Milliners has already made significant strides in sustainable practices, starting with "low-hanging fruits" and good maintenance to reduce costs. **"The most important point,"** said Saqib Sohail, **"is the management of data to identify the hotspots to address first."** He also found it highly beneficial to exchange best practices and challenges at the local level to share ideas with other industries. General Electric is working on sustainability measures and was recommended by the UN Fashion Charter to collaborate with Artistic Milliners. Circular Fashion, which focuses on eco-design and product identification, also conducted a workshop at Artistic Milliners. **"It requires a hunger to learn,"** said Saqib, emphasizing the need to seek out resources and network with collaborators to tackle these challenges collectively. "In the end, the business needs to run; it is not an NGO, so there is always the pressure to make a profit." Kamran Zia, from Naveena Exports limited, added, **"90% of initiatives to move towards sustainable production make economic sense. This is a business case, and it has to be viable."**

The insights from the German Environmental Agency were complemented by further insights from Aqsa Liaquat, representing the [Pakistan Ministry of Climate Change and Environmental Coordination](#). The ministry is responsible for implementing climate change projects and securing financing. There are 13 policies currently in place, with one on carbon credits nearing finalization. A National Action Plan was introduced in 2023 (the document can be found [here](#)), focusing on mitigation and adaptation. Pakistan, highly vulnerable to climate change, saw significant damage from the 2022 floods, costing \$3.48 billion. The aim is to build a resilient Pakistan and support vulnerable communities through agriculture, urban resilience, and social inclusion. Funding relies on support from developed countries, but competition has shifted to project-based funding, supplemented by Pakistan's government. Climate action must reach the grassroots, with provinces contributing action plans to the National Adaptation Plan (NAP). Organizations like GIZ provide grants, while the ministry has established four new units, including a project preparation facility, to enhance project competitiveness. Additional initiatives include policies for trading markets, urban development, and a national climate finance strategy. Capacity issues in both government and private sectors slow progress, but efforts are underway to strengthen expertise.

Pakistan also supports [UNFCCC's initiative](#) on climate action, which requires bi-annual transparency reports, and a long-term low-emission strategy is in the planning stage. The funding

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gap is estimated at \$9-15 billion for Pakistan annually, which indicates the extent of the impending difficulties. Despite challenges, progress is being made, with projects partially funded by sources like the Green Climate Fund.

Annexure 3: Feedback from the participants

Feedback from the textile exposure visit showed a very positive response from participants. Most rated the overall content and presentations as excellent, with 100% of respondents stating that the presentations were of high quality and that the speakers were knowledgeable and engaging. The diversity of stakeholders represented was highly appreciated, bringing in all different voices and perspectives.

Adelphi's sessions on German and EU supply chain legislation were particularly highlighted for their detailed knowledge sharing. The site visits were also well-received, with impactful takeaways on the need for improvement in the textile industry, particularly in terms of sustainability practices and value addition. Some participants mentioned intentions to collaborate more, share knowledge, and align with the EU Green Deal. Suggestions for improvement included more workshop-based activities and more frequent training sessions, although the overall training was considered useful, although somewhat tiring.