



Study for a Regulatory Framework to Enable Recycling of Post-Industrial Waste (JHUT) for the RMG Industry in Bangladesh

A Study for a Regulatory Framework to Enable Recycling



Implemented by:
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

H&M Group

In cooperation with:



GIZ STILE project –

STUDY FOR A REGULATORY FRAMEWORK TO ENABLE RECYCLING OF POST – INDUSTRIAL WASTE (JHUT) FOR THE RMG INDUSTRY IN BANGLADESH

Published by the

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn, Germany

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With support from

Services and Solutions International Ltd. (SSIL)

On behalf of

German Federal Ministry for Economic Cooperation and Development (BMZ)

Dhaka, June 2024

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Abbreviations and Acronyms

BGMEA	Bangladesh Garment Manufacturers and Exporters Association
BKMEA	Bangladesh Knitwear Manufacturers and Exporters Association
BTMA	Bangladesh Textile Mills Association
BTTC	Bangladesh Trade and Tariff Commission
DIFE	Department of Inspection for Factories and Establishments
DoE	Department of Environment
ECA	Environment Conservation Act
EPR	Extended producer responsibility
GFA	Global Fashion Agenda
GIZ	Deutsche Gesellschaft fuer Internationale Zusammenarbeit
MoC	Ministry of Environment and Forestry
NBR	National Board of Revenue
NGO	Non-governmental organisation
PET	Polyethylene terephthalate
PPP	Public-private partnership
PPWD	Packaging and Packaging Waste Directive
RMG	Ready-Made Garment
SDG	Sustainable Development Goal
SME	Small and medium-sized enterprise
STILE	Programme for Sustainability in the Textile and Leather Sector
VOC	Volatile organic compounds
WFD	Waste Framework Directive
WEEE	Waste Electrical and Electronic Equipment Directive (WEEE Directive)

Executive Summary

Bangladesh's textile industry has significant potential to use the circular economy for the next stage of product innovation and upgrading the sector's industrial structure. This will require formalising the currently highly informal post-industrial textile waste (Jhut) economy and trade. However, existing political economy challenges have so far prevented an inclusive and socially just transition of the sector.

This report proposes measures and regulatory reforms to create an effective management framework for post-industrial textile waste (Jhut) in order to accrue maximum economic, social and environmental benefits from the Jhut supply chain in Bangladesh.

Based on the findings, the following are some of the most important recommendations that are needed to transform the Jhut sector:

- **Collaborative Stakeholder Engagement:** There is a critical need for enhanced collaboration among key stakeholders, including government bodies, manufacturers, NGOs, and recycling companies. Joint efforts are essential in developing and implementing sustainable infrastructure, adopting innovative technology, and establishing efficient waste management systems. This collaborative approach would facilitate the sharing of resources, expertise, and responsibility, leading to more impactful results.
- **Protection of Workers' Rights and Safety:** The report stresses the importance of enforcing existing labour laws and introducing new regulations to safeguard the rights and safety of workers in the Jhut recycling industry. This includes ensuring proper occupational health and safety standards, eliminating child labour, and addressing gender-based challenges. Strengthening these protections will not only improve working conditions but also contribute to the overall well-being and dignity of the workforce, which is crucial for sustainable industry practices.
- **Promotion of Circular Textile Economy Practices:** Encouraging the adoption of a circular economy within the textile industry is vital. Brands and suppliers need to take the lead in this transformation by incorporating recycled materials into their product lines, thereby setting an industry standard for sustainable production. This approach will not only help in reducing waste but also in fostering consumer awareness and demand for eco-friendly products. The promotion of circular economy principles will drive innovation and open new markets for recycled products, contributing to both environmental sustainability and economic growth.
- **Capacity Building and Technology Adaptation:** Investing in the development of advanced recycling technologies and building the capacity of local enterprises is essential for the effective management of Jhut. This includes training programmes for workers, technological upgrades in recycling processes, and research into new methods of waste conversion. Such initiatives would improve the quality and efficiency of recycling, reduce environmental impact, and enhance the competitiveness of the Bangladeshi textile industry in the global market. In recent years, Bangladesh has seen various initiatives aimed at attracting innovative recycling technologies. However, challenges persist, including insufficient transparency, particularly within the informal sector.

Six key policy solutions for the informal textile Jhut sector in Bangladesh were developed based on the in-depth analysis, interviews and stakeholder consultations:

1. Improve data availability, transparency and traceability through a national Jhut database
2. Introduce industry guidelines for Jhut management and recycling standards
3. Implement changes in existing VAT and tariff rules for Jhut transactions
4. Provide economic incentives to formalize Jhut collection, handling and sorting
5. Establish a central depository system and cluster-based Jhut sorting hubs for decent work and social inclusion
6. Improve investment environment for state-of-the-art recycling technologies

In addition to these six policy recommendations for inclusion of informal sector stakeholders, the report proposes a set of recommendations for wider shift towards circular and sustainable textile sector:

Ensuring the enforcement of existing waste management policies: Strengthen regulatory frameworks and enforcement mechanisms to ensure compliance with existing waste management policies, especially the Solid Waste Management Rules 2021, for the textile sector. Increase monitoring and inspection efforts to ensure compliance.

Addressing incineration of textile waste: Implement comprehensive measures to mitigate the incineration of textile waste, such as promoting recycling and upcycling initiatives by factories. Collaborate with industry stakeholders to establish guidelines for responsible disposal methods, prioritizing reuse and recycling over incineration, as part of the industry guidelines for Jhut management.

Economic incentives for factories to upgrade boilers for heat generation: Introduce financial incentives for factories to transition to cleaner and more efficient boiler systems. This could include tax breaks, grants, or subsidies for the installation of energy-efficient boilers or the adoption of renewable energy sources such as biomass or solar thermal energy.

Adopt effective approaches from other countries for informal sector inclusion of wastepickers and economic incentives schemes: Identify key lessons learned and best practices on formalization from other textile producer countries like Turkey or Thailand that can be adapted to the local context. Customize proven approaches to suit the specific needs and challenges of Bangladesh's domestic textile industry, taking into account factors such as infrastructure, regulatory framework, and socio-economic dynamics.

Consider the development of a national strategy for circular textile: Formulate a comprehensive national strategy for circular textile management to guide the transformation of the sector over the next 5-10 years, encompassing the entire lifecycle of textile products from production to disposal.

Extended Producer Responsibility: The government of Bangladesh should explore the application of an Extended Producer Responsibility (EPR) system for Jhut waste and other textile materials released into the domestic market. Based on the EPR system that is currently under development for plastic waste, a related EPR system that would make textile manufacturers responsible for the entire lifecycle of their waste and by-products would address issues relating to Jhut management such as reporting, traceability and sources for financial incentives.

Introduction

Bangladesh's textile and ready-made garment (RMG) industry, a vital contributor to its economy, is currently facing significant environmental and social challenges due to the inefficient management of post-industrial textile waste, commonly referred to as Jhut. This issue presents a complex web of environmental hazards, health risks, and human rights concerns, deeply rooted in the industry's practices and supply chain management. The annual production of an estimated 330,000 – 500,000 tonnes of pre-consumer textile waste¹, with a very limited recycling capacity, highlights a critical gap in sustainable industrial waste management and impediment to move towards a circular textile industry. The disposal methods currently employed result in detrimental environmental impacts, including air pollution, resource depletion, and harmful chemical leaching, posing severe threats to ecosystems and public health. Furthermore, due to lack of comprehensive policy framework on circular textile that would incentivize the industry entrepreneurs to upgrade recycling of post-RMG Jhut, Bangladesh has been missing out on a potential export business of recycled textile products worth US\$4.0-5.0 billion per year.²

To identify possible solutions, the Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and H&M commissioned this research study titled “Regulatory Framework that Enables Recycling of Post-Industrial Waste (“JHUT”) for the Ready-Made Garment (RMG) Industry in Bangladesh” under the Programme for Sustainability in the Textile and Leather Sector (STILE). The study includes an analysis of the informal Jhut sector, supported by a survey with informal sector workers across several Jhut clusters in Bangladesh (PART 1). An analysis of the current existing regulatory framework in Bangladesh and a gap analysis with international circular textile policies is provided (PART 2). Based on the analysis, a set of actionable policy recommendations was developed (PART 3), supported by a focus group discussion with key stakeholders from government and business that was held in Dhaka on 5 February 2024.

The aim of this study is to propose measures and regulatory reforms to create an effective management framework for post-industrial textile waste (Jhut) in order to accrue maximum economic, social and environmental benefits from the Jhut supply chain in Bangladesh. Furthermore, the findings and recommendations of the study can contribute to a Just Transition pathway towards formalizing the informal RMG Jhut sector.

Part 1 of this report provides a thorough investigation into the challenges posed by the informal Jhut sector in Bangladesh. Through a multidisciplinary approach involving an extensive literature review, stakeholder analysis, field studies, and case evaluations, it provides insights into the current Jhut economy and waste management system.

¹ Estimates vary widely depending on sources, e.g. the Global Fashion Agenda and McKinsey estimate 330,000 tonnes per year, Syrett H., Sawers C., Stenholm M. and Runnel A. (2021), “Scaling Circularity: Lessons learned from the Circular Fashion Partnership for building pre-competitive collaborations to scale upstream fashion systems”, McKinsey and Company and Global Fashion Agenda Report. Other sources such as Textile Today in this article states 400,000 tonnes, <https://www.textiletoday.com.bd/bangladesh-can-earn-us-6-0bn-by-textile-garment-waste>, another article citing Reverse Resources estimates 500,000 tonnes annually <https://www.lightcastlebd.com/insights/2023/08/textile-waste-opportunity/>

² Syed Mansur Hashim, "Time to utilize Jhut gainfully", The Financial Express, Aug 12, 2023; URL: <https://thefinancial-express.com.bd/views/columns/time-to-utilise-jhut-gainfully>

The following are the key findings that were identified through the in-depth research on the Jhut sector:

- **Environmental Impact:** The findings underscore the significant environmental impact associated with the disposal and treatment of Jhut. When disposed of through incineration or landfill, it releases toxic emissions and chemicals, exacerbating air pollution, resource depletion, and chemical leaching. These practices not only degrade the immediate environment but also contribute to broader global environmental challenges. It is worth noting, however, that such practices are not prevalent in Bangladesh. Onsite incineration occurs primarily in Jhut boilers, mainly in denim and woven factories, while data on offsite incineration and controlled landfilling sites are scarce. Our recommendations include conducting a comprehensive study across the apparel and textiles industry in Bangladesh to identify the types, volumes, and methods of post-industrial waste disposal.
- **Health and Safety Risks:** The study highlights the hazardous working conditions faced by workers in the Jhut recycling sector. They are routinely exposed to dangerous work environments, lack adequate protective gear, and come into contact with harmful chemicals. These conditions lead to a range of health problems, emphasizing the urgent need for improved occupational health and safety measures.
- **Human Rights Concerns:** The analysis highlights significant human rights issues within the sector, including poor labour conditions, the prevalence of child labour, and specific challenges faced by female workers. These findings indicate a severe violation of Bangladesh's labour rights and call for immediate attention and action to protect these vulnerable groups.
- **Political economy risks:** There are some potential threats that could arise if factory owners setting practices to implement Jhut recycling. There is a risk of encountering direct influence or restrictive measures imposed by local political entities, which could hinder the recycling initiative's progress. Furthermore, beyond specific party agendas, there might be broader political pressures or influences that could affect the sustainability of the Jhut business.

Based on the findings, the following are some of the most important recommendations that are needed to transform the Jhut sector:

- **Collaborative Stakeholder Engagement:** There is a critical need for enhanced collaboration among key stakeholders, including government bodies, manufacturers, NGOs, and recycling companies. Joint efforts are essential in developing and implementing sustainable infrastructure, adopting innovative technology, and establishing efficient waste management systems. This collaborative approach would facilitate the sharing of resources, expertise, and responsibility, leading to more impactful results.
- **Protection of Workers' Rights and Safety:** The report stresses the importance of enforcing existing labour laws and introducing new regulations to safeguard the rights and safety of workers in the Jhut recycling industry. This includes ensuring proper occupational health and safety standards, eliminating child labour, and addressing gender-based challenges. Strengthening these protections will not only improve working conditions but also contribute to the overall well-being and dignity of the workforce, which is crucial for sustainable industry practices.
- **Promotion of Circular Textile Economy Practices:** Encouraging the adoption of a circular economy within the textile industry is vital. Brands and suppliers need to take the lead in

this transformation by incorporating recycled materials into their product lines, thereby setting an industry standard for sustainable production. This approach will not only help in reducing waste but also in fostering consumer awareness and demand for eco-friendly products. The promotion of circular economy principles will drive innovation and open new markets for recycled products, contributing to both environmental sustainability and economic growth.

- **Capacity Building and Technology Adaptation:** Investing in the development of advanced recycling technologies and building the capacity of local enterprises is essential for the effective management of Jhut. This includes training programs for workers, technological upgrades in recycling processes, and research into new methods of waste conversion. Such initiatives would improve the quality and efficiency of recycling, reduce environmental impact, and enhance the competitiveness of the Bangladeshi textile industry in the global market.

In recent years, Bangladesh has seen various initiatives aimed at attracting innovative recycling technologies. However, challenges persist, including insufficient transparency, particularly within the informal sector. The prevalence of informal practices, coupled with constraints in renewable energy and a dearth of supportive policies and legislation, has led to a shifting preference towards Vietnam and Indonesia as favoured destinations for recycling industries.

PART 2 of the report evaluates the legal framework of RMG Jhut recycling in Bangladesh with the objective to strengthen circular textile economy solutions. It provides a thorough review of the current regulatory framework that governs the management of post-industrial waste (Jhut) in the RMG sector in Bangladesh. Furthermore, a comprehensive analysis of the existing international and national laws and policies concerning the management of this “waste” stream is provided.

There are several legal frameworks and policies in place in Bangladesh which could be applied to address the solid waste management issue as they promote waste reduction, segregation and recycling. However, none of these regulatory frameworks and programmatic actions comprehensively and specifically address the issues of informal textile Jhut management. The existing legislative and policy instruments in Bangladesh do not sufficiently address the issues of circular economy enough to properly regulate the management of the Jhut.

The following are the key findings that were identified through the in-depth research on the RMG legal framework:

- The National Environmental Policy 2018 could provide a suitable policy framework for introducing circularity in the apparel manufacturing and textile Jhut management.
- The Solid Waste Management Rules 2021 provide room for the government of Bangladesh to coordinate the management of pre-consumer RMG Jhut. The Rules introduced fundamental principles of solid waste management and extended producer responsibility (EPR), but these are currently not implemented in relation to Jhut management and other post-industrial textile waste.

- The Bangladesh Labour Act from 2006 provides that effective arrangements must be made in every establishment for disposal of wastes and effluents due to the manufacturing process carried on therein. The Labour Act also contains necessary provisions to address hazardous working conditions and child labour in the Jhut sector.

Furthermore, the current regulatory framework in Bangladesh lacks effective alignment with the emerging legal frameworks in EU and the international legal environment for circularity in textile manufacturing and waste management. There is a necessity of overall reforms of Bangladesh's environmental regulatory mechanism for encapsulating the whole Jhut supply chain.

An enabling regulatory framework and strong incentives is required to ensure that the reuse and recycling of post-industrial waste adheres to upcoming international regulations and the long-term plans of international buyers.

PART 3 of the report provides recommendations for legislative and policy reforms:

Six key policy solutions for the informal textile Jhut sector in Bangladesh were developed based on the analysis and stakeholder consultations:

These recommendations are presented in a sequence of policies actions that build on each other. More details on each of these actions are provided in PART 3.

1. Improve data availability, transparency and traceability through a national Jhut database
2. Introduce industry guidelines for Jhut management and recycling standards
3. Implement changes in existing VAT and tariff rules for Jhut transactions
4. Provide economic incentives to formalize Jhut collection, handling and sorting
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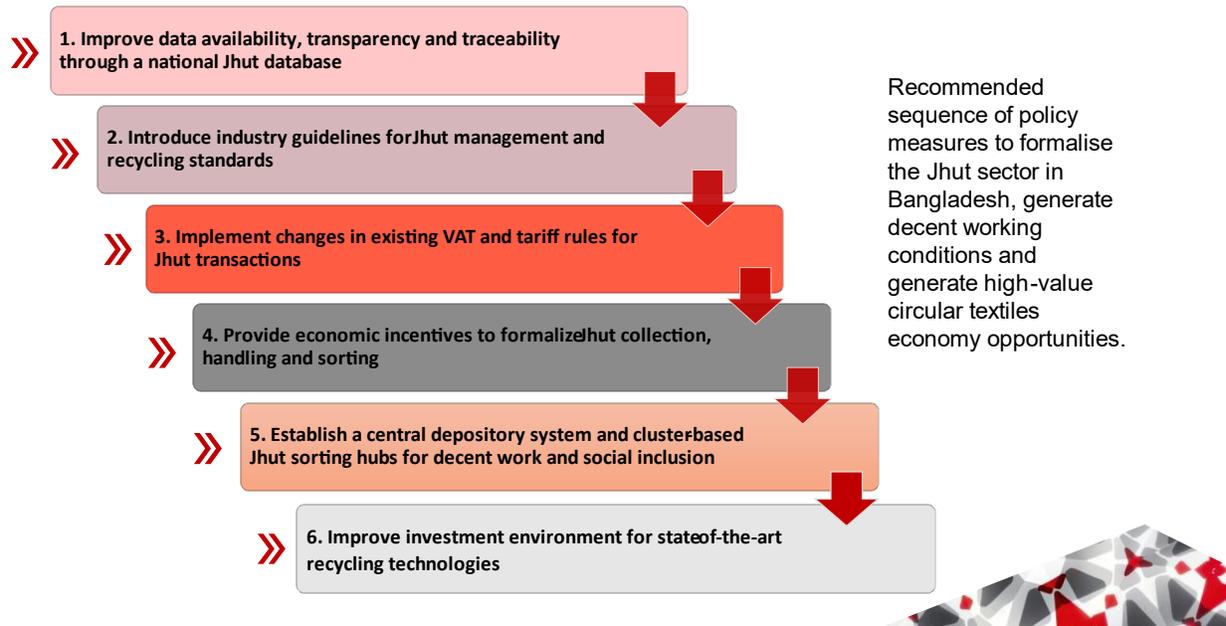


Figure 1: Recommended sequence of policy measures to formalize the Jhut sector in Bangladesh

In addition to these six policies for inclusion of informal sector stakeholders, the report proposes a set of recommendations for wider shift towards circular and sustainable textile sector:

Ensuring the enforcement of existing waste management policies: Strengthen regulatory frameworks and enforcement mechanisms to ensure compliance with existing waste management policies, especially the Solid Waste Management Rules 2021, for the textile sector. Increase monitoring and inspection efforts to ensure compliance.

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Economic incentives for factories to change boilers for heat generation: Introduce financial incentives for factories to transition to cleaner and more efficient boiler systems. This could include tax breaks, grants, or subsidies for the installation of energy-efficient boilers or the adoption of renewable energy sources such as biomass or solar thermal energy.

Adopt effective approaches from other countries for informal sector inclusion of waste pickers and economic incentives schemes: Identify key lessons learned and best practices that can be adapted to the local context. Customize proven approaches to suit the specific needs and challenges of Bangladesh's domestic textile industry, taking into account factors such as infrastructure, regulatory framework, and socio-economic dynamics.

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These recommendations are ‘no regret’ strategies that will help to ensure long-term competitiveness and sustainability of the Bangladesh RMG sector. Furthermore, they will help to ensure meeting upcoming requirements from markets in the EU and US regarding due diligence and material traceability. The issues of gender and Just Transition principles should be considered in all policy areas. The recommendations consider feasibility, benefits, and challenges, and identify responsible government bodies and potential timelines for implementation.

The management of Jhut waste in Bangladesh presents both a challenge and an opportunity. By adopting the recommended strategies, there is a potential to transform this critical issue into a model for sustainable industry practice. It requires a collective effort from all stakeholders - government, industry leaders, NGOs, workers, and consumers - to create a sustainable, ethical, and profitable textile industry. The implementation of these recommendations will not only address the immediate concerns related to Jhut, but also pave the way for a more sustainable future for the textile industry in Bangladesh and beyond.

PART 1 – Bangladesh’s Jhut Sector Analysis

Chapter 1: Background

In recent years, an in-depth exploration of Bangladesh's textile and apparel industry waste management has brought the challenge of Jhut to the forefront. Classified as post-industrial waste, Jhut encompasses fabric scraps, yarn, and additional residues emerging from production processes. Based on studies conducted by Reverse Resources, Bangladesh has an existing recycling capacity for apparel-grade recycled yarns ranging between 18,000 to 24,000 tonnes annually. Intriguingly, this only represents a modest 5 - 7% of the expansive 330,000 – 500,000 tonnes of 100% cotton and cotton-elastane waste produced every year.³ Less than 5% of this waste is upcycled into products such as rag rugs, rag dolls, blankets, etc. A significant portion, over 55%, is exported to recycling companies globally, while the remaining waste is downcycled into stuffing materials for cushions and mattresses, incinerated onsite for waste-to-energy purposes, and a negligible amount is landfilled. In Bangladesh, comprehensive data regarding Jhut waste remains incomplete. While formal practices are tracked and documented, the extent of informal Jhut collection and management practices remains uncertain. This pronounced disparity underscores the vast potential for enhancing Bangladesh's textile recycling infrastructure.

Such disposal practices yield substantial environmental impacts. From polluting water bodies to releasing toxins into the atmosphere, the environmental footprint of Jhut disposal is increasingly evident. This opens the dialogue to potential intervention areas that can alleviate the dual burden of environmental degradation and public health concerns. Strategic measures encompass enhancing Jhut recycling rates, championing efficient waste management practices, and amplifying public awareness campaigns on the adverse effects of Jhut pollution.

In the global context, an evolving narrative around sustainability in the textile sector is shaping the operations and strategies of major brands. A pronounced push towards integrating circularity in value chains is evident, with entities such as H&M and GIZ at the forefront of these initiatives. Significantly, regulatory frameworks, particularly from bodies like the European Union, are edging towards stricter mandates and instating extended producer responsibilities.

This global shift offers Bangladesh a multifaceted opportunity. On one hand, aligning with these international sustainability goals holds promise for elevated trade and partnership prospects. On the other, the drive to formalize and institutionalize the informal Jhut sector could usher in a new era of circular economy models and formal employment opportunities in the country.

³ Syrett H., Sawers C., Stenholm M. and Runnel A. (2021), “Scaling Circularity: Lessons learned from the Circular Fashion Partnership for building pre-competitive collaborations to scale upstream fashion systems”, McKinsey and Company and Global Fashion Agenda Report.

Chapter 2: Methodology

The methodology delineated below, spanning four distinct phases, strived to capture the complexity of the issue, engage diverse stakeholders, and propose actionable, sustainable solutions.

Phase 1: Preliminary Assessment and Mapping

1. Literature Review and Benchmarking:

- Begin with a comprehensive review of existing literature, industry reports, and studies related to the informal Jhut sector in Bangladesh and similar sectors globally.
- Identify best practices from similar sectors internationally, for instance, how India's informal waste sector has evolved.

2. Stakeholder Mapping and Engagement:

- Create a visual representation to identify and categorize the key stakeholders in the current informal Jhut business scenario, including their interests, threats, and potential dangers.
- Preliminary engagement with these stakeholders to understand their initial perspectives.

3. Field Surveys and Observational Study:

- Embark on field visits to key Jhut business locations for a first-hand observational study.
- This phase would also involve structured interactions with local workers and business owners to grasp their day-to-day operations, challenges, and opportunities.

Phase 2: In-depth Analysis

4. Occupational Health, Safety, and Environmental Impact Analysis:

- Delve deeper into conducting a risk assessment to identify and quantify occupational health and safety hazards in the sector.
- Analyse the environmental implications of current informal practices, focusing on tangible parameters like pollution levels, waste mismanagement, and resource misuse.

5. Technological and Infrastructure Assessment:

- Carry out a technical evaluation of existing recycling methods, machinery, and technologies available in Bangladesh.
- Investigate the market, operational, and technical barriers hindering the introduction of advanced Recycling-Machines in the country.

6. Case Study Development:

- Identify a few representative Jhut businesses and chart their end-to-end operations, challenges, and successes.
- Document best practices and key learnings from these businesses, e.g., a Jhut business that has successfully transitioned to a more formal setup.

Phase 3: Hypothesis Generation and Validation

7. Hypothesis Formulation:

- Based on data and insights collected in phases 1 and 2, develop structured hypotheses on how to effectively transition the informal sector into a formal system.

8. Focus Group Discussions and Workshops:

- Organize a series of focused group discussions involving workers, business owners, community leaders, and other stakeholders.
- Conduct stakeholder workshops aimed at brainstorming, hypothesis validation, and solution ideation.

9. Risk and Opportunity Analysis:

- Deep dive into evaluating the risks associated with formalizing the informal sector, like regulatory challenges or potential job displacements.
- Parallely, assess the potential upsides and incentives of transitioning into a formal system, for instance, increased profitability or access to broader markets.

Phase 4: Strategy Formulation and Recommendation

10. Shared Responsibility Model and Advocacy:

- Develop a shared responsibility framework, detailing the roles, duties, and potential collaborations between different stakeholders.
- Draft a phased advocacy and incentive plan, outlining step-by-step actions, responsible parties, and expected outcomes. Use examples from sectors or regions where such models have worked effectively.

Chapter 3: Research Findings - Primary Data from Bangladesh's Jhut Sector

Based on the survey of 180 respondents in the Jhut industry:

- Gender Distribution: Among 75 respondents, 60% were men and 40% were women.

4.1 Purchasing Jhut

As per the survey, the primary purchasers of Jhut (textile waste) from factories are categorized into four main groups:

1. Traders, who act as middlemen, buying Jhut to sell it to various entities that can repurpose or recycle it.

2. Recycling companies, which specialize in processing textile waste to reclaim usable materials.
3. Local Jhut industries, which are small-scale operations that directly utilize Jhut for producing various products.
4. Incinerator boilers, which are facilities that use Jhut as a fuel source for energy recovery.

These buyers form the backbone of the Jhut recycling and disposal chain, each playing a critical role in the ecosystem of textile waste management. As per the survey responses, local traders and Jhut businesses collect approximately 72.97% of the Jhut, who either sell Jhut to recycling businesses or process it themselves. Formal recycling companies & exporting account for about 25.68%. 18.92% of respondents shared that they recycle Jhut at their own factories, while the remaining 31.08% incinerate Jhut in the boilers.



Figure 2: Primary purchasers and end-use of Jhut materials

4.2 Classification of Jhut:

The classification of Jhut, as depicted in the image, encompasses five distinct categories, illustrating the diverse spectrum of textile waste generated by the industry.

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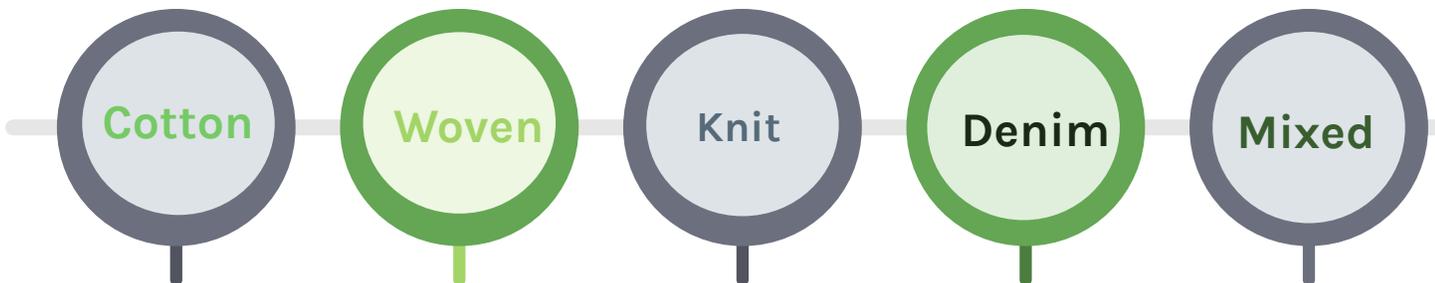


Figure 3: Classification of different Jhut materials

Cotton Jhut derives from the remnants of pure cotton fabric production, prized for its natural and biodegradable qualities. Woven Jhut refers to scraps from the production of woven fabrics, which may include a range of materials such as cotton, silk, or polyester blends, and is distinguished by its interlaced thread structure. Knit Jhut comprises waste from knit fabric manufacturing, known

for its stretch and versatility, commonly used in casual wear. Denim Jhut, with its robust, twilled construction, originates from the production of denim clothing and is often sought after for its durability and iconic style. Lastly, Mixed Jhut represents an amalgamation of various fabric scraps, offering a heterogeneous mix of fibres that can be sorted for recycling or upcycling.

4.3 Releasing Jhut

34% of the surveyed entities release 1-5 tons of Jhut per week, while a significant majority of 67% release more than 5 tons of Jhut per week. This suggests a considerable generation of textile waste by the respondents, highlighting the scale of Jhut production. In terms of the frequency of Jhut release, the majority, 53%, do so on a weekly basis, followed by 33% who release Jhut daily. A smaller segment, 7%, releases Jhut monthly, and the remaining 7% release it as required. The data points to a predominantly routine and high-frequency schedule of Jhut release in the sector, emphasizing the continual nature of textile waste management and the need for efficient disposal or recycling systems.

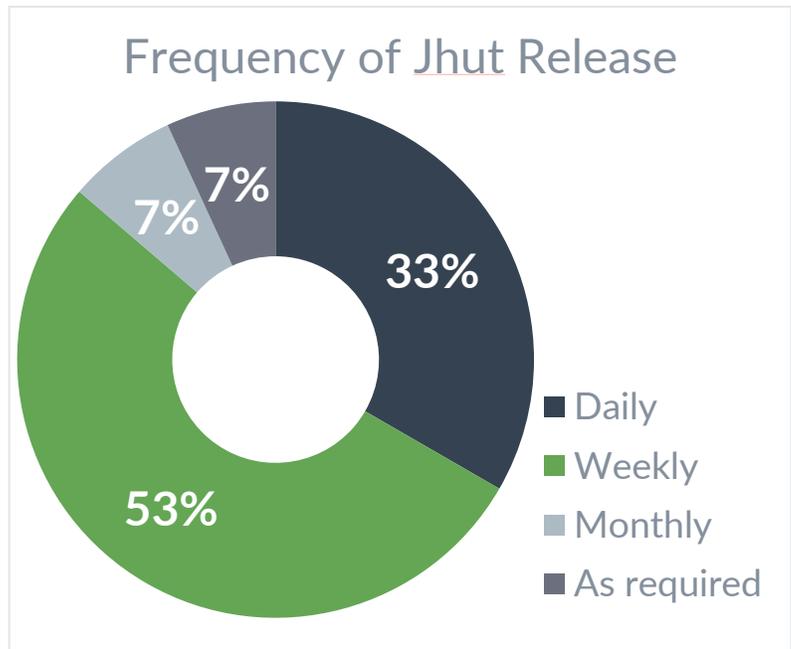


Figure 4: Frequency of Jhut release from factories

4.4 Challenges

The primary issues identified by the survey can be broken down into several key areas:

1. **Sorting Jhut:** This is recognized as a repetitive and labour-intensive task that has been identified by most respondents as a primary challenge. Efficient sorting is crucial for recycling and reusing materials, but it requires considerable manual effort and time.
2. **Releasing Jhut as Quickly as Possible:** Factories face the challenge of promptly disposing of or releasing waste to avoid accumulation and potential interference with production processes.
3. **Increasing Productivity:** As per the survey, there is a clear need for more efficient waste management processes that align with production goals. As per the respondents, the Jhut generated seem to be hindering productivity, indicating that improvement could lead to both enhanced waste management and increased factory output.

Figure 5: Amount of Jhut released per week

4. **Reducing Waste with Proper Design:** Another aspect shreds by the respondents were, absence of a proactive approach to waste management, they emphasize the skill gap in improving design practices to ensure that production is as waste-free as possible.

The challenges are further elaborated, highlighting concerns with the roles that political leaders, internal management, government officers, and entities such as the National Board of Revenue (NBR) or Department of Inspection for Factories and Establishments (DIFE) play in this context. Quality assurance also emerges as a challenge, implicating the need for maintaining product standards while recycling Jhut. These challenges reflect the complex interplay between production efficiency, regulatory compliance, and environmental management within the textile industry.

4.5 Threats

There are some potential threats that could arise if factory owners set a strategy to implement Jhut recycling within their own premises:

1. **Influence or Restrictions from Political Parties:** There is a risk of encountering direct influence or restrictive measures imposed by political entities, which could hinder the recycling initiative's progress.
2. **General Political Pressures or Influences:** Beyond specific party agendas, there might be broader political pressures or influences that could affect the sustainability of the Jhut business.
3. **Increased Attention from Various Stakeholders:** Implementing recycling measures may draw increased scrutiny from stakeholders, leading to additional oversight or demands.
4. **Factory Owners Beginning to Reuse Waste Themselves:** Some vertically integrated factories recycle their own Jhut, primarily cotton, other factories utilize Jhut as feedstock for their Jhut boilers. This proactive approach could disrupt existing waste management ecosystems, potentially leading to conflicts with current waste handlers or recyclers.
5. **Threats from Entities or Individuals Using Force or Intimidation:** There may be threats from those who have a vested interest in maintaining the status quo or from those who may lose economically from the recycling activities within the factory premises.

These threats highlight the complex and potentially contentious nature of implementing a sustainable waste management strategy within the highly competitive and politically nuanced context of the Jhut business.



Figure 6: Perceived threats to Jhut businesses

4.6 Reason Behind Selling Jhut

The decision to sell Jhut is primarily driven by practical concerns; factories, constrained by limited storage, opt to clear out waste to facilitate smooth operations and capitalize on an additional income stream. Moreover, external pressures and a lack of repurposing know-how further tilt the balance towards selling Jhut, underscoring a gap between waste generation and sustainable management expertise.

1. **No Space to Preserve Jhut:** Factories often face a lack of adequate storage space, compelling them to sell off Jhut to avoid congestion and manage space more efficiently.
2. **To Clean the Factory for Smooth Regular Production:** The accumulation of Jhut can interfere with the day-to-day operations of a factory. Selling it helps maintain a clean environment, which is essential for efficient and uninterrupted production.
3. **Additional Income:** The sale of Jhut represents an opportunity for factories to generate additional revenue, turning what would be waste into a profitable commodity. The average price per kilogram for fabric scraps is 24BDT (0.21USD), for damaged garments 14BDT (0.11 USD), and for rejected items, 10BDT (0.08USD).⁴
4. **Political or Any Pressure:** There may be external pressures, including political ones, which influence a factory's decision to sell Jhut, possibly due to regulatory requirements or informal sector dynamics.
5. **Not Interested in Jhut:** Some factory owners may not see value in the textile waste beyond its immediate disposal, leading to a lack of interest in keeping or repurposing it.
6. **No Knowledge to Design Out:** A lack of expertise or knowledge in how to repurpose or design new products using Jhut can be a significant barrier, prompting factories to sell it rather than investing in new processes for its use.

4.7 Buyers' Requirements

The respondents have indicated that the trade of Jhut is contingent upon meeting buyer-specific requirements that dictate the transaction's success. The segregation of Jhut by colour and size is essential, allowing buyers to match the waste material with their processing capabilities or end-use demands. The type of fabric is also a deciding factor, with buyers selectively sourcing materials like cotton, polyester, or denim to fit into their recycling ecosystems. In some instances, buyers require Jhut to be sorted by colour and composition, a step that significantly streamlines the recycling process and ensures the right match for potential reuse scenarios.

4.8 Recommendations from Respondents

The respondents' suggestions extend to policy-level interventions, pressing for government action to raise Jhut's economic value, thereby incentivizing recycling. They urge the enforcement of stringent guidelines and the creation of a common facility centre, indicating a desire for a robust, standardized framework for Jhut handling.

⁴ Conversion Rate: 1BDT = 108.5USD (5 May 2024)

The respondents suggest the following interventions:

1. **Improve Warehouse Capacity:** Enhance the storage facilities to accommodate larger quantities of Jhut for efficient processing.
2. **Develop Jhut Collection at Locality:** Establish localized systems for collecting Jhut, making it easier to gather and transport to recycling centres.
3. **Sorting Facilities:** Create facilities specifically designed for sorting Jhut, which can streamline the recycling process.
4. **Recycling Capacity:** Increase the capacity to recycle Jhut, possibly by investing in more advanced technology or expanding existing facilities.
5. **Improve Design to Design Out:** Suggest design improvements to products or packaging to minimize waste from the outset.
6. **Upskill Designers:** Provide additional training for designers to equip them with the knowledge to create more sustainable and waste-reducing designs.

The recommendations from survey respondents emphasize the need for government intervention, proposing actions such as:

- Regulating the prices of Jhut to incentivize recycling.
- Providing clearer guidelines and regulations to standardize Jhut collection and sorting.
- Establishing a Cluster-based hub, or a Common Facility Centre (CFC), would centralize Jhut collection and processing efforts. This hub would be equipped with necessary tools and machinery for efficient handling and sorting of Jhut.
- Training programs for handlers should be implemented to ensure proper handling techniques and minimize contamination throughout the process.
- Ensuring the safety and protection of workers who handle Jhut.
- Introducing a comprehensive management system for Jhut waste.
- Enacting and enforcing relevant laws and policies for textile waste management.
- Working with local groups to optimize the supply chain for waste management.
- Implementing policies that align with the goals of improved Jhut management and recycling.

4.9 Training Scenario

From the perspective of a respondent within the Jhut waste management sector, the training provided has been insightful and comprehensive, targeting key areas such as material segregation, handling of hazardous substances, and ethical waste management practices. As per

the feedback, these sessions are crucial for understanding the intricacies of sustainable waste management and ensuring safety. However, there is a noticeable gap in digital technology adoption for fabric cutting, with most of them still relying on traditional methods. Moreover, it is concerning that a large majority of the sector have not received any form of training. This lack of knowledge could lead to inefficiencies and non-compliance with environmental protocols, hindering progress in circularity field.

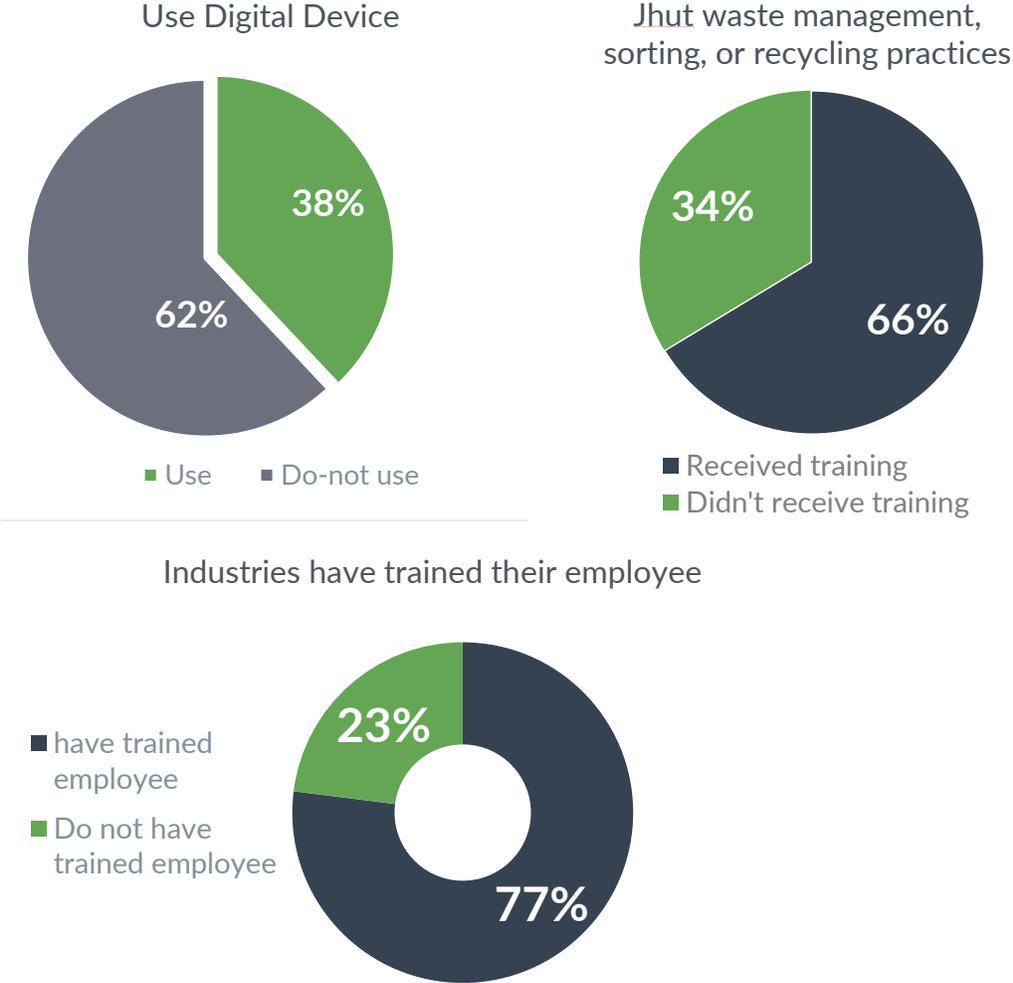


Figure 7: State of skills and training needs for Jhut workers

While the survey provided insights into the current landscape, including opportunities, challenges, and key stakeholders, precise quantification of the market value, distribution of Jhut among key players, and detailed analysis of its colour, composition, and type-specific value of fabric waste in Bangladesh necessitates further research. A comprehensive waste mapping is essential to ascertain the total volume of fabric waste generated, explore potential use cases, determine the proportion of highly recyclable waste, and construct a robust business case for Bangladesh, encompassing the entirety of its value chain.

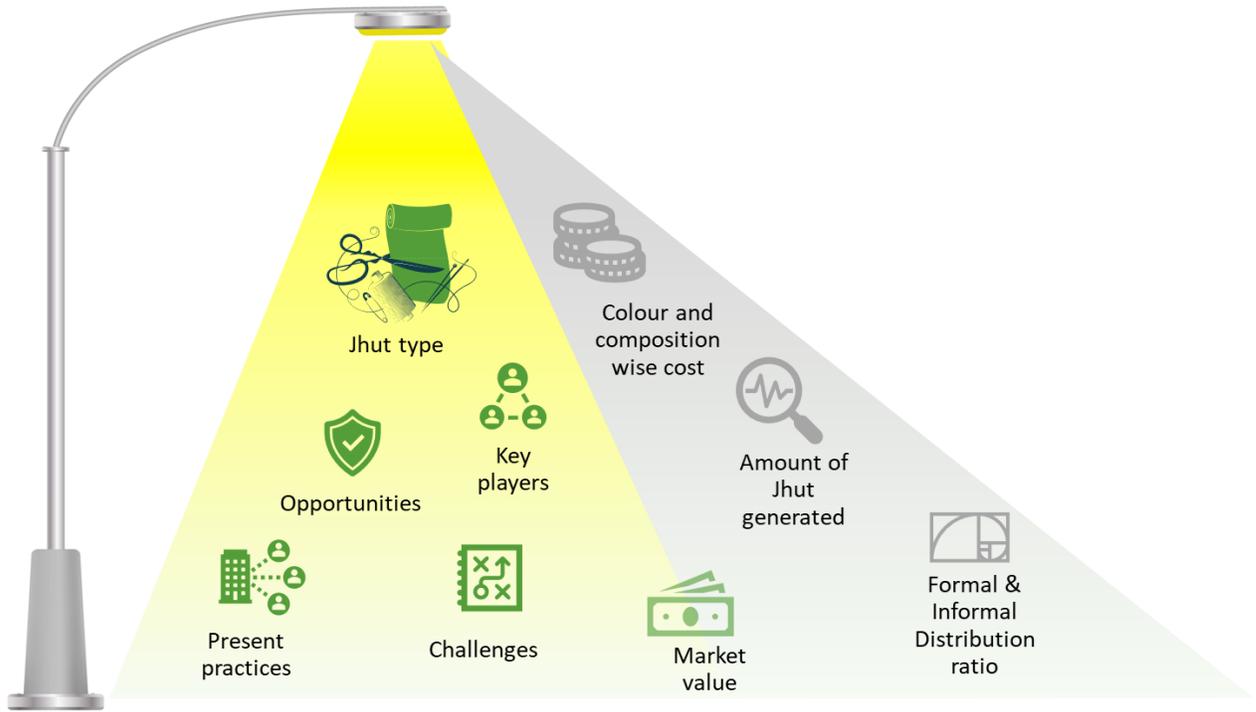


Figure 8: Remaining issues and data needs regarding the Jhut sector in Bangladesh

Chapter 5: Existing Activities on Jhut Circularity and Current Trends

During the fiscal year 2022/23, Bangladesh's export of Jhut amounted to 291,356.66 tons, as per the information obtained from the Export Promotion Bureau. The total value of the exported Jhut was determined by applying a fixed unit price of 363 USD⁵ per ton. This unit price was established through a combination of our survey findings and existing knowledge on the subject. The market price fluctuates based on factors such as type, colour, and composition, with an average ranging from 30 to 35 BDT (approximately \$0.27 to \$0.31 USD)⁶ per kg. Jhut exporters typically have a profit margin of 10-15% on these transactions.

Scenario A: Informal Practices

In Bangladesh, the management of Jhut or waste from the textile industry is largely an informal practice. There is a notable lack of preliminary sorting or segregation of the Jhut by the factories before sale, passing the responsibility of waste management onto these local businesses. A significant number of factories opt to sell their Jhut at minimal prices to local businesses, typically controlled by local muscle groups. The average local price is around 40 BDT per kg, with variations based on colour and composition. For informal sector, prices typically range from 5 to 10 BDT per kilogram (equivalent to approximately \$0.04 to \$0.09 USD)⁷. Recyclers, on the other hand, deal within the range of 15 to 40 BDT per unit (approximately \$0.13 to \$0.36 USD)⁸.

These local enterprises undertake the task of cleaning, segregating, and aggregating the Jhut prior to its onward sale to local and international buyers. Segregation is based on both colour and composition according to the hierarchy are given below:

- 100% Cotton White
- Cotton Rich White
- 100% Cotton other colour
- Cotton Rich other colour
- Mixed Composition including polyester or Viscose
- Printed

⁵ Conversion Rate :1 USD = 98.864 BDT in FY 22/23

⁶ Conversion Rate :1 USD = 108.43 BDT in 2024

⁷ Conversion Rate :1 USD = 108.43 BDT in 2024

⁸ Conversion Rate :1 USD = 108.43 BDT in 2024

It is crucial to note that these businesses do not maintain detailed records of these transactions, particularly concerning the quantity of Jhut traded to specific sectors. This Jhut eventually undergoes recycling processes, primarily in developed recycling hubs such as Vietnam, Finland, Sweden, India, China. The resultant recycled fabric is then sold back to the factories in Bangladesh, perpetuating a continuous cycle. This prevailing system lacks formality and transparency, which can hinder comprehensive efforts towards sustainable and ethical practices in the industry.

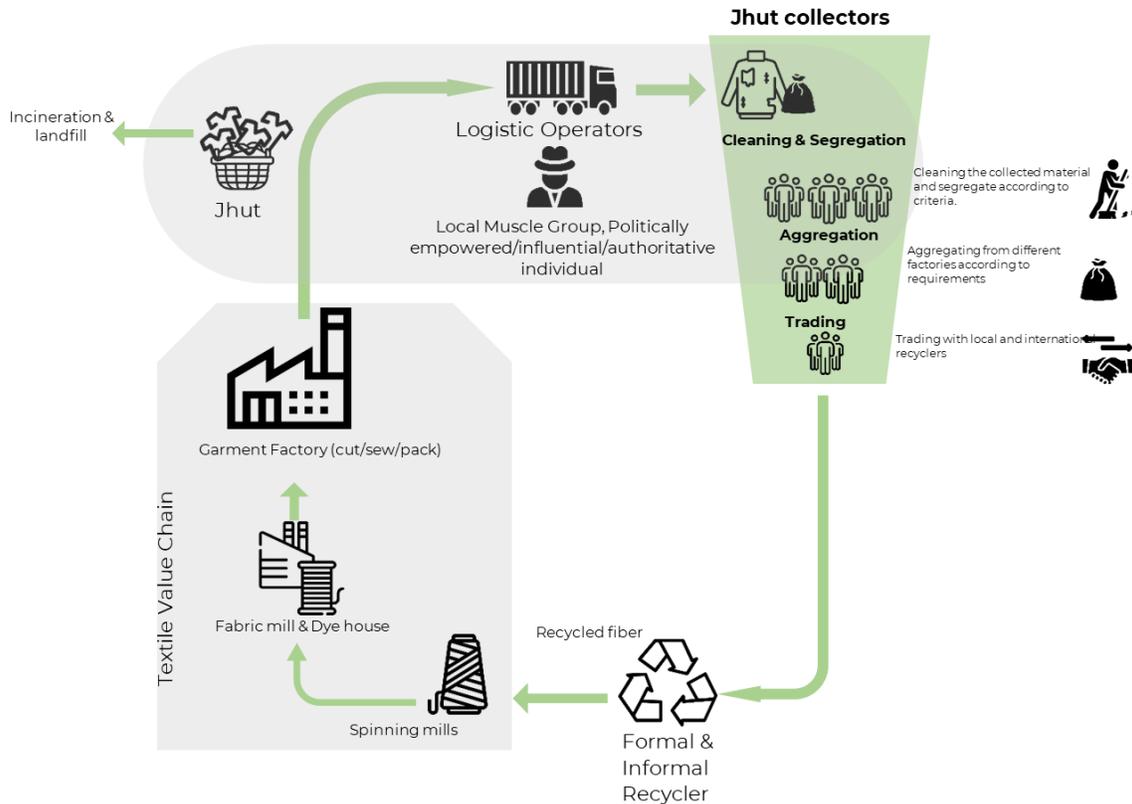


Figure 9: Flow chart of the Jhut cycle including stakeholders along the value chain

The informal sector exhibits a structured hierarchy of control spanning three distinct levels.

Partnership with authoritative personnel: Engaging in partnerships with authoritative individuals involves strategically collaborating and building alliances with those of considerable influence and authority. This goes beyond mere political associations and includes individuals who have exhibited substantial empowerment in the past or presently occupy influential positions. The essence of this collaborative approach lies in capitalizing on the expertise, networks, and credibility of these authoritative figures to achieve mutual benefits and shared objectives.

Muscle Group: A muscle group refers to either a collective or an individual possessing a distinctive blend of political or economic influence coupled with physical or localized power. This classification can be further outlined into two specific categories:

1. **Politically Empowered Muscle Group:** In contrast, the politically empowered muscle group comprises individuals currently holding political influence or having previously been empowered. This category includes individuals with political affiliations, prior political roles, or historically influential roles in shaping policies or decision-making processes. Their influence extends beyond local boundaries, encompassing broader political and economic realms.
2. **Local Muscle Group:** This group encompasses individuals or entities lacking direct political power but applying significant influence within specific local or regional contexts. Their potency proceeds from grassroots connections, community ties, or localized networks. Despite the absence of political empowerment, they exert a tangible impact on the ground, representing them as valuable allies for initiatives requiring local support.

At the pinnacle of this hierarchy are politically empowered individuals or groups who possess area-specific influence, allowing them to exert substantial control over textile waste management processes. Collaboration with authoritative personnel forms the second tier, indicating a strategic alliance between local power brokers and formal authority figures to facilitate operations. The third echelon is occupied by influential entities, which are pivotal in swaying decisions and streamlining the flow of Jhut through the sector. Anchoring the structure is the local muscle group, which represents the grassroots level operatives who provide the manpower and local knowledge essential for the day-to-day handling of textile waste. This layered framework underpins the complex interplay of power and function that characterizes the management of Jhut in Bangladesh's informal sector.

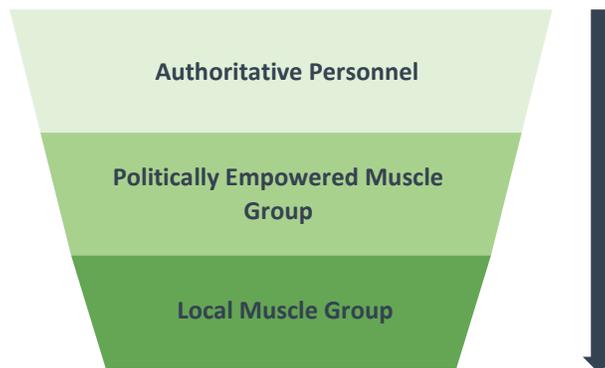


Figure 10: Power hierarchy of actors in the informal Jhut sector

Scenario B: Sustainable Waste Management

Upon generation, the waste, or Jhut, produced in the factory is diligently managed within the premises itself. The factory undertakes a cleaning process to ensure that the waste is uncontaminated. Following this, the waste is appropriately segregated according to various

factors that determine its suitability for future processing. This ensures the uncontaminated status of the waste and facilitates targeted processing based on unique characteristics.

Once the waste is prepared and classified, it is sold to some sustainable partners like Reverse Resources or CYCLO. Moreover, since 2019, the Global Fashion Agenda (GFA) has led a collective effort to reshape the fashion industry, adopting sustainability and responsible circularity practices. These circularity partnerships created an initiative that fosters a circular approach to fashion. This partnership has not only helped enhance brands sustainability goals, but it also strengthens the industry's collective effort towards environmental stewardship.

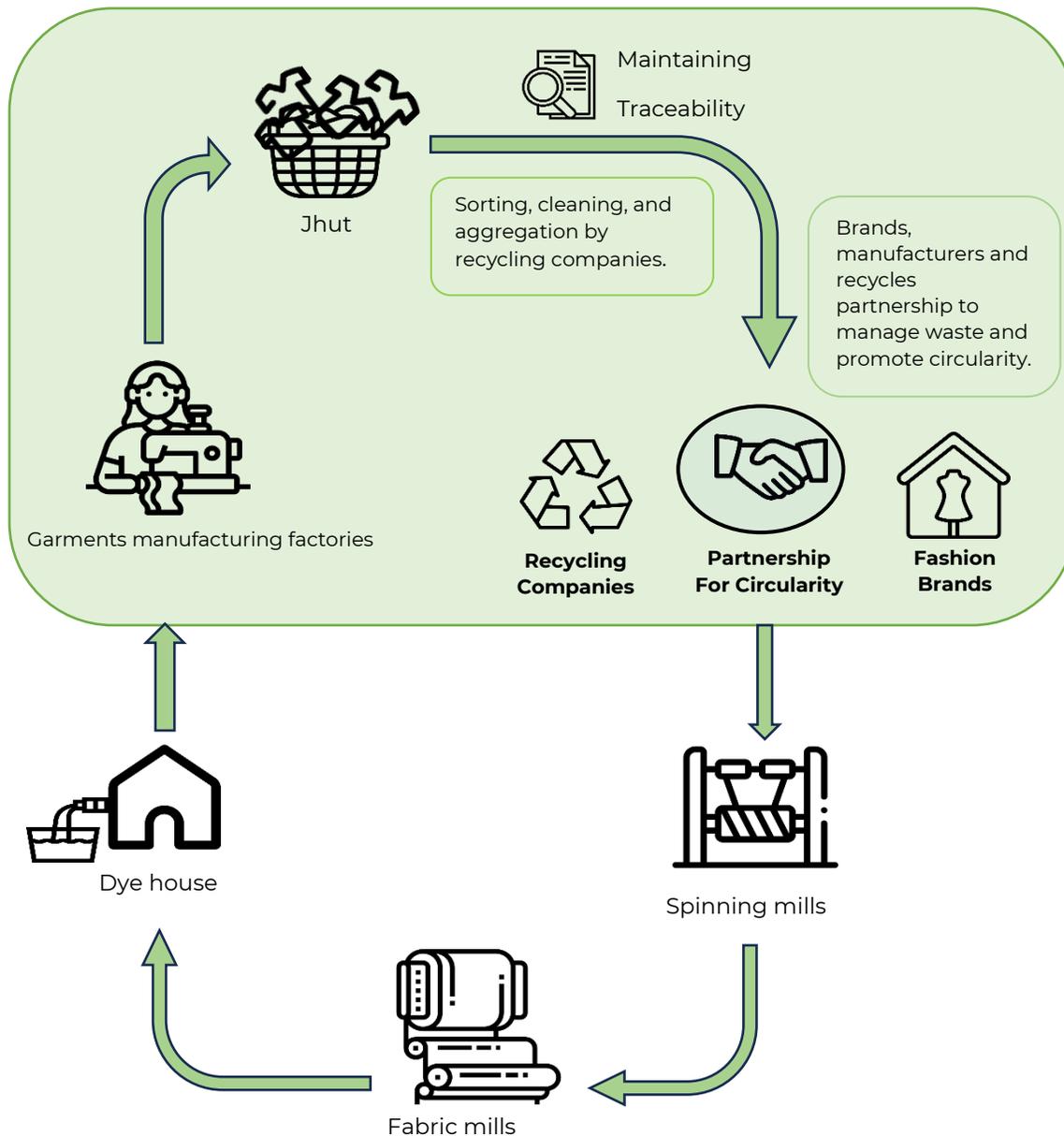


Figure 11: Formalised and traceable Jhut processing through partnerships

Under this kind of partnership, the segregated Jhut is transported to the partner's facility, where it undergoes mechanical recycling process. This process transforms the waste into fibre/yarn/fabric. Subsequent to this process, the recycled material is sent back to the factory where it becomes a valuable raw material for manufacturing new clothes, effectively closing the loop in the production cycle.

Scenario C: Recycling at Own Facility

Within the textile industry landscape of Bangladesh, there exists a select group of factories that have chosen to pursue more sustainable practices. Approximately 10 to 15 of these facilities are vertically integrated, meaning they have streamlined their production processes to include recycling within their operations. They exhibit a commendable commitment to waste management by recycling an estimated 20-30% of the cotton waste material, produced within their premises.

Rest of the remaining Jhut is sold to partner recycling facilities, maintaining a responsible and traceable waste stream that supports a circular economy. These partner facilities, aligned with sustainable practices, ensure that the Jhut is appropriately treated, reused, or recycled.

On the other hand, a portion of the waste is also sold to local vendors, stimulating the local economy and allowing these businesses to participate in the broader textile supply chain. By combining internal recycling efforts with strategic partnerships, these vertically integrated factories are leading the way towards a more sustainable, accountable, and integrated textile industry in Bangladesh. Nevertheless, printed & mixed fabric waste is not recycled due to its composition and limited demand, leading to its eventual disposal in landfills.

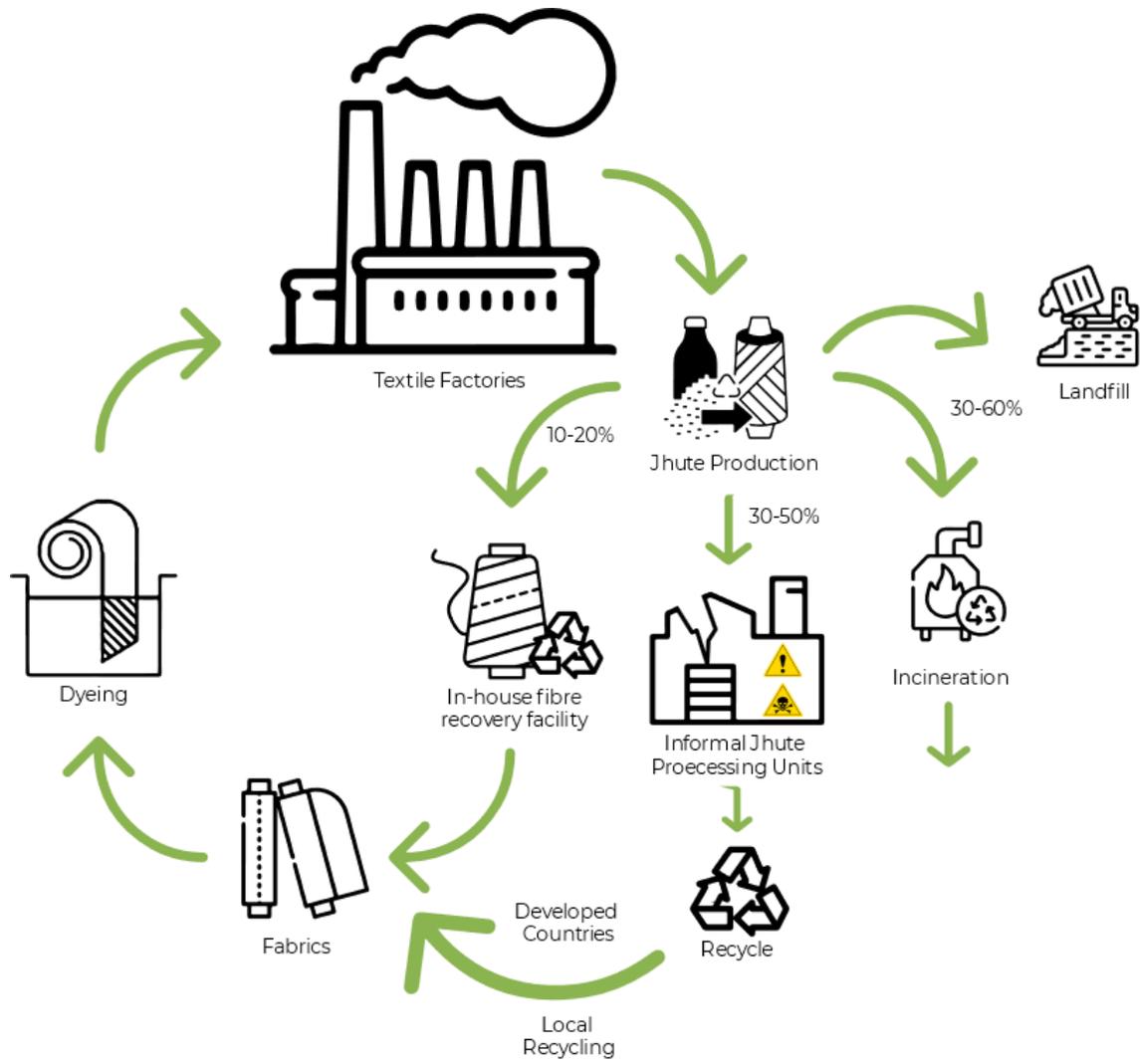


Figure 12: Internalised Jhute recycling process

Chapter 6: Major Concerns

6.1 Environmental Impacts

6.1.1 Air Pollution:

Incinerating Jhut can release toxic emissions such as dioxins, furans, particulate matter, and volatile organic compounds (VOCs). Different types of fabric cause different type of emissions. Fabrics containing synthetic fibres like polyester and nylon generally produce more harmful emissions than natural fibres like cotton and wool. Some of the details are mentioned below:

Natural fibres: Natural fibres, such as cotton, wool, and linen, typically produce less harmful emissions when burned than synthetic fibres. However, they can still produce some emissions, including particulate matter, carbon monoxide, and volatile organic compounds (VOCs).

Synthetic fibres: Synthetic fibres, such as polyester, nylon, and acrylic, typically produce more harmful emissions when burned than natural fibres. These emissions can include dioxins, furans, heavy metals, and VOCs.

Blended fabrics: Blended fabrics, which are made from a combination of natural and synthetic fibres, can produce emissions that are similar to the emissions from either type of fibre.

These emissions contribute to air pollution, which in turn leads to a host of environmental problems. For example, particulate matter can reduce visibility and contribute to the formation of smog. Moreover, persistent organic pollutants such as dioxins and furans can travel long distances, impacting areas far from the initial source of emission. They can accumulate in the environment and pose risks to both wildlife and human health.

- **Dioxins:** Dioxins are a group of highly toxic chemicals that are formed when organic matter is burned at high temperatures. Dioxins such as Polychlorinated dibenzo-p-dioxins (PCDDs) can have a negative impact on human health, including cancer, reproductive problems, and developmental defects.
- **Furans:** Furans (C₄H₄O) are another group of highly toxic chemicals that are formed when organic matter is burned at high temperatures. Furans can have a negative impact on human health, including cancer, reproductive problems, and developmental defects.
- **Heavy metals:** Heavy metals, such as lead (Pb), mercury (Hg), and cadmium (Cd), can be released into the air when Jhut is incinerated. Heavy metals can have a negative impact on human health, including neurological damage, kidney damage, and cancer.
- **Particulate matter:** Particulate matter is a mixture of solid particles and liquid droplets that are suspended in the air. Particulate matter can have a negative impact on human health, including respiratory problems, heart disease, and cancer.

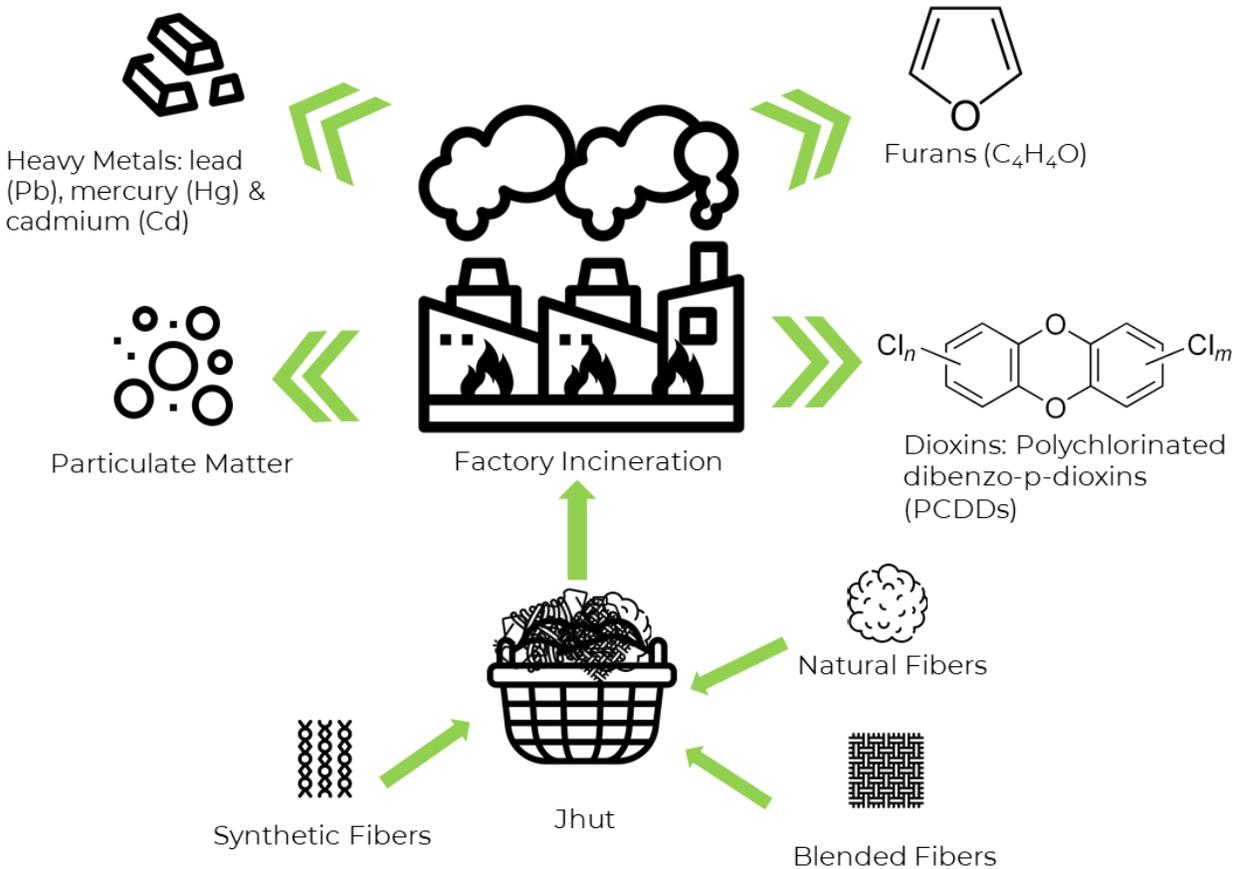


Figure 13: Problems of textile waste incineration

6.1.2 Resource Depletion:

The production of fabric consumes a large number of resources, including water, energy, and raw materials. If a significant portion of this fabric ends up as Jhut that is not recycled or reused, it represents a significant loss of resources. This contributes to the overuse of resources, as virgin materials are continually required for new production. Over time, the growing demand for virgin materials can lead to resource depletion, with considerable environmental consequences. This can lead to deforestation (in the case of natural fibres like cotton) or increased extraction of fossil fuels (for synthetic fibres like polyester), both of which can lead to habitat loss, biodiversity decline, and increased carbon emissions. Hence, it is crucial for factories and brands to consider more sustainable approaches to managing Jhut, including recycling initiatives, sustainable waste management practices, and efforts to reduce the overall waste produced in the textile industry. By doing so, they can help mitigate these environmental issues.

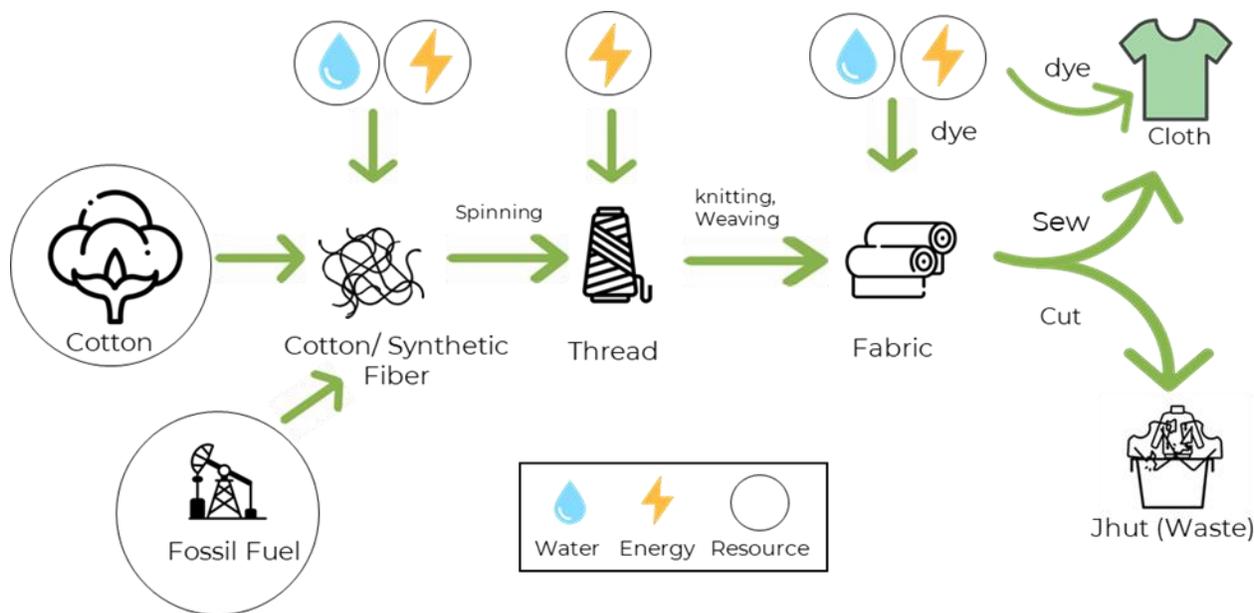


Figure 14: Resource inputs for textile and garments production

6.1.3 Chemical Exposure (Leaching):

Jhut, like other textile waste, often contains a variety of chemicals, including dyes and finishing agents. These can be harmful to both humans and the environment, particularly if they leach into soil or water supplies. Leaching occurs when chemicals used in the production of Jhut, such as azo dyes, chlorinated compounds, and heavy metals, infiltrate the surrounding soil and groundwater. These substances can then find their way into the wider ecosystem and human water supplies.

Some of the chemicals that can leach from Jhut include:

- **Azo dyes:** Azo dyes like solvent yellow 7 ($C_6H_5N_2C_6H_4OH$) are used to colour Jhut. They can leach into the environment and cause cancer, reproductive problems, and developmental defects.
- **Chlorinated compounds:** Chlorinated compounds such as chlorine gas, sodium hypochlorite ($NaOCl$), Calcium hypochlorite ($Ca(ClO)_2$) are used to disinfectants and bleaching Jhut. They can leach into the environment and cause cancer, liver damage, and reproductive problems.
- **Heavy metals:** Heavy metals, such as lead, mercury, and cadmium, can be used in the production of Jhut. They can leach into the environment and cause neurological damage, kidney damage, and cancer.

The type of chemical that leaches from Jhut can depend on the type of fabric, the way it is treated, and the conditions in the landfill.

When Jhut is disposed of in landfills, it undergoes decomposition, releasing hazardous chemicals like azo dyes and heavy metals that leach into soil and groundwater. This poses environmental and health risks, contaminating ecosystems and water supplies, with the leaching influenced by factors like fabric type, treatment methods, and landfill conditions.

The leaching of these chemicals can cause significant environmental harm. For instance, heavy metals like lead, mercury, and cadmium can bioaccumulate in the food chain, posing risks to a wide range of organisms, while azo dyes and chlorinated compounds can lead to soil and water pollution, which can affect the viability of ecosystems and harm aquatic life.

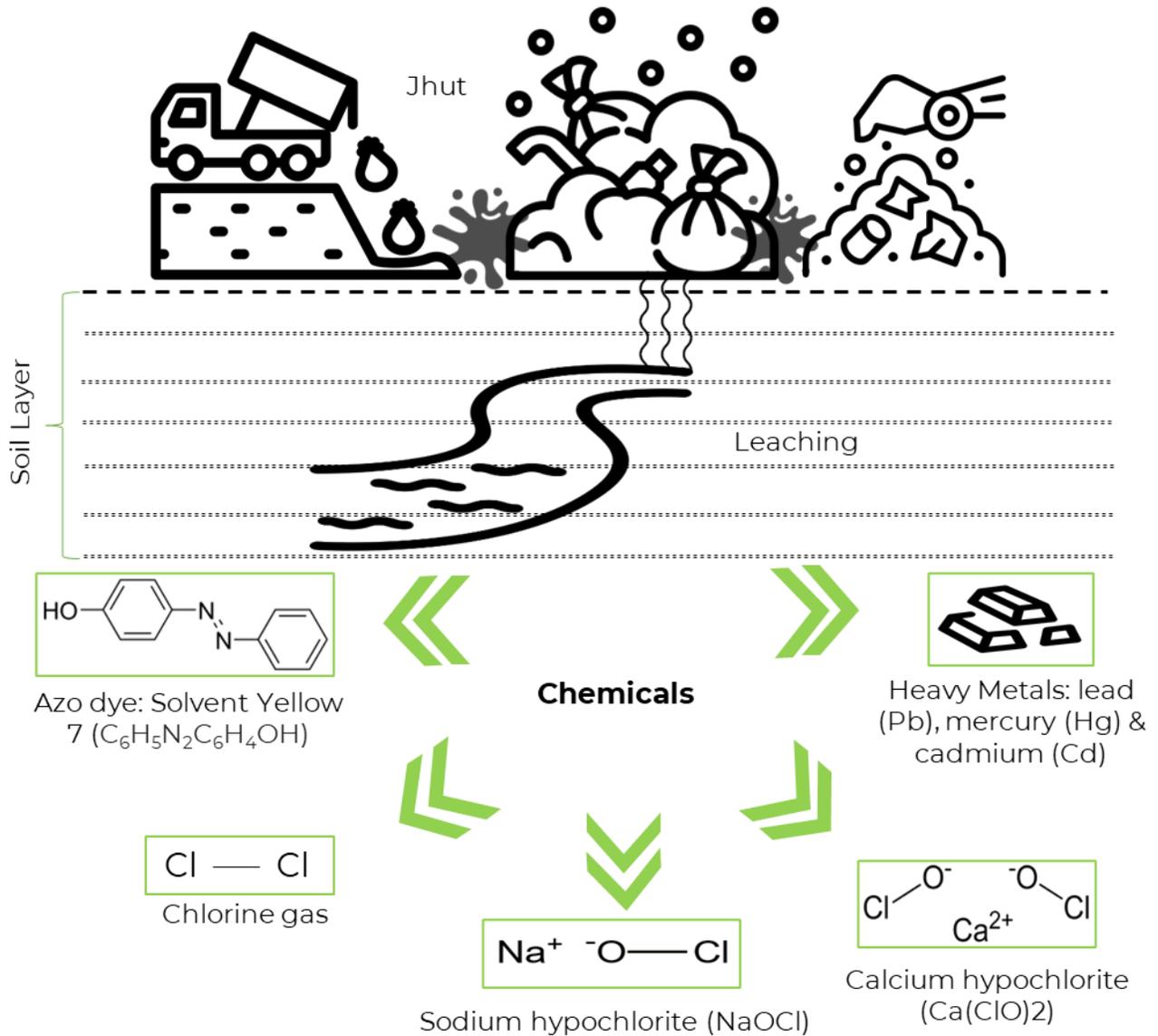


Figure 15: Environmental impacts from landfilling textile waste

6.2 Major Health and Safety Issues

Occupational Health and Safety:

Many Jhut processing facilities in which women workers are engaged in sorting and processing Jhuts, suffer from poor infrastructure—largely fragile and makeshift sheds or occupied abandoned houses—and substandard safety arrangement. This inadequate infrastructure exposes workers to potential accidents and creates an uncomfortable work environment, which impact on their safety, health and warrant low productivity risks. Frequent fire accidents in the Jhut hubs due to faulty construction of warehouses and lack of fire safety measures are common causing injury and casualty of workers. Workers often have to adopt unscientific and risky methods of materials testing and segregation by burning clothes without ensuring fire prevention systems and emergency response plans. Given the flammable nature of textile materials, the absence of safer burn-testing system and basic safety standards in Jhut hubs puts workers at significant life risks. Moreover, inadequate ventilation can lead to the increase of heat and pollutants contributing to respiratory illnesses, heat stress, and overall discomfort at the workforce.

Lack of awareness about potential hazards can be another responsible factor for augmenting the health and safety risk of workers through exposure to toxic materials and risky recycling processes. The poor labour conditions, absence of safety measures, prevalence of child labour and specific challenges faced by female workers show significant violation of labour rights within the Jhut sector.

- **Hazardous working conditions:** Workers in textile recycling and waste management (handling Jhut) are often exposed to hazardous conditions such as dust, and improper ergonomics, leading to health issues like respiratory problems, hearing loss, musculoskeletal disorders, etc. Dust is generated during cleaning process as waste materials, this dust could include fine silica particles, microfibres etc.





- **Exposure to hazardous chemicals:**

Jhuta may contain remnants of harmful chemicals used in dyeing and printing processes, posing risks to workers who handle them without adequate protective measures. In dyeing process, pretreatment chemicals such as bleaching agents, acids, reactive and disperse dyes and other special finishing chemicals. Repeated handling can cause chronic skin dermatitis. Some dyed compounds such as azoic amine dyes and special finishes are carcinogenic that can cause cancer. Furthermore, Jhuta are tested for their fibre type or content through burn test. Dyed fibre when burned can cause harmful fume that can cause severe respiratory problems when inhaled for prolonged period.

- **Inadequate training and awareness:** Many workers are not properly trained or equipped to handle these wastes safely. Lack of awareness about potential hazards can also increase the risk of chemical exposure while cleaning and segregation.
- **Lack of Personal Protective Equipment (PPE):** Workers are often not provided with necessary protective gear like masks and gloves. This leaves them vulnerable to potential injuries or health risks inherent to handling and processing Jhuta.
- **Dust Generation:** The process of managing and recycling Jhuta generates significant dust. Without proper mitigation measures, workers can develop respiratory conditions due to prolonged dust exposure.





• **Poor Infrastructure:** Many facilities lack sound structures and safe buildings. This inadequate infrastructure exposes workers to potential accidents and creates an uncomfortable work environment, which may impact their safety, health and productivity.

- **Lack of Fire Safety measures:** Workers often resort to burning clothes to distinguish between cotton and other man-made fibres. This practice not only exposes them to harmful fumes and burn risks but also creates a hazardous work environment prone to fire incidents. It underscores the urgent need for safer, more scientific methods of materials testing and segregation in the industry. Factories often lack effective fire prevention systems and emergency response plans. Given the flammable nature of textile materials, this absence puts workers at significant risk and violates basic safety standards.
- **Poor Ventilation:** Inadequate ventilation can lead to the build-up of heat and pollutants, contributing to respiratory illnesses, heat stress, and overall discomfort for the workforce.



6.3 Human Rights

Human Rights Issues:

- Poor labour conditions:** Workers involved in the handling and recycling of Jhut often work in precarious conditions, with low wages, long working hours, and lack of job security, lack of washroom facility. Moreover, there are no noticeable measures noticed to verify implementation of the Labour Law in these facilities.
- Child labour:** The textile recycling facilities, including waste management, is notorious for employing underage workers in Bangladesh, who are subject to the same working conditions as adults.
- Challenges for women:** Women working in local Jhut recycling facilities face numerous challenges that hinder their well-being and professional growth. They endure low wages due to the perception of their work as unskilled and low status. Working for long hours, up to 12 hours a day, takes a toll on both their

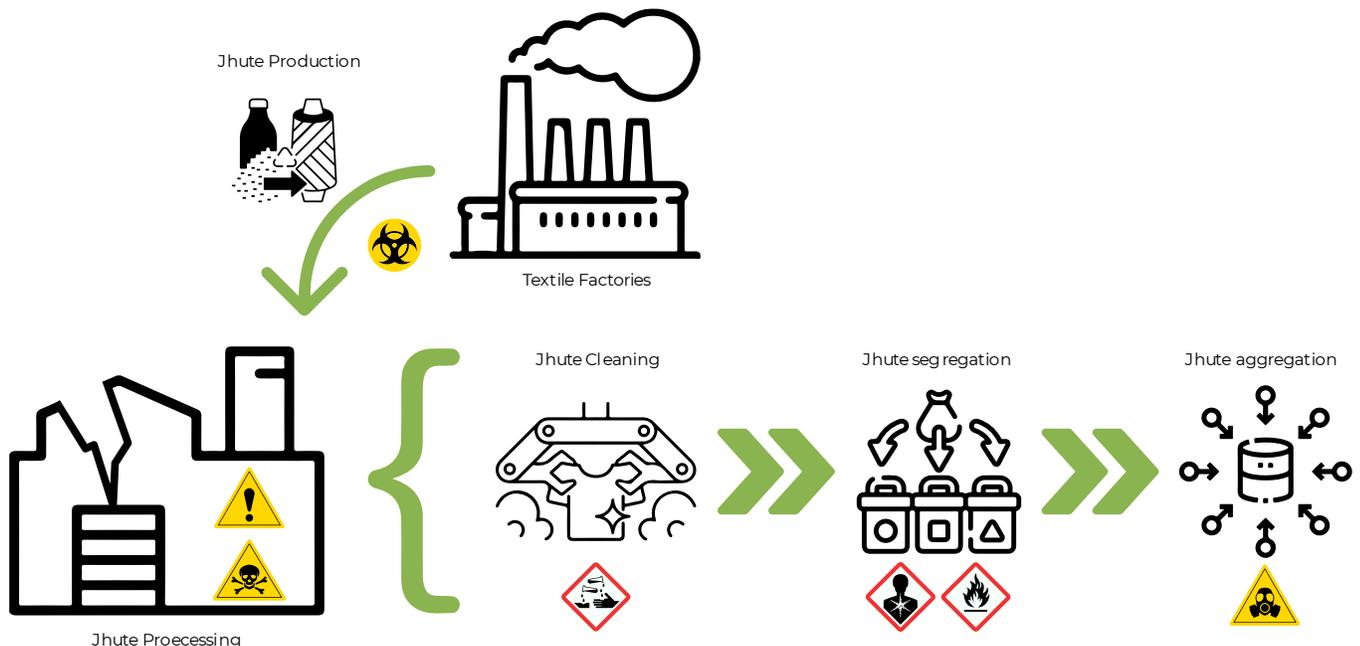


Figure 16: Exposure of workers to harmful substances during Jhut cleaning, segregation and aggregation

Caution GasMask Corrosive Flammable Danger Biological Hazard Health Hazard

physical and mental health. Moreover, the job exposes them to hazardous substances, resulting in respiratory problems and skin diseases. Adding to these difficulties, women often experience sexual harassment, creating a hostile work environment. Additionally, the lack of access to training opportunities further limits their career advancement and earning potential. Moreover, these facilities often lack proper lavatory facilities, exacerbating the hardship faced by women workers. Urgent attention is required to address these issues and create a safer and more equitable working environment for women.

Chapter 7: Roles of Stakeholders

Jhut recycling in Bangladesh involves a multi-layered, dynamic network of stakeholders, each playing a distinct role in the entire waste management process. The process begins with the factory owners and personnel, who are responsible for producing Jhut or fabric waste during textile production. Local muscle groups have a heavy influence in the distribution of the Jhut from the factories. Under their influence this Jhut is collected and transported by the local recyclers. They handle logistics, physically sorting and channelling waste materials through their workers. This sorted Jhut finds its way to the other Jhut recyclers who process it further, transforming waste fabric into fibres or yarns. These materials are then procured by local spinning mills, which repurpose the Jhut yarns into new threads and fabrics. Simultaneously, brands play a critical role in this flow, as their supply chain choices, waste management guidelines, and sustainability goals can directly influence waste production and disposal practices at the factories. Independent organizations like NGOs and research bodies provide essential oversight, advocacy, and knowledge sharing, thereby influencing waste management policies and practices. Together, these stakeholders form a complex fabric waste management web, their roles and relationships interwoven as tightly as the threads they deal with.

Brands have a significant opportunity to develop the recycled product by introducing designs with recycled materials. Current trends and upcoming legislation in buyer markets influence brands to increase the share of recycled materials in their products; if Bangladesh develops a robust recycling hub, then reliance on imported recycled materials will be reduced. Through their design and marketing strategies, brands can substantially influence consumer preferences and behaviours. By focusing on products made from recycled materials, brands not only contribute to environmental sustainability but also shape consumer attitudes towards recycling and sustainable consumption.

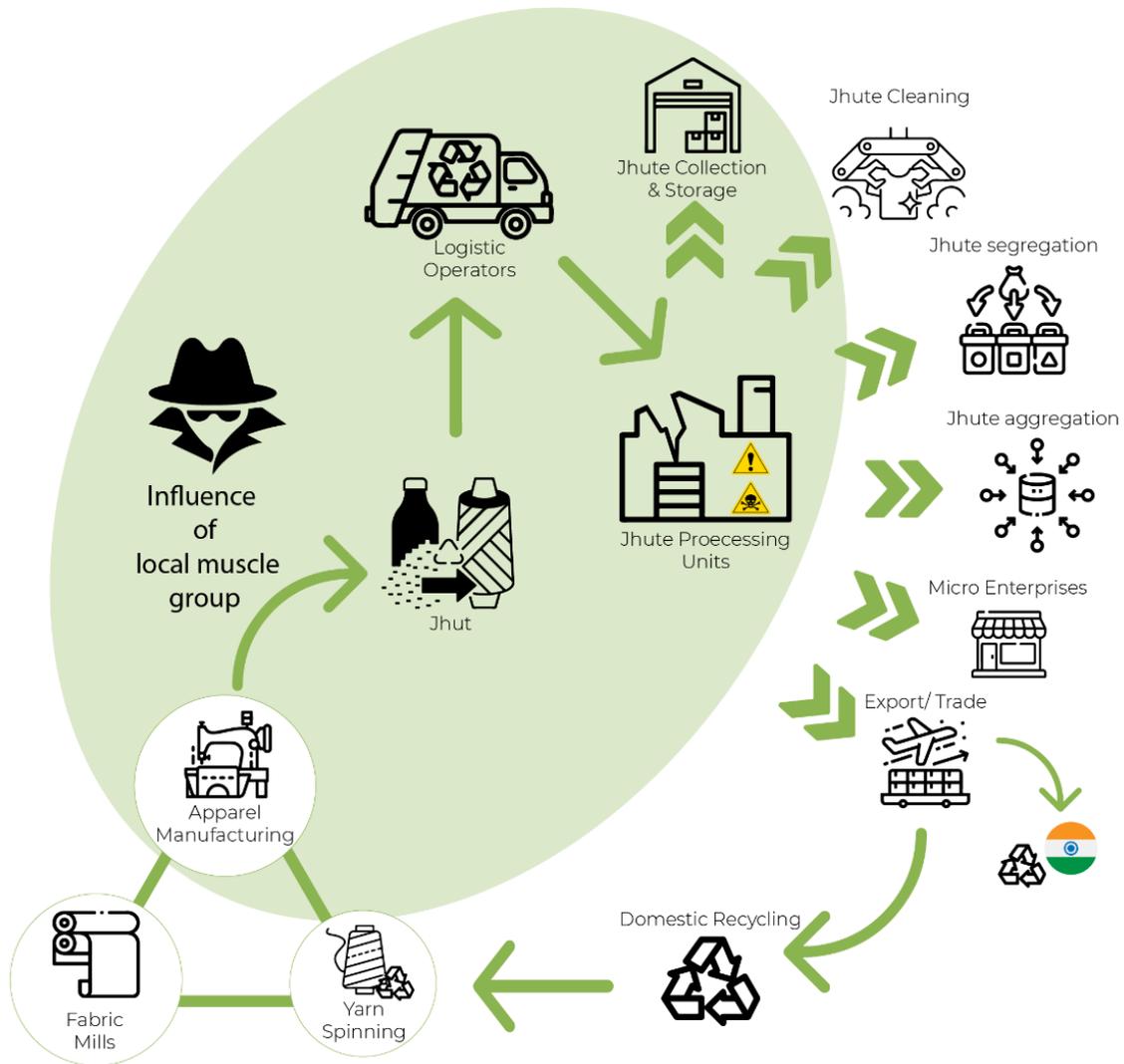


Figure 17: Current handling of Jhute materials by the various informal sector stakeholders

Involving stakeholders from the informal sector in the regular waste collection of post-industrial waste is a challenging task. It requires a well-coordinated and thoughtful approach that addresses the specific needs and realities of these stakeholders, while also ensuring compliance with environmental standards and regulations. Here are some steps that can be taken to achieve this:

1. **Creating a legal framework:** One of the primary barriers to the inclusion of informal sector stakeholders in formal waste management systems is the lack of legal recognition. To address this, it may be necessary to enact laws or regulations that recognize and protect the rights of informal sector workers, including waste pickers. This can protect their rights, improve their working conditions, and provide them with a more stable income. Some examples of such laws and regulations are given below.

New forms of wage labour and struggle in the informal sector: the case of waste pickers in Turkey

- **Legal Sanction for Recycling Companies (2016):** Recycling companies face fines if they buy waste from waste pickers.
- **By-Law on Waste Management:**
 - Companies involved in waste management must obtain licenses or work permits.
 - Waste collection companies must have contracts with municipal authorities.
 - Unauthorized waste collection from public areas is prohibited.
 - Companies generating waste must sort it on-site before delivery to recycling facilities.
 - The law aims to formalise the recycling industry and end informal waste picking.

Waste picker's rights protection, improved working conditions, stable income

- Recognition by Municipality: Classified as 'environment volunteers' by Çankaya Municipality, provided with safety gear and badges.
- Collective Advocacy: Formation of the Waste Pickers' Association to unite and represent waste pickers in negotiations and collective actions.
- Financial Support Mechanisms: Use of advance payments by warehouse owners to provide temporary financial stability to waste pickers.
- Bargaining Disparities: Variations in bargaining power based on ownership of trucks and dependence on warehouses.
- Self-Definition and Dignity: Efforts by waste pickers to redefine their work as dignified 'recycling workers', highlighting their environmental contribution.

Legal Framework in Brazil: Brazil is cited as a successful example of integrating waste pickers into the formal waste management system. The country has implemented laws and policies that recognise waste pickers, formalise their activities, and improve their working conditions. Key initiatives include:

1. Municipal laws recognizing waste picker cooperatives.
2. Federal laws enable the direct hiring of waste picker associations for selective waste collection.
3. The National Policy on Solid Waste is making the inclusion of waste pickers in the reverse logistics system mandatory.
4. Establishing binding laws that recognize waste picking as a profession.
5. Implementing occupational health and safety regulations.

2. **Advocate for Policy Change:** Push for policy changes that recognize waste pickers as formal workers and ensure their access to essential services. This can help in creating a more enabling environment for waste pickers.
3. **Providing education and training:** Education and training programs can help to build the capacity of informal sector stakeholders to participate in regular waste collection. This might involve training in waste sorting, safe handling practices, workplace safety, and basic business skills.

Education and training programs can be conducted by various development organizations, NGOs, and entities formally working in this sector are critical in enhancing the capabilities of informal sector stakeholders for organized waste collection. These initiatives can address crucial skills such as waste sorting, safe handling, workplace safety, and basic business skills. The goal is to train informal workers, create a safer environment, foster entrepreneurship, and facilitate collaboration with formal waste management entities.

4. **Establishing waste collection hubs:** Setting up designated hubs for waste collection in key locations can streamline the collection process and make it more manageable for informal sector workers. These hubs should be strategically located to minimize the travel distance and should be equipped with the necessary facilities for safe waste handling, sorting and storage.
5. **Incentivizing participation:** Incentives can be a powerful tool for encouraging participation in regular waste collection. This might include financial incentives, such as fair payment for collected waste, or non-financial incentives, such as health care services or education opportunities. The Government of Bangladesh can offer a range of non-cash incentives to encourage sustainable practices in the textile industry. These include 15% tax breaks for garment factory owners and SMEs, subsidies covering 50% of machinery costs, BDT 500,000 grants for environmental projects, training programs with BDT 10,000 per trainee for industry workers, low-interest loans at 4% up to BDT 2 million, 10% export rebates for Jhut products, and 30% rental discounts for start-ups and SMEs. These measures can significantly boost eco-friendly initiatives in the textile sector.
6. **Strengthening waste picker organizations:** Waste picker organizations can play a key role in negotiating better conditions for their members and in liaising with government bodies and other formal sector stakeholders. Supporting these organizations can help to strengthen the voice of informal sector workers and to facilitate their inclusion in regular waste collection.

These measures below can be adapted and implemented in Bangladesh:

- Non-hazardous solid waste management legislation to support effective waste handling.
- Requiring waste management hubs to get specific licences or work permits to comply with waste handling regulations and operations.
- Contractual agreements between Jhut collectors and local authorities to expedite disposal and promote waste management collaboration.
- Empower waste value chain workers to protect their rights and ensure fair treatment and improve their social benefit & welfare.
- Enforcement of occupational health and safety regulations to protect workers.



Figure 18: Governance process and required actions for formalization of the informal sector

7. **Promoting social inclusion:** To truly involve informal sector stakeholders in regular waste collection, it's important to address the social stigma and discrimination that they often face. This could involve awareness-raising campaigns, social inclusion programs, and efforts to improve the working conditions and living standards of waste pickers.
8. **Collaboration with formal sectors:** Building partnerships between formal waste management companies and informal sector stakeholders can lead to win-win outcomes. These collaborations could involve contractual agreements, joint ventures, or other forms of partnership.

It is important to note that any strategy for involving informal sector stakeholders in regular waste collection needs to be context-specific and participatory. This means engaging with these stakeholders, understanding their perspectives, and involving them in decision-making processes. Only by doing so can sustainable and inclusive waste management systems be developed.

Chapter 8: Recycling Technologies

Numerous technologies exist for recycling Jhut, or textile waste, including mechanical recycling, chemical recycling, and enzymatic recycling. Each method has its strengths and drawbacks, with suitability largely dependent on the type of Jhut, the intended end product, and the technology's cost.

- i. **Mechanical Recycling:** This method, while simple and applicable to a broad variety of Jhut, tends to yield a product of lower quality than the original.
- ii. **Chemical Recycling:** Despite being more complex and costly than mechanical recycling, this method can produce a higher-quality product and is capable of handling Jhut unfit for mechanical recycling.
- iii. **Enzymatic Recycling:** A relatively new and promising technology, enzymatic recycling can potentially offer a more sustainable approach. However, it is still in the early stage of development.

In addition to these primary methods, emerging technologies such as hydrothermal liquefaction, gasification, and pyrolysis present promising alternatives. These innovative processes convert Jhut into usable fuels and constituent chemicals for new products. Despite their potential, these technologies are in nascent stages of development and have yet to mature.



Figure 19: Three types of textile waste recycling

8.1 Challenges of Cotton and Man-made Fibre Recycling

Recycling materials have some technological challenges due to their process and technological limitations. These challenges include costly and complex process, decrease in material strength, blended fabric, fibre contamination etc.

Mechanical recycling

The current technological process does not let recycled fibre to maintain their original strength. This especially true for mechanical process.

- In mechanical process the fabric is teared and shredded which results into shorten fibre length. (Loo et al., 2023) Natural fibres such as cotton are mostly affected, loses strength

the most. For natural fibres, 5 - 20% of high-quality textile inputs can be recovered as spinnable fibres. (Duhoux et al., 2021) Furthermore, due to friction there might be loss in fibre mass, results into decrease of further fibre strength.

- With every cycle of recycling the fibres further degrade their mechanical strength, limiting the number of times it can go through the recycled process. (Loo et al., 2023)
- Shorter fibre length can result into lower yarn strength, increase in yarn breakage, yarn hairiness etc.(Pan et al., 2001)
- Good quality output can only obtain when the fibre is easy to open and doesn't have special finish or coatings. For all these reasons it needs to be blended with virgin fibres, it cannot be used on its own and need to mix with virgin fibre to produce yarn. (Duhoux et al., 2021)

Blended fabric recycling

Polyester-cotton, cotton-spandex, polyester-spandex are widely used blended fabric choice.

- Mechanical process alone is not sufficient when it comes to blended yarn recycling, because it is not possible to remove and separate the different fibres. (Damayanti et al., 2021) Thus, it will result into contaminated yarn which aren't suitable for fabric processing. (Loo et al., 2023) Same case is for thermo-mechanical recycling due to close thermal properties it is not possible to recover fibres separately.
- Through physico-chemical recycling (Solvent Based Separation) process it is possible to separate and recover pure fibres. For example, due to cotton and polyesters solubility differences it is possible to selectively dissolve both separately and completely recovered. However, only one of the fibres can be recovered that has a higher molecular density to be re-spun into fibre. The other maybe completely or partially degraded which is not suitable for fibre production. (Loo et al., 2023)
- Blended cotton, which combines natural cellulose fibres with synthetic ones, poses a recycling challenge. Mechanical recycling struggles with efficient fibre segregation due to the intertwined nature of the blend. In contrast, chemical recycling can target specific fibres: either isolating the cellulose or the synthetic component, but not both simultaneously. This limitation necessitates more innovative solutions or a dual-process approach to fully capitalize on recycling blended cotton textiles.
- In depolymerization process the target polymer may have intact structure but there is a possibility for side reactions within the structure or contamination in the process that may degrade the quality of fibre. In some cases, can disrupt fibre production altogether. On the other hand, for depolymerization process requires higher quality of fibre content. (Loo et al., 2023)

Chemical recycling

Both solvent based and depolymerization recycling is considered as chemical recycling.

- Compared to mechanical recycling chemical recycling is complex, requires higher investment cost, skill requirement and higher process cost. (Loo et al., 2023) It requires high amount of water, chemicals, and energy.
- After processing separation and purification is required, increase process complexity, energy consumption, and environmental implications; a climate change impact of 480 kg

CO₂ equivalents per ton of dissolving pulp created from textile raw material has been reported. (Oelerich et al., 2017)

- If the polymer specially fibres like polyester or nylon has a higher viscosity and forms highly concentrated solution, it requires high liquid-to-solid (L/S) ratios for processing. Thus, increasing the amount of solvent that is needed. (Duhoux et al., 2021)
- Quality of feed material is a major concern. Through chemical process it can be spun into fibre if only the feed material has higher polymer weight. (Loo et al., 2023)
- Due to high consumptions of solvents and chemicals such and acids and alkalis. To recover and recycle them it requires additional processes that is costly.
- Chemicals can cause corrosion to the equipment that may require frequent maintenance, increasing maintenance cost. (Loo et al., 2023)

Thermo-mechanical process

Thermo-mechanical process is mainly used for synthetic thermoplastics. Here high temperature is used to melt the waste fabric scraps and re-spun then into fibre filaments.

- As polyester requires high temperatures to melt (e.g. polyester melts at 295°C). Which requires a huge amount of energy to generate that amount of heat. (Damayanti et al., 2021)
- Elastane fibres such as spandex with thermosetting properties are not suitable for this process as it processes fibre in high temperature.
- One of the main challenges for regarded for thermos-mechanical process is polymer degradation. Due to reprocessing the polymer such as polyester starts to degrade which occurs because of the application of heat and mechanical shearing forces during the process of melting. (Ragaert et al., 2017)
- Thermo-mechanical process is very sensitive to contaminants such as pigments, residue and coatings that can hinder fibre processing. Therefore, it needs to be made sure that fibre content should be pure.
- Through this process only dark colours can be obtained as the colorants remain in the fibre melt. (Duhoux et al., 2021)

Enzymatic process

Enzymatic process is considered the mildest to fibres for recycling where enzymes are used to depolymerize fibres which gives virgin fibre like quality.

- Enzymatic process requires pretreatment and enzymatic hydrolysis which requires high amount of water, energy. In fact, for per kg of polyester processing 207MJ of energy is alone required during pretreatment process only. (Subramanian et al., 2020)
- A further, about 17 kg of water required in pretreatment and enzymatic hydrolysis process. (Subramanian et al., 2020)

Challenges to recycle polyester

Raw material sourcing: Raw material sourcing is a critical aspect of the polyester recycling industry. One of the challenges faced by many polyesters recycle factories is the shortage of raw materials, particularly plastic bottles. This scarcity has resulted in the factories running at lower capacities.

Competition with Virgin Polyester: Virgin polyester is cheaper and better than recycled polyester. Virgin polyester is produced in large quantities around the world, which lowers its production costs and increases its availability.

Contamination: In polyester recycling, PET waste can get mixed with things like labels, caps, and dirt, as well as other types of plastics. Contamination can affect the physical and chemical properties of recycled PET and reduce its performance and value.

Chapter 9: Current Best Practices and the Motivation Behind

9.1 Independent recycler

In the bustling Jhut recycling sector in Bangladesh, about 5 independent recyclers play an integral role. These recyclers typically source Jhut directly from the factories. It's a unique supply chain set up where international brands instruct their contracted factories to send the Jhut to these recyclers instead of discarding it. This initiative not only promotes sustainable practices but also provides an additional revenue stream for factories, as recyclers compensate them for the Jhut. This way, the cycle of sustainability is maintained - the Jhut waste gets a new life, factories profit from what was once waste, and recyclers receive the raw materials they need for their businesses.

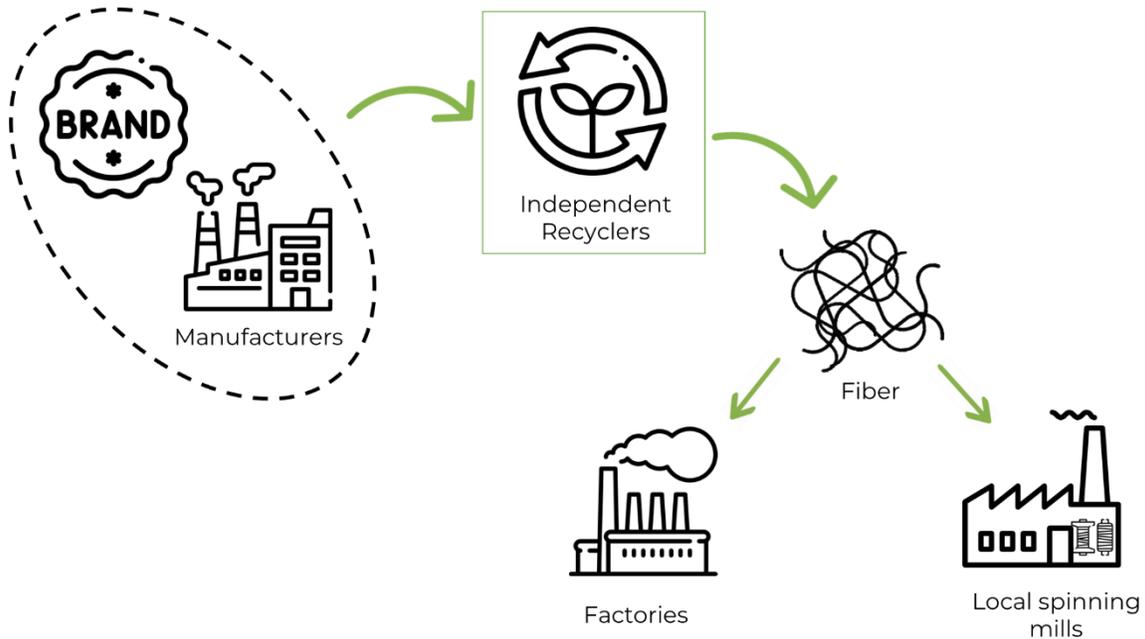


Figure 20: Independent recycling stakeholders

Some entity functions independently for recycling fibre like, **Recover™** adopts a different perspective - viewing waste not as a discarded end-product, but rather as an opportunity for circular solutions. Instead of heading to landfill, textile waste from the factories becomes the raw material for **Recover™**, which is then transformed into high-quality recycled cotton fibre. The fibre is then sent to factories or local spinning mills where the fibre is made into recycled yarn. This innovative process enables the reincorporation of these recycled fibres back into textile production, creating a sustainable, closed-loop model for the industry.

One of the factories receiving their fibre is **BEXIMCO**, one of the largest exporters of garments in Bangladesh, who has initiated steps to incorporate sustainable practices, by producing recycled yarn, into their manufacturing process.

1. **BEXIMCO Ltd.**
2. **Reverse Resources**
3. **Recover TM**

4. **CYCLO Recycled Fibres**
5. **Recycle-Raw**
6. **Circular Fashion Partnership (CFP)**

What brands are doing:

1. **BEXIMCO Ltd:**

- Focuses on the upcycling of fabric mill waste cut clips.
- Works towards enabling and scaling up interventions to achieve a circular economy target in Bangladesh.

2. **Reverse Resources:**

- Develop and manage SaaS for efficient textile waste recycling, enabling end-to-end oversight and circular life cycle planning.
- Disrupt waste handler business models, introduce brand opportunities, and overhaul supply chains with a code of conduct and enhanced transparency.
- Communicate market barriers, engage policymakers, and position Reverse Resources as a global leader in advancing sustainable textile waste management.

3. **Recover TM:**

- Delivering innovative, cost competitive, recycled fibres and circular solutions at scale. Involved in the recycled yarn sector.

4. **CYCLO Recycled Fibres:**

- Participates in recycling pre-consumer cotton produced by various Ready-Made Garment (RMG) enterprises in Bangladesh.

5. **Recycle-Raw:**

- Engages in the recycling of pre-consumer cotton, similar to CYCLO Recycled Fibres, contributing to the country's efforts in recycling textile waste.

6. **Circular Fashion Partnership (CFP):**

- A cross-sectoral initiative aimed at facilitating the growth of the recycling industry in Bangladesh.
- Focuses on capturing and redirecting post-production fashion waste into the production cycle.
- Involves collaboration between textile and garment manufacturers, recyclers, and global fashion brands.
- It includes over 36 waste management companies and recyclers working to create new fashion products from recycled materials.

9.2 Local Spinning Mills:

Numerous local spinning mills such as **Shahjalal Recycling Ltd., Mosharrof Spinning, Maliha Poly Recycling Ltd., & Badsha Group** contribute to the recycling initiative by purchasing recycled fibre or Jhut from independent recyclers, open market or factories. They transform this Jhut or fibre into yarn, subsequently selling it to garment factories and other companies. Most of these spinning mills do not have an identification as a Brand, however, they sell the recycled yard to other factories and brands by maintaining proper documentation and record as a legal entity.

Among these group only **Simco Spinning & Textiles Limited (Simco)**, a visionary textile company based in Bangladesh, is a pioneer in recycling fabric waste into recycled fibres and yarns and upcycling post-consumer garment waste into a fibre brand named CYCLO. The company has been instrumental in offering solutions to mitigate textile waste problems in Bangladesh. The expansion significantly boosted the company's production capacity, enabling it to process up to 30 tons of waste per day.

Global brands such as H&M, Adidas, and Puma integrate the versatile CYCLO fibres into their products. These fibres, available in diverse colours and weights, lend themselves to the creation of a range of textile products including clothing, home textiles, and industrial fabrics.

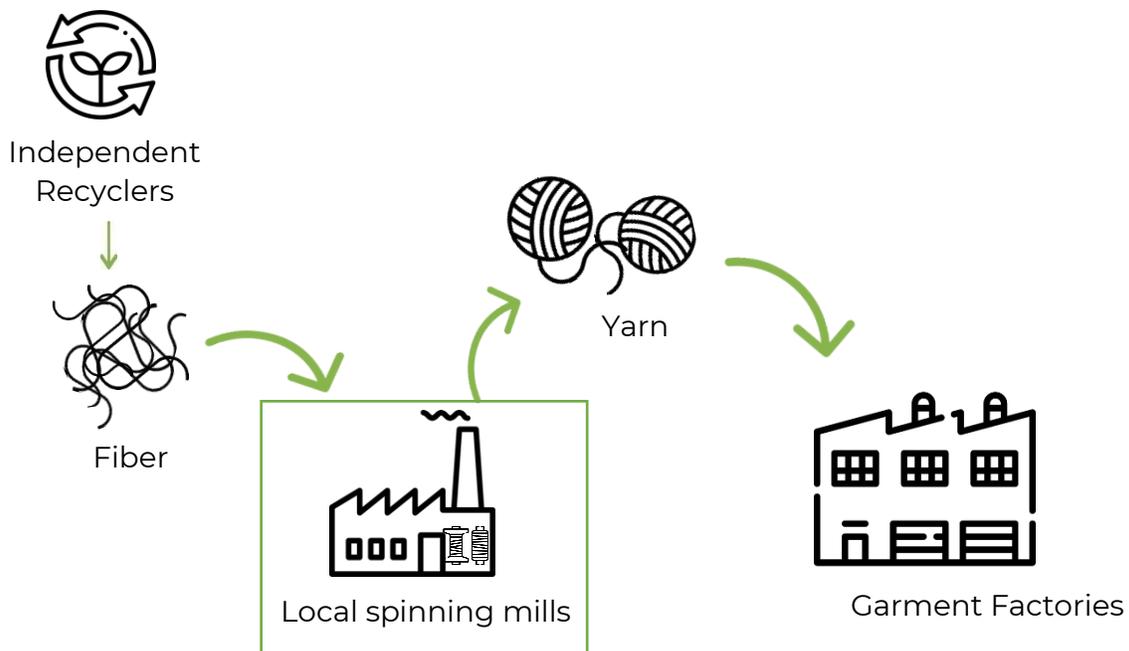


Figure 21: The position of local spinning mills in the recycled Jhut value chain

9.3 Vertically Integrated Factories:

The sustainable recycling of Jhut, or textile waste, in Bangladesh has seen an increasing involvement from vertically integrated factories and brands, who play a crucial role in streamlining the process. Brands act as a conduit, sending the Jhut to the dedicated facilities for recycling, thus aiding in waste reduction. Some factory has already established circular approach in their operation like DBL Group, Square Group, Hameem Group, Reedisha Group etc., they recycle

their own Jhut also receive Jhut from other factories as a result of brand's influence without putting extra efforts to collect it.

DBL Group, a leading conglomerate in Bangladesh, operates a dedicated Jhut recycling company and is one of the largest producers of recycled cotton yarn in the country, exporting their products globally. DBL Group's subsidiary, DBL Recycling Textile Ltd., established in 2016, processes a substantial 10,000 metric tons of Jhut annually.

Square Textiles Ltd, another key player, is dedicated to the sustainable management of cotton textile waste. They are committed to an eco-friendly approach in all their operations, including the sustainable sourcing of raw materials, waste management, and recycling.

Ha-Meem Group, through their denim manufacturing section, has implemented a circular production model that includes cotton Jhut recycling. Their state-of-the-art denim mill recycles and reuses the waste produced during the manufacturing process, further endorsing the value of Jhut recycling.

Reedisha Group, one of the 100% export-oriented textile industry makes product with recycled cotton within their facility, independently.

It is notable to mention here that all of them function with mechanical recycling technology only.

Similarly, **Waste Concern**, an organization that has been involved in Jhut recycling since 2008, has a plethora of recycling projects under its belt. They offer support and training to waste pickers while innovating new recycling technologies, such as machines capable of converting Jhut into yarn.

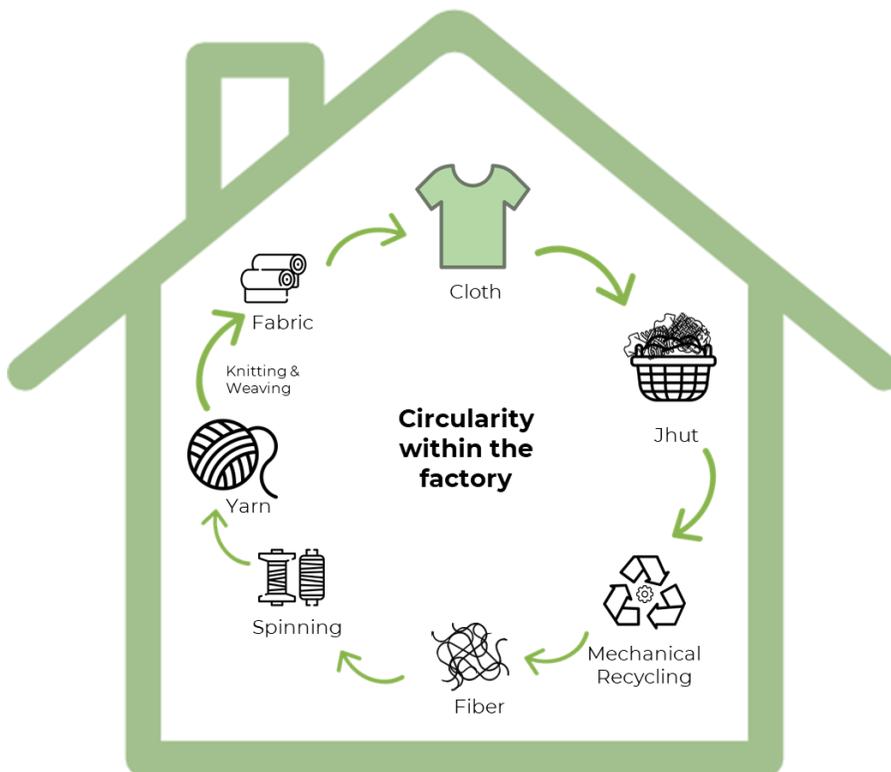


Figure 22: Integrated recycling process within factories

9.4 Reasons to Recycle:

In essence, recycling textile waste (Jhut) is propelled by heightened ESG commitments, a surge in market demand with lucrative financial benefits.

ESG Commitment Acceleration:

- 75% of brands have committed to using recycled textile products.
- Aligns with brands' Environmental, Social, and Governance (ESG) strategies.
- Reinforces brand reputation and meets eco-conscious consumer expectations.

Market Demand Resonance:

- Growing consumer preference for sustainable goods.
- Factories and brands respond by sourcing recycled Jhut.
- Symbiotic relationships form between recyclers and brands, catering to market demand.
- End customers value eco-friendly products, driving adoption of recycled materials.

Profitability and Premium Appeal:

- Recycling textile waste offers robust commercial advantages.
- Premium pricing achievable due to sustainability appeal.
- Brands realize increased profitability and market positioning.
- Recyclers secure consistent material streams, enhancing economic viability.

Chapter 10: Challenges in the Adoption and Application of Technologies in Bangladesh

The adoption and application of these technologies in Bangladesh face significant obstacles mentioned below:

- i. **Unstable natural gas supply:** Many Jhut recycling processes require a steady supply of natural gas as fuel, the supply of which is currently unstable in Bangladesh. This instability can lead to operational disruptions, affecting the overall efficiency and feasibility of these methods. Securing more stable and diverse energy sources could help address this issue. Furthermore, because of this limited natural gas supply, textile waste is used for incineration in so-called 'Jhut boilers' for heat and steam production in garment factories.⁹
- ii. **Limited renewable energy source:** Renewable energy constitutes a mere 2.93% of Bangladesh's total energy composition as per United Nations¹⁰. Moreover, new recycling technologies primarily entail chemical processes, known for their high energy consumption. However, prominent recyclers are currently seeking access to low-emission energy sources, a resource currently lacking within Bangladesh's infrastructure.
- iii. **Lack of complementary legislation:** Current legislations in Bangladesh do not adequately support the use of advanced Jhut recycling technologies. Without appropriate legislative support, businesses may find it challenging to invest in these technologies. Developing comprehensive policies and regulations that promote and incentivize the use of sustainable recycling technologies is crucial. Bangladesh can improve textile waste management by utilising the EU Directive 2018/851 model. Establishing recycling goals might encourage the sector to recycle and reuse more materials. The recycling effectiveness of textile waste can be increased by introducing a separate collection system. Textile waste can be turned into a helpful resource by defining end-of-waste requirements. Reducing the sector's environmental impact can be achieved using waste prevention strategies, such as promoting sustainable production. These actions can improve Bangladesh's textile waste sustainability and are consistent with the circular economy and producer responsibility ideas.
 - **Recycling Targets:** The Commission is to consider setting specific targets for re-use and recycling of textile waste. The targets are: Extended Producer Responsibility (EPR) Schemes, Eco-design Requirements, Textile Waste Management, Circularity and Sustainability, Labelling and Green Claims, Preventing Illegal Waste Shipments, Ban on Destruction of Unsold Textiles. Set specific, measurable targets for reusing and recycling textile waste, providing clear goals for various stakeholders. **Bangladesh should formulate a comprehensive National Waste Strategy and Roadmap, setting targets aimed at enhancing the recycling of Jhut.**
 - **Separate Collection of Textile Waste:** Bangladesh can establish systems for separate collection of textile waste. This involves setting up dedicated collection points and ensuring separate waste streams in different kinds of textile sectors. This system

⁹ <https://www.tandfonline.com/doi/abs/10.1080/15567036.2020.1856236>

¹⁰ <https://bangladesh.un.org/en/260959-bangladesh%E2%80%99s-energy-transition-journey-so-far>

should be integrated into the existing waste management infrastructure to ensure efficiency.

- **End-of-Waste Criteria for Textiles:** The Bangladeshi government can empower a relevant commission or authority to define criteria under which textile waste ceases to be considered waste and becomes a resource. This step would facilitate recycling and repurposing of textile waste.
- **Prevention of Textile Waste Generation:** To prevent textile waste, Bangladesh can encourage sustainable production and consumption. This involves promoting practices such as eco-design, durability, repairability, and reusability in the textile industry. Awareness campaigns and incentives for manufacturers and consumers can be effective here.
- **Extended Producer Responsibility (EPR):** Following the EU model, Bangladesh could introduce EPR legislation. This would require textile producers to take responsibility for the disposal of their products, possibly through take-back schemes or contributing to waste management costs. EPR can create new market opportunities for companies specializing in fabric waste management technologies.
- **Preventing Overproduction:** Drawing from **France's anti-waste law**, Bangladesh could implement regulations to prevent the destruction of unsold textiles, encouraging donation, resale, or recycling. To effectively address overproduction and textile waste in Bangladesh, inspired by France's anti-waste law, the government can take these streamlined steps:
 - **Legislative Framework:** The government of Bangladesh could introduce a specific law or amend existing ones to include clauses that prohibit the destruction of unsold textiles. This law would mandate the donation, resale, or recycling of unsold textile products.
 - **Incentives for Compliance:** To encourage compliance, the government could offer incentives to companies that successfully implement strategies to reduce overproduction. These could include tax breaks, subsidies, or recognition programs.
 - **Partnerships with NGOs and Private Sector:** These partnerships can influence existing networks and expertise in waste management and social welfare.
 - **Awareness Campaigns:** Running awareness campaigns to educate manufacturers and retailers about the environmental impact of textile waste and the benefits of reducing overproduction. These campaigns could also inform them about the new regulations and the importance of compliance.
 - **Monitoring and Enforcement Mechanisms:** Establishing robust monitoring and enforcement mechanisms to ensure that companies adhere to the regulations. This could involve regular audits, reporting requirements, and penalties for non-compliance.
 - **Support for Recycling and Upcycling Initiatives:** Encouraging the development of recycling and upcycling industries in Bangladesh. This could involve providing support for startups and established businesses that specialize in turning textile waste into new products.

- iv. **High costs:** The initial investment and operational costs of advanced recycling technologies can be deterrents to the growth of this business. This is particularly the case

for SMEs, potentially limiting the widespread adoption of these technologies. Subsidies, incentives, or innovative financing models could help alleviate these cost barriers.

- v. **Skills gap:** There is a notable skills gap in the workforce needed to operate and maintain these advanced technologies. Training programs and educational initiatives could help build the necessary technical capabilities within the workforce.
- vi. **Power infrastructure:** The existing power infrastructure in Bangladesh may not be able to support the increased load from these advanced systems. Moreover, frequent power outages could interrupt operations, affecting the overall productivity and feasibility of these technologies. Investment in the modernization and expansion of the power infrastructure is key to addressing this issue.
- vii. **Quality Assurance:** Quality assurance presents a significant challenge for factories in the context of waste management and circularity initiatives. Many factories are hesitant to make substantial investments in machinery and technology because they harbour concerns that the resulting quality may not meet the high expectations of buyers. This apprehension is rooted in the delicate balance between adopting sustainable practices and ensuring product quality. Factories often fear that prioritizing waste reduction and recycling might compromise the quality of their products, which could have adverse effects on their reputation and competitiveness in the market. Consequently, this reluctance to invest in machinery and technologies becomes a noteworthy barrier to achieving both environmental sustainability and meeting buyer demands for top-notch product quality. Balancing these two essential aspects remains a complex and ongoing challenge for factories striving to embrace circular economy principles.

Chapter 11: Hypotheses of Transforming the Informal Sector into Formal Sector

11.1 Dialogue between key stakeholders:

Effective formalization of the informal Jhut sector in Bangladesh requires a holistic approach involving key stakeholders. An open dialogue among these players is crucial to address the diverse and interrelated challenges this sector faces. These stakeholders include government bodies, manufacturers, the Bangladesh Garment Manufacturers and Exporters Association (BGMEA), the Bangladesh Textile Mills Association (BTMA), Non-Governmental Organizations (NGOs), the local muscle group, recyclers, and brands. Each stakeholder plays a unique role in this transformation, with the potential to contribute significantly to areas such as regulatory frameworks, formalization of workers, infrastructure development, partnerships, capacity building, public awareness, and market development. The following is a detailed breakdown of who should engage with whom and on what topics to facilitate this crucial transition:

- a. **Collaborative Discussion for Jhut Sector Enhancement:** Facilitate a comprehensive discussion among pivotal stakeholders—recyclers, manufacturers, business associations (BGMEA, MKMEA, BTTLAM, BTMA), the local muscle group, NGOs, government bodies, and brands—to foster collaboration and dialogue. The goal is to collectively address challenges and strategize the formalization of the Jhut waste recycling sector in Bangladesh.
 - b. **Government bodies and Manufacturers: Regulatory Framework and Incentives for Compliance** Officials from the Ministry of Commerce and the Ministry of Environment should collaborate to engage with manufacturers, working to establish a robust and practical regulatory framework. They should also discuss the creation of incentives for companies that transition to formal operations, such as tax breaks or subsidies.
 - c. **BGMEA, BKMEA, BTTLAM, BTMA, and Local Muscle Group How: Formalization of Informal Workers** Representatives from the BGMEA, BKMEA, BTTLAM and BTMA should engage with the local muscle group to strategize the formalization of informal workers. This includes discussion on fair wages, job security, access to benefits, and worker protection.
- b) Business associations, including BGMEA, BKMEA, BTTLAM, and BTMA, are motivated to engage with the local workforce for the formalization of informal workers due to the alignment with sustainability goals, improved compliance and reputation, access to ethical markets, long-term stability, ethical responsibility, risk mitigation, positive government relations, global standards compliance, enhanced supply chain resilience, and the promotion of brand loyalty associated with fair labour practices.
- a. **Manufacturers, Recyclers, and Government: Infrastructure Development and Technology Innovation** Manufacturers, recyclers, and Government need to discuss the development of infrastructure and technological solutions to manage, recycle, and upcycle Jhut waste efficiently. This includes investment in modern recycling facilities and research on innovative waste management technologies.
 - b. **Government bodies, NGOs, and Local Muscle Group: Partnerships and Collaboration** Government bodies should collaborate with NGOs and the local muscle group to form strategic partnerships for effective waste management. These partnerships can facilitate resources sharing, knowledge exchange, and joint initiatives for community-based recycling programs.

- c. **BGMEA, BKMEA, BTTLAM, BTMA, and Recyclers: Capacity Building and Training** BGMEA and BTMA representatives need to engage with recyclers to discuss capacity building and training initiatives. Workers transitioning from the informal sector require training on waste management practices, safety guidelines, and operational efficiency to smoothly integrate into the formal sector.
- d. **Threads of Tomorrow: Brands Pioneering Sustainable Style:** Follow the sustainable practices of industry leaders such as H&M, ALDI, and KIK by integrating recycled materials in clothing lines, emphasizing circular fashion principles, and actively promoting eco-friendly alternatives. Prioritize transparency in supply chains to enhance environmental responsibility and make sustainable fashion accessible and affordable for a broader consumer base.
- e. **Manufacturers, Government Bodies: Market Development for Recycled Products** Manufacturers, government bodies need to collaborate with Brands to develop and expand markets for products made from recycled Jhut. This could include discussions on creating demand, setting quality standards, and promoting these products through branding and marketing strategies.

Table 1: Overview of key stakeholders and topics of discussion

Stakeholder	Engage With	Topics of Discussion
Government Bodies	Manufacturers	Regulatory Framework and Incentives for Compliance
	BGMEA, BKMEA, BTTLAM, BTMA, and Local Muscle Group	Formalization of Informal Workers
	Manufacturers, Recyclers	Infrastructure Development and Technology Innovation
	NGOs, Local Muscle Group	Partnerships and Collaboration
	BGMEA, BKMEA, BTTLAM, BTMA, and Recyclers	Capacity Building and Training
Business Associations (BGMEA, BKMEA, BTTLAM, BTMA)	Local Muscle Group	Formalization of Informal Workers
	Recyclers	Capacity Building and Training
Manufacturers and Recyclers	Government	Infrastructure Development and Technology Innovation
	Government, NGOs, and Local Muscle Group	Partnerships and Collaboration
	BGMEA, BTMA, Brands	Market Development for Recycled Products
Brands (e.g., H&M, ALDI, KIK)	Manufacturers, Government Bodies	Market Development for Recycled Products (Enhanced Focus)
	Government, NGOs, and Local Muscle Group	Collaborative Initiatives for Sustainable Practices in the Fashion Industry

Threads of Tomorrow (Brands Pioneering Sustainable Style)	All Stakeholders	Advocate and Lead in Sustainable Practices, Circular Fashion, Eco-friendly Alternatives, Transparency, and Affordability of Sustainable Fashion
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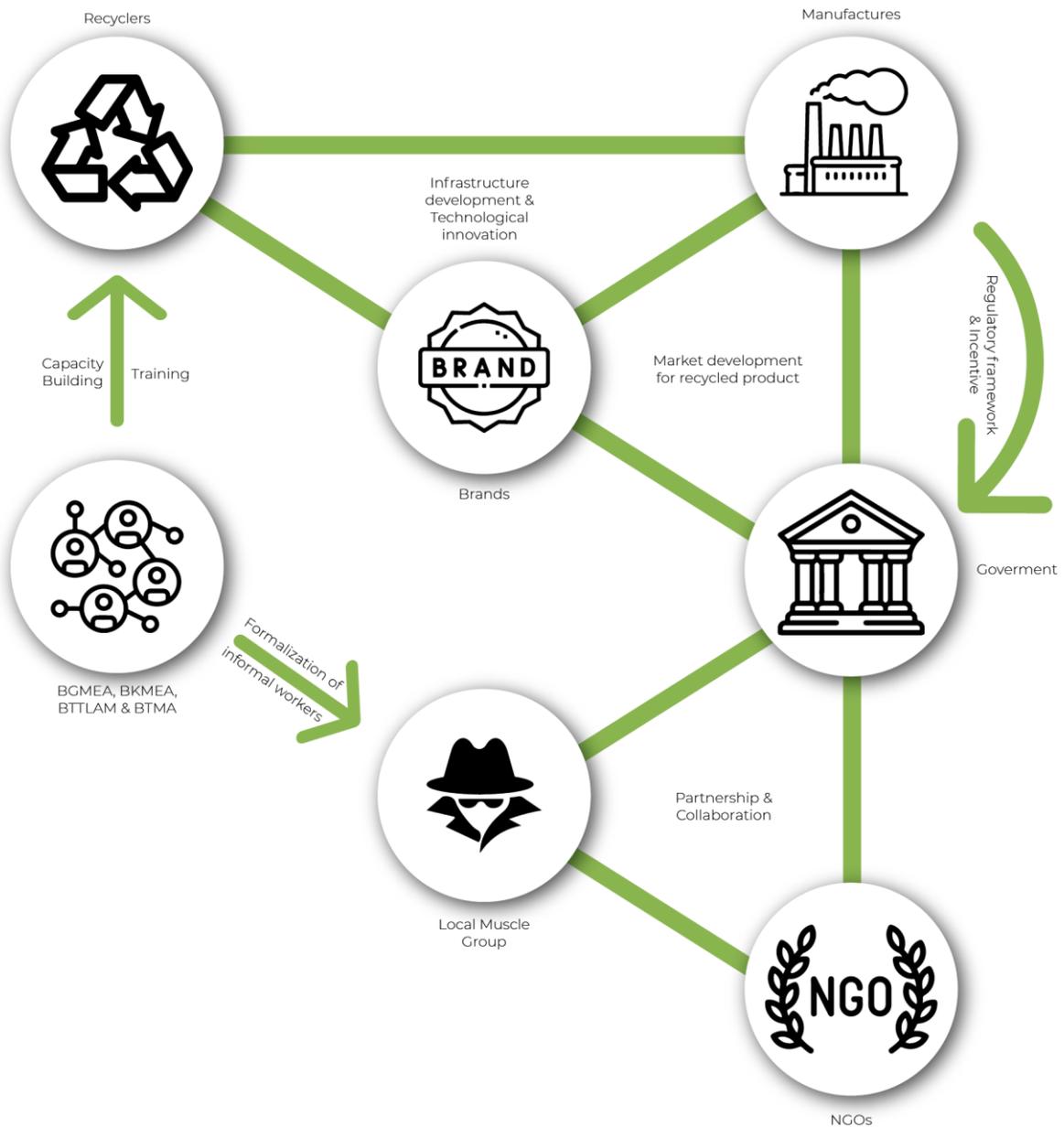


Figure 23: Stakeholder relationship map

11.3 Formalization of the Local Muscle Groups: Tasks, Documentation and Roles

As part of their formalization, the local muscle groups would need to undertake specific tasks that contribute to the overall objective of sustainable Jhut waste management. This could include collection and segregation of waste, transporting waste to designated recycling facilities, or even managing some aspects of the recycling process.

1. **Legal Brokerage Functions:**

As a formal entity, the local muscle group could also serve as a legal brokerage firm, facilitating connections and contracts between Jhut waste generators (such as manufacturers and brands) and recyclers. This role would require understanding and adhering to relevant laws and regulations and negotiating and enforcing contracts.

2. **Logistics Support:** The local muscle group would play a crucial role in the logistics of Jhut waste management. This includes ensuring efficient and environmentally friendly collection and transportation of Jhut waste and coordinating these activities with other stakeholders such as manufacturers, recyclers, and regulatory bodies.

3. **Jhut recycling**



Figure 24: Local muscle groups exert control over processes including logistics, sorting, recycling and brokerage

By adopting the below tasks, local muscle group can contribute proactively to a comprehensive system that covers all stages of Jhut waste handling - from collection and classification to cleaning, processing, and reintroduction into the production cycle.

- **Collection:** Initiating and organizing the collection of Jhut from textile and garment manufacturing units.
- **Sorting and Classification:** Overseeing the sorting and classification of Jhut based on type, colour, and usability, ensuring maximum utilization.
- **Cleaning:** Ensuring that the collected Jhut is cleaned, either through direct handling or through coordination with external service providers.
- **Processing:** Participating in the initial processing of Jhut, preparing it for recycling or reuse.

Additionally accurate record keeping is essential in the formalization process. The local muscle group needs to keep detailed records of their operations, including the volume of Jhut waste collected, transported, and recycled. Additionally, documentation of any financial transactions, contracts, or partnerships will be necessary.

11.4 Hypothetical Incentive Scheme

In Bangladesh's Jhut waste recycling industry, there's significant potential for uniform growth and formalization.

The current supply of Jhut in the local market is insufficient to meet the production needs of recycling factories (producers of recycled yarns) as they do not get sufficient Jhut as raw materials to utilize their existing recycling capacity.¹¹ Increasing export of Jhut or leftover fabric scraps has hit the domestic recycled yarn factories who are now turning to imported yarns to prevent production shut down in the face of short supply of raw Jhut from local sources.¹² On the flip side, local millers producing recycled yarn lack business competitiveness thereby failing to supply cheaper recycled yarns to the market than the imported ones. As a result of which local suppliers are losing out to foreign competitors as they are forced to shut down their recycled yarn production.¹³

By cultivating an environment where every stakeholder sees clear benefits, we can create a win-win scenario for all. This not only enhances the industry's credibility but also ensures sustainability. A hypothetical incentive scheme, tailored for manufacturers and recyclers, could be the catalyst in driving this positive change, marrying economic viability with environmental responsibility by brands & government, as mentioned in the table below:

Table 2: Policy options for incentivising Jhut recycling and formalization

Incentive Type	Potential Beneficiaries	Amount/Percentage (Hypothetical)	Rationale for Incentive	Prerequisites for Receiving Incentives
Tax Breaks	Garment factory owners, SMEs, Jhut recyclers	XX% reduction in corporate tax for Y years	Encourages formalization and growth of recycling operations	Business License/ registration, minimum recycling capacity
Subsidies	Small-scale recycling entities	Up to XX% of machinery costs	Lowers financial barriers to acquire essential recycling machinery	Business license, use of approved recycling machinery
Grants	NGOs, R&D Institutions, Entrepreneurs , Innovative recycling projects	BDT XXX for approved projects	Supports the development of sustainable recycling technologies	Project proposal, compliance with environmental standards
Training & Skill Dev.	NGOs, SMEs	BDT XXX per trainee	Enhances operational efficiency and worker safety	Training Ideas, Enrolment target in recognized training programs
Low-interest Loans	Small to mid-sized recycling enterprises	X% interest rate, up to BDT X million	Facilitates expansion and technological upgrades	Business plan, proof of recycling volume

¹¹ Monira & Arafat, above note 3.

¹² The producers of recycled yarns encounter some challenges in sourcing raw waste materials because the local Jhut market is highly unregulated, informal, and unpredictable yet.

¹³ See, "Jhut export on the rise, recycled yarn producers feel the pinch", RMG Bangladesh, Dec 14, 2019.

Export Incentives	Recyclers exporting recycled materials, Garment factory owners	XX% rebate on export earnings	Promotes international trade of recycled materials	Export license, adherence to international quality standards, traceability reports
Access to Infrastructure	New and growing recycling businesses	XX% discount on rental for Y years	Reduces operational costs for nascent recycling enterprises	Lease agreement, location in designated business areas, Intended capacity, Strategy documentation

Incentives can be offered based on performance of sustainable Jhut (textile waste) management. This approach involves rewarding stakeholders that demonstrate effective and environmentally responsible practices in handling Jhut. The criteria for performance could include efficient recycling methods, reduced environmental impact, innovative approaches to repurposing or reusing textile waste, and adherence to sustainable disposal practices.

11.5 Hidden Opportunities

Jhut in Bangladesh is a goldmine for the home textile sector due to its recyclability. Currently, this vast, informal segment remains an untapped opportunity. By offering incentives like tax breaks and training, the government can encourage Jhut businesses to register and operate formally. Transitioning informal Jhut handlers into formal business entities can significantly enhance their position within the value chain of brands securing potential longevity of their business operations. Access to low-interest loans and infrastructure facilities can serve as catalysts for their growth and integration into the formal economy. However, these incentives might not be enough and further survey and analysis is required to identify what conditions would be required for them to consider in becoming formal business entities. Transitioning this sector from informal to formal can unlock significant economic benefits and sustainable practices for Bangladesh.

By segregating Jhut waste based on fabric type and colour, factory owners can significantly enhance the value of their waste material. Organized and separated waste is more desirable for recycling, allowing vendors to process it more efficiently. As a result, factory owners can demand higher prices for their sorted waste, turning their leftovers into a more profitable revenue stream. Partnering for sustainable waste management is more efficient and transparent than each factory building its own recycling plant; such a minor shift in approach can have a profound impact on Bangladesh's position in the global market.

11.6 Risk Associated with Formalization

If these actors adapt to a formal framework, they may face challenges in terms of compliance costs, bureaucratic hurdles, and potential changes in their established practices.

1. Disrupting the whole Jhut industry:

The dynamics of the Jhut industry could change as a result of the process of incorporating the informal sector into a regulatory framework. Established practices and informal networks could be reshaped, potentially leading to job losses or resistance from stakeholders who have operated outside formal structures resulting in complete disruption of the industry and supply chain.

2. Nuisance from the factory:

Adapting to formalized legal requirements could disrupt established supply chain dynamics, affecting sourcing, production, and distribution processes. These changes may lead to potential delays or interruptions in the operational flow. Moreover, meeting the demands of formal legal standards often entails substantial financial investments, impacting the factory's short-term profitability and financial stability. To address these challenges, a strategic approach is crucial, involving careful planning to minimize disruptions while ensuring compliance. Without proper planning and oversight, these factories could face difficulties.

3. Feasibility of inclusion:

A crucial factor to take into account is whether the informal sector can integrate smoothly into the legal system. Due to different operating norms, adapting informal methods to satisfy formal criteria might not be simple. Balancing the flexibility needed for these small-scale operations with the rigidity of regulations is a complex issue that demands careful examination.

To mitigate the risks associated with the formalization of informal sectors, a multi-faceted and considerate approach is essential. Some steps are suggested below;



Gradual Integration: Instead of an abrupt shift, a phased approach to formalization can help. This allows time for adaptation and minimizes disruption. Begin by introducing less invasive regulatory requirements and slowly increase compliance demands as the sector adapts.



Government Support and Incentives: To ease the financial burden of formalization, the government could offer temporary tax relief, subsidies, or grants specifically designed to cover compliance costs. These financial aids would help businesses invest in necessary upgrades without compromising their operational stability.



Capacity Building and Training: Implementing training programs to educate business owners and workers about the new regulations and their benefits can facilitate smoother transitions. These programs should also offer guidance on maintaining efficiency and profitability under the new systems.



Stakeholder Engagement: Involve all stakeholders in the planning and implementation stages of formalization policies. This includes business owners, workers, local communities, and government officials. Flexibility in Regulations: Tailor regulations to fit the unique needs and challenges of the Jhut industry. Regulatory frameworks should be flexible enough to accommodate the operational styles of small-scale enterprises while ensuring that they meet essential standards.



Establishing Clear Pathways for Compliance: Provide clear, accessible information and support systems to help businesses understand and meet legal requirements through development organizations & within the sector. This could include setting up dedicated help desks, online portals, and community meetings.

Chapter 12: International Examples of Recycling Technologies and Jhut Business Models

12.1 Recycling Technologies

The following table compares textile **recycling technologies** across five countries. Bangladesh, Pakistan, and Cambodia primarily use mechanical recycling methods. Vietnam expands its approach to include mechanical, chemical, and enzymatic techniques. China employs a diverse range of technologies, such as Solid Recovered Fuels, transforming fabric waste into wood-plastic composites for small-scale production, and chemical recycling, though the latter incurs high costs due to secondary pollutant treatment. This overview reflects the different stages of technological adoption in textile waste recycling among these nations.

Table 3: Available recycling technologies in different Asian countries

Countries	Recycling Technologies
Bangladesh	Mechanical
Pakistan	Mechanical
Vietnam	Mechanical, Chemical & Enzymatic
Cambodia	Mechanical
China	Solid Recovered Fuels, Fabric waste into wood Plastic Composite (only for small-scale production), Chemical recycling (high cost due to high secondary pollutants treatment cost)

The comparative analysis of textile waste management practices across Bangladesh, Pakistan, Vietnam, Cambodia, and China reveals a rich tapestry of strategies, each tailored to the specific needs and capabilities of the respective countries. From Bangladesh's focus on informal sector-led mechanical shredding for export to China's comprehensive legislative framework and advanced recycling technologies, these countries offer a spectrum of approaches to tackle the burgeoning issue of textile waste. The synthesis of these diverse practices underscores the importance of adaptable, context-specific solutions, and the potential benefits of cross-border knowledge exchange. As the world grapples with the environmental impacts of the textile industry, the insights garnered from these countries can guide the formulation of more effective, sustainable, and globally harmonized waste management frameworks. The journey towards a more sustainable textile industry is complex and requires concerted efforts from all stakeholders, but the experiences of these countries serve as valuable stepping stones in these ongoing endeavours.

12.2 Prato, Italy - Transitioning from Informal to Formal in the Circular Economy

Prato holds the position as the global epicentre for recycled textile materials

Prato, an industrial beacon in Italy, boasts a textile district that accounts for about 3% of Europe's textile production. Historically, the city's textile success hinged on its innovative approach to reusing waste, notably through creating carded wool, a pioneering recycled spinning. Today, with 7,200 companies, 35,000 direct employees, and generating 17% of Italy's textile exports, Prato's district is a global textile hub with annual sales nearing 400 million EUR. The city has always championed circularity; from recycling natural fibres from rags and used clothes to establishing a state-of-the-art wastewater purification system. However, as market demands and material technologies evolved, so did Prato's industry, reflecting shifts in industrial processes and material

usage. This integration further cements Prato's legacy as a hub of textile innovation and adaptability, historically rooted in sustainability.¹⁴

In 2017, Prato's textile sector successfully converted 142 million kilograms of discarded materials into fibres. This industry, representing the heart of Prato's sustainable initiative, is responsible for recycling an impressive 15% of all global garment waste. With this achievement, it is estimated to have contributed a staggering \$2.5 billion to the economy, solidifying Prato's position as the global epicentre for recycled textile materials.¹⁵

Initiatives for Formalization:

1. Programma Ambiente Efforts:

- Programma Ambiente emerged as a leader in handling technical innovations, particularly in collecting and reusing synthetic textile fibres.
- Leveraging advanced equipment and deep technical knowledge, Programma Ambiente put forward proposals to maximize the recycling and reuse of waste, suggesting separate collection of synthetic and natural fibres.

2. Raw Material – "Regenerated" Wool: Prato is particularly known for producing "regenerated" wool. This involves taking old garments, used textiles, and fabric offcuts, then shredding them down to fibres. These fibres are then spun into new yarns and woven or knitted into new textiles. This method reduces waste and offers a sustainable alternative to virgin wool production.

3. Recycling Process:

- **Collection:** Old garments and textile waste are collected, often imported from various parts of the world.
- **Sorting:** These textiles are then sorted based on colour and material type.
- **Shredding:** Once sorted, textiles are shredded into fibres.
- **Spinning:** These fibres are blended and spun into new yarns.
- **Manufacturing:** The new yarns are then woven or knitted into new textiles.

4. Economic Significance: The recycling process in Prato isn't just an environmental initiative; it's a significant economic driver. The city has established itself as a leader in "regenerated" textiles, and many businesses in the region thrive on this niche.

5. Environmental Impact: By recycling old textiles, Prato reduces the environmental burden associated with textile production. It conserves resources, diminishes waste, and reduces the carbon footprint and water usage typically linked with virgin material production.

¹⁴ Borsacchi, L., Barberis, V., & Pinelli, P. (2018). Circular economy and industrial symbiosis: The role of the municipality of Prato within the EU Urban Agenda partnership.

¹⁵ "The European market potential for recycled fashion" (2021), CBI, [The European market potential for recycled fashion | CBI](#)

12.3 India

Combining upcycling and downcycling to maximize sustainability and profitability:

The business model for fabric waste recycling in India combines upcycling and downcycling to maximize sustainability and profitability. Upcycling transforms high-quality fabric waste into unique, eco-friendly products for niche markets and fashion retailers, while downcycling converts lower-quality waste into practical materials for industries like automotive and construction. This dual approach allows for diverse revenue streams: premium prices for unique upcycled items and steady income from bulk sales of downcycled materials.

Key operations include sourcing and sorting fabric waste, designing upcycled products, processing downcycled materials, and effective marketing. The model relies on a steady supply of waste materials, specialized facilities, and skilled labour. Sustainability is central, aiming to reduce landfill waste and promote energy-efficient practices, though challenges like maintaining quality, market acceptance, innovation, and regulatory compliance are crucial.

In summary, this business model addresses environmental concerns and taps into the sustainable product market, offering a balanced and impactful approach to fabric waste recycling in India.

12.4 Turkey

Fabric Waste Recycling Business Model in Turkey – "Upcycling and Recycling Partnerships":

Business Model Overview: The fabric waste recycling model in Turkey involves upcycling discarded fabric into high-quality products and establishing partnerships to enhance recycling efforts.

Key Components:

- **Upcycling:** Transform used fabric into new, high-quality products like tote bags, quilts, and more, adding value and uniqueness to the items.
- **Recycling Partnerships:** Collaborate with businesses and individuals to collect fabric waste and recycle it into new products, expanding the reach and impact of recycling efforts.

12.5 China

Fabric Waste Recycling Business Model in China – "Closed-loop System and Vertical Integration":

Business Model Overview: China's fabric waste recycling model combines closed-loop systems, vertical integration, and partnerships to efficiently recycle fabric waste.

Key Components:

- **Closed-loop System:** Collect fabric waste from manufacturers, sort it based on type and quality, and reprocess it into new materials. This minimizes waste sent to landfills and creates new jobs in the recycling sector.
- **Vertical Integration:** Own all stages of the recycling process, from collection to reprocessing to manufacturing. This approach ensures quality control and captures value at multiple stages.

- Partnerships: Collaborate with other organizations to streamline fabric waste collection, sorting, and recycling efforts, benefiting from shared resources and expertise.

PART 2 – Bangladesh’s RMG Legal Framework Analysis

The following chapters provide analyses of legal frameworks relating to circular economy approaches in management of Jhut in Bangladesh is drawn from both national and international regulations.

Currently, no all-inclusive legal and policy framework relating to circularity in fabric waste (Jhut) management exists in Bangladesh. The country is yet to develop and adopt a ‘comprehensive national strategy’ to effectively address the issue of post-industrial textile waste (Jhut) management. However, there are a number of piecemeal legislations in Bangladesh like the Environment Conservation Act 1995 and the Solid Waste Management Rules, among others, that include some provisions for reducing and processing of industrial textile wastes as well as the disposal thereof.

The review of existing regulatory framework reveals that the methods of sustainable solid waste management and circular use of waste resources, such as reducing, reuse, recycling, upcycling, recovering, and repairing, are not clearly defined, particularly for the RMG Jhut. This regulatory gap makes it difficult to identify and implement these methods within the scope of the circular textile economy. ¹⁶

Bangladesh’s transition towards a circular textile economy will require revising national strategy development strategies, environmental laws and regulations, and investment programmes, as well as its active involvement in global efforts to promote circularity in textile value chains.¹⁷ The legal regime for circular textile waste management in Bangladesh is still in a developing stage.

The table below outlines various legislative initiatives and policies in Bangladesh which partially fulfil the requirements of a circular RMG waste (Jhut) management system essential to adopt circular economy.

Table 4: Overview of Bangladesh’s regulations and acts relevant to Jhut sector

Title of National Regulatory Instrument	Year	Organization
National Conservation Strategy, 1992	1992	DoE
Bangladesh Environmental Conservation Act 1995, amended in 2000, 2002, and 2010	1995	DoE
National Environmental Management Action Plan	1995	DoE

¹⁶ Maeen, Upama, Mazedul & et al (2022), "Textile-apparel manufacturing and material waste management in the circular economy: A conceptual model to achieve sustainable development goal (SDG) 12 for Bangladesh", Cleaner Environmental Systems, Vol 4, 100070, at p:10; URL: <https://doi.org/10.1016/j.cesys.2022.100070>

¹⁷ For example, documents like the Eighth Five Year Plan (2020–2025), the Perspective Plan 2041, and the Bangladesh Delta Plan (BDP) 2100 have sought to integrate the idea of ‘greener Bangladesh’ in national planning. *For more analysis*, Rojbin Ewan Ismail, above note 2, at p: 5.

Environmental Conservation Rules 2023	2023	DoE
National 3R Strategy for Waste Management 2010	2010	DoE
Local Government (City Corporation) (Amended) Act 2011	2011	LGD
National Environmental Policy 2013	2013	DoE
Seventh Five Years Plan (FY 2016- FY 2020)	2015	Ministry of Planning
Solid Waste Management Rules 2018	2021	DoE
Bangladesh Industrial Policy 2022	2022	MoC
Labour Act 2006 and 2023 (amendment)	2023	Ministry of Labour and Employment
Textile Policy (2017) and Textile Act (2018)	2018	Ministry of Textiles and Jute

Chapter 13: Bangladesh’s Laws and Policies Relevant for Jhut Collection and Processing

13.1 The Environment Policy, 2018

There is no specific single legislation in Bangladesh to provide comprehensive legal framework dealing with waste management from the RMG sector. The National Environmental Policy 2018 is a significant advance towards the national adoption of international legal mandates for waste management, environmental protection and ensuring sustainable development in Bangladesh. The 2018 Policy aims to tackle climate change issues, protect and improve the environment, and implement the principles of circular economy and SDG within Bangladesh context. It is favorable for introducing circularity in garments manufacturing and Jhut management in the light of CE approach. The Policy also has wider or partial similarities with some EU regulations on circular economy and the Convention on Biodiversity (CBD) 1992.

13.2 The Environmental Conservation Act, 1995 (ECA)

The Environmental Conservation Act 1995 (ECA)¹⁸ is the flagship law in Bangladesh for protecting the environment and controlling environmental pollution, but its provision have not yet been applied to the Jhut sector. Regulated by the Ministry of Environment and Forest (MoEF), the law covers the key aspects of conservation of environment, improvement of environmental standards and control and mitigation of environmental degradation. The Act

¹⁸ https://bangladeshbiosafety.org/wp-content/uploads/2017/05/Bangladesh_Environmental_Conservation_Act_1995.pdf

defines "waste" as "any solid, liquid, gaseous, radioactive substance, the discharge, disposal and dumping of which may cause harmful change to the environment". This definition would apply the mismanaged Jhut waste.

Furthermore, the Act requires that prior to establishment of any industrial set up, environmental aspects have to be given appropriate consideration (S. 12). **The key features of the law that might have impact on Jhut management in Bangladesh are: Mandatory requirements for prior environmental clearance, regulation of industrial wastes, setting standard limit for discharging and emitting waste, institutional mechanism for ensuring environmental justice, remedial measures for injury to ecosystem.** Furthermore, it outlines measures on offences committed by companies violating any of the provisions of the ECA (S. 16). Finally, the Act gives the government "power to make rules" (S. 20), including regulation for the establishment of industries and other development activities for conservation of environment, which could be applied to various Jhut collection and processing activities.

13.3 The Bangladesh Labour Act, 2006 and 2023 Amendment

The Bangladesh Labour Act 2006 is an important domestic legislation for workers' rights. On 2 November 2023 the Bangladesh Parliament approved amendments to the Bangladesh Labour Act, 2006, aligning it more with the International Labor Organization.

The Labour Act can support decent work provisions in textile waste management and give effect to international laws on waste management including the Basel Convention on the Control of Transboundary Movement of Hazardous Waste, 1992 and Stockholm Convention. **According to this law, every garment factory must make effective arrangements, with the approval of the Government (e.g. Department of Environment), for disposal of cutting wastes (Jhut) and effluents created from the industrial process carried on therein (Ss. 54, 351).** It also requires the entrepreneurs — Jhut traders and recyclers to maintain cleanliness (S.51) and prevent dust and fumes (S.53) while carrying out sorting, processing and segregation of Jhut materials. Reduction of waste is a primary concern of waste management regulation for reducing burden on the environment and ecosystem. The Participation Committee (in-house body) of the factory should help reduce waste production by fostering mutual commitment of employer and workers (s. 206).

Additional provisions include:

- a) **Protection for Young (Adolescent/Child) worker:** In Chapter III of the Bangladesh Labour Act 2006, titled "Employment of Adolescent Worker," Section 34 outlines strict restrictions on the employment of children and adolescents. It prohibits the employment of children and adolescents without a certificate of fitness from a registered medical practitioner, and they must carry a token referencing this certificate while at work. Exceptions are made for apprenticeships and vocational training. Below 14 girls and boys, often found working in informal waste management setups, should be protected from employment that hinders their education or development.
- b) **General OSH Measures:** Chapter V of the Bangladesh Labour Act 2006 focuses on health and hygiene in establishments, outlining various measures to ensure the well-being of workers. Sections relevant to fabric waste management include Section 51, Cleanliness

Section 53, focusing on the prevention of dust and fumes, and Section 54, emphasizing effective arrangements for the disposal of wastes and effluents.

- c) **Social Security for Young Workers:** Section 41 of the Bangladesh Labour Law Act 2006 establishes comprehensive regulations for the working hours of adolescent workers, focusing on safeguarding their well-being and ensuring a balance between work and personal development. The legislation sets strict limits on daily and weekly working hours. Overtime is permitted but is subject to specific restrictions, capping the total hours, and mandating approval from authorities. Adolescent workers are limited to two shifts, each not exceeding 7.5 hours, with provisions for weekly holidays and restrictions on working in more than one establishment per day.
- d) **Prohibition of Hazardous Work for Minors:** In the specific context of Bangladesh's textile waste management sector, Section 39 of Chapter III in the Bangladesh Labour Law Act 2006 holds particular significance. This section empowers the government to declare hazardous work, and consequently, it prohibits the employment of adolescents in any work categorized as hazardous. Given the nature of fabric waste management, which may involve potentially risky tasks, strict adherence to Section 39 is crucial to ensure the protection of adolescents engaged in this sector. It is especially pertinent for those below 14 years old who might be found working in informal waste management setups related to fabric waste. Upholding these legal provisions becomes essential to prevent the exploitation of young workers, safeguarding their rights, education, and overall development, particularly in areas associated with fabric waste processing where child labour risks may be prevalent.

Although these provisions are already present in Bangladesh's Labour Law, their effective implementation is lacking in the Jhut sector. These provisions need to be thoroughly applied to enhance compliance and safeguard the right of workers in the Jhut management sector.

13.4 The Environment Conservation Rules (ECR) 2023

Concerning the processing, recycling or sustainable management of textile Jhut, the Environment Conservation Rules 2023 (ECR) is applicable as complementary to the industrial waste management standards laid down in the BECA 1995 and the Labour Act 2006. The combined reading of these laws confirms that no Jhut processing and recycling industrial process can be carried out without prior obtaining an Environmental Clearance Certificate (ECC) from the Department of Environment-DoE which is mandatory for all categories of industrial establishments (s. 12, BECA).¹⁹ Provided that Jhut processing and recycling establishments belonging to moderately polluting “Orange” and highly polluting “Red” categories must submit Environmental Management Plan (EMP) for obtaining ECC. Small enterprises

¹⁹ *Vide:* S. 12 of the BECA 1995 r/w Rule 6 of the ECR 2023.

The ECR classifies industries into Green, Yellow, Orange and Red category on the basis of their impacts on the environment and human health. The most problematic enterprises causing serious environmental pollution fall in Red category, Yellow and Orange are less polluting category and the Green enterprises are the most environment friendly industries with provisions for reduction of pollution.

operating Jhut processing and recycling run by family members and investing upto maximum 5 lac BDT are exempted from obtaining Environmental Clearance Certificate (ECC).²⁰

Environmental Impact Assessment (EIA) is very essential for Red category industries which are highly dangerous for public health and the environment, and it should be carried out before setting up the industry.²¹ **It is important to note that there is no specific exemption in law given to a Jhut enterprise from the EIA, at the same time there is no provision specifically requiring the Jhut processing factories to undertake an EIA.** However, enterprises producing recycled fibre from garments waste and spinning mills are exempted from EIA because they are included in the list of Orange category industrial establishments mentioned in Schedule 1 to ECR 2023. It is still unclear from the law whether Jhut enterprises engaged in storing, processing and final discharging of hazardous wastes would be required to carry out the environmental impact assessment. Since the whole Jhut supply chain is still informal, unorganized and unregulated, and there are evidences of health and environmental risks therein, the requirement for EIA should apply to Jhut processing.

13.5 The Solid Waste Management Rules 2021

The government of Bangladesh has formulated 'Solid Waste Management Rules-2021' under the Bangladesh Environmental Protection Act, 1995. The legislation deals with specific guidelines for landfilling, composting and incineration. Moreover, the legislation has also introduced Extended producer responsibility (EPR). According to the clause 9 subclause 1, 4 and 5 manufacturers and importers of non-degradable and disposable products should take responsibility for properly disposing and recycling waste either through self-investments or jointly working with local government bodies.

The Solid Waste Management Rules 2021 provide an existing legal framework for undertaking solid waste management activities related to segregation, processing and final disposal of solid waste. It has provisions for collection, transportation and treatment of solid waste at any stage from waste creation until final disposal of it. The Rules lays down guidelines for developing solid waste management plans. It provides specific list of duties for the waste generators, manufacturers and importers of products, local government and other authorities for dealing with solid waste management. It stipulates for all non-individual entities including the factories to carry out solid waste management activities, *i.e.*, segregation, processing, recycling and final disposal of solid waste in an environment-friendly and hygienic manner and requires them follow the guidelines, procedures and standards laid down in Schedules 2 and 3 to the Solid Waste Management Rules 2021.

The law also requires the local government authorities (city corporations) to set up associated facilities for solid waste segregation, processing and final disposal at the designated locations within their jurisdiction. Solid waste can be collected from any or all sources of waste generation, such as household, institution, commercial establishments or industrial plants. The law provides incentives for better solid waste management. However, no such similar requirement has been set for the textile industry owners, product manufacturer or importer of the consumer products.

²⁰ Schedule 1 to the ECR 2023.

²¹ Rule 15 of the ECR 2023.

The Rules has also introduced fundamental principles of solid waste management and extended producer responsibility (EPR) rule, but currently the EPR system will only apply to plastic waste²², not textile waste and Jhut.

13.6 The Income Tax Act 2023

There is no direct reference in the Income Tax Act 2023 for circular economy in textile Jhut management. However, the following are some areas of income tax law which can offer incentives to the Jhut trading enterprises in the form of deductions from income tax assessment and tax exemptions. Such incentives would leverage the financial capacity of Jhut recycling entrepreneurs for sustainable investment and can be helpful for formalizing the Jhut supply chain and adopting circular business model through environment-friendly waste management system.

1. Allowable deductions (for expenses) in calculating income from business:

A Jhut trader or recycling company can claim deductions from its gross business income for the following expenses²³:

- a) Expenses related to purchase, stocking of raw materials;
- b) Expenses for payment of rents for the lands or premises used for business;
- c) Maintenance and preservation costs;
- d) Insurance premium purchased and paid for business;
- e) Expenses for electricity, energy and other utility services;
- f) Charges for transportation, clearing and forwarding of products;
- g) Costs of training the employees;
- h) Money not exceeding 5% of the net business profit paid to workers' participation fund, welfare fund and to workers' welfare foundation fund under labour law.

Tax Exemption for Approved Tax Holiday Beneficiary

If Jhut entrepreneurs are tax holiday beneficiaries, they can enjoy full or partial tax exemption from its business income under the tax holiday scheme for specific duration and subject to prescribed limits, conditions and qualifications (requirements). Such tax exemption will reduce income tax burden of the Jhut entrepreneur. Provided that the tax beneficiary must be a company incorporated under the Companies Act 1994 with paid up capital not below 20 lacs BDT.²⁴

Tax Exemption for SME Entrepreneur Income:

Income of any small and medium industry (SMI) from manufacturing products shall be exempted from the calculation of total income of such industry, on condition that its turnover does not exceed 70 lacs BDT, if it is female-owned; or 50 lacs BDT in other cases.²⁵

²² <https://www.dhakatribune.com/bangladesh/313102/minister-government-to-introduce-circular-economy>

²³ S. 49 of the Income Tax Act 2023.

²⁴ S.81, part 4 of schedule VI & chapter 3 of the Income Tax Act 2023.

²⁵ Clause 24, part-1, Schedule 6, of the Income Tax Act 2023.

Accelerated Depreciation Benefit on Machineries and Establishments:

Any Jhut recycling company which invests in new machineries and technologies for producing high yielding recycled yarns, can enjoy accelerated depreciation benefit against the purchase value of those machineries and establishments at the rate of 50% in the first year, 30% in the second year and 20% in the third year respectively. The accelerated depreciation benefit will be allowed for three years from the starting of commercial operation of that recycling factory subject to the conditions that the entity is a registered company in Bangladesh and it must forego any other income tax exemption.²⁶

13.7 The Textile Act 2018 & Textile Policy 2017

Both the Textile Act 2018 and Textile Policy 2017 are intended to increase textile export by upgrading the competitiveness of textile industries, improve quality of textile products, create local jobs, ensure sustainable development, formulate demand-based curriculum in textile education and research, human resource development. In relation to RMG Jhut management, the Textile Act is relevant in the following areas:

- a) Improvement of safety & workplace conditions for workers by the textile industry (S. 10);
- b) Creation of skilled manpower in the textile sector by the Government through providing skills training and technical education for workers sustainable textile production, sustainable fashion design, etc. (S. 11);
- c) Inspection and monitoring by the government for ensuring compliance with law (S. 17).

The above issues have only indirect connection with management of post-industrial textile wastes (Jhut), and **the Textile Act 2018 does not have any specific provision to regulate the Jhut management**. On the other hand, the Textile Policy 2017 has a great degree of relevance with the Jhut sub-sector. The treatment and management of Jhut is covered by the policy. For example, the following goals of the Policy are related with the Jhut management:

- i. Ensure a safe and eco-friendly textile and apparel sector.
- ii. To make strategic development planning for spinning, hosiery, home textiles and terry-towel sub-sectors where recycled Jhut are used as feedstock.
- iii. To encourage waste reduction, recycling, reuse and removal strategy in the textile waste management for producing eco-friendly products.
- iv. To develop the quality and design of local garments.
- v. To comply with exiting environmental legislations.

However, there is no specific indication in the Textile Policy on how the above goals will be implemented and which government agencies are responsible for implementation, monitoring and enforcement.

²⁶ Clause 6, Schedule 3 of the Income Tax Act 2023.

13.8 National Industrial Policy 2022 in Relation to Jhut

The National Industrial Policy has provisions which bear much importance for the formalization of the Jhut sub-sector. The policy seeks to create a conducive environment for small and medium industries through detailed policy guidelines and attract local and foreign investments for their growth. This opens up the scope for wider policy support to uplift the Jhut recycling sub-sector as an SME business hub. The policy is essential as Bangladesh is graduating from LDC in 2026 when the country will lose preferential market access. It has effectively addressed the post-graduation challenges and announced support to the private sector to work together to deal with these challenges.²⁷

The policy is very relevant for informal Jhut supply chain in the sense that it commits to formulate a national database for the informal sector which also covers Jhut processing and trading. A national work plan will be developed for registration and development of informal sector entrepreneurs in order to formalize them. This commitment is a mark of recognizing the informal sector entrepreneurs for facilitating their growth. Both the Industrial Policy 2022 and the SME Policy 2019 have the joint impact on the growth and formalization of the Jhut sub-sector. The SME entrepreneurs in the Jhut trading can draw the benefits and protections offered in these two policy instruments.

Chapter 14: Gaps in the Legal Framework for RMG Waste Management in Bangladesh

14.1 Definitions of Waste: Is Jhut Waste or a By-Product?

There are no defined criteria in Bangladesh's regulatory framework under which textile cuttings and scraps cease to be considered waste and become a resource or product. This is very crucial to facilitate recycling and repurposing of textile waste. The term Jhut is typically known as the solid waste generated from textile and garments manufacturing operation in Bangladesh. 'Solid waste' is legally defined in the Solid Waste Management Rules 2021 as discarded, unclaimed, abandoned, or surplus materials which are hazardous in nature (*Rule 2(6)*). The Environment Conservation Act (ECA), 1995 broadly defines 'wastes' as any solid, liquid, gaseous and radioactive substance the disposal of which may cause harmful change to the environment.²⁸ But none of these definitions or no other law explicitly includes apparel Jhut in the solid waste category. This creates legal ambiguity regarding Jhut's classification and management as solid waste and the local market practices do not clearly recognize or identify the proper identity of Jhut either as a waste or as an industrial by-product.

However, the trajectory of Jhut starting from the factory, where it is created, to the intermediate Jhut traders and finally to the recycling millers indicates that the material which is a waste in the manufacturing factory can essentially be used by other supply chain actors as a product, resulting in change in the material's legal identity. In the present context of multi-layered supply chain with

²⁷ "Build Connect Newsletter", URL: <https://buildbd.org/wp-content/uploads/2023/02/Connect-2022-05.pdf>

²⁸ Sec 2 (l), the Bangladesh Environment Conservation Act, 1995.

a large number of stakeholders involved, fabric waste or Jhut has become a very valuable commodity with about US\$200 million worth domestic market and an estimated US\$5.0 billion worth future export market.²⁹ Under these considerations, Jhut should be regarded as a valuable 'product' for a new emerging industrial sector in Bangladesh.

The position of different government stakeholders is contradictory regarding the treatment of Jhut—either as a waste or a product. The National Board of Revenue (NBR) does not consider the cutting waste or Jhut as a product for recycling industry, they basically treat it as waste. Other government stakeholders like Ministry of Commerce or Ministry of Industry consider Jhut as a product of SME business and are promoting the Jhut recycling industry to grow in Bangladesh. The NBR's position about jhut causes a confusion about the legal framework of customs bond and imposition of two-steps value added tax (VAT) at 22.5% on the sale of raw Jhut and recycled yarns.

If Jhut is defined only as the cutting waste of RMG, not a product, according to the NBR, it might be disposable for being a hazardous material and cannot be sold in formal way to create any commercial value. But if Jhut is sold in the market to the traders who, after recycling, further sell it as feedstock or raw material for manufacturing another product, it turns out to be a valuable product and no longer remains a waste.³⁰ This analysis of legal aspect regarding the identity of Jhut leads to the conclusion that Jhut is a waste until it remains in the custody of the RMG manufacturer or when it is dumped, and becomes a product as soon as it is sold to a collector or sorter and then to the subsequent parties since it creates business value.

14.2 Contract of Jhut Sale and Ownership of Waste

One of the main reasons of why the Jhut supply chain in Bangladesh is operated in informal manner is the lack of formal or legal contract system in the sale and transaction of Jhut materials among the parties. The contractual effects of selling Jhut by the apparel manufacturers to the collectors, and by the collectors to the subsequent parties, is crucial for understanding the level of informality involved in the processing (collecting, sorting, recycling) of Jhut in Bangladesh. The decision of textile millers to sell Jhut is primarily driven by practical concerns. Once released from the garments factories, Jhut is transferred from the manufacturers to the recycling mills or foreign importers through at least four intermediary parties each differently known as Jhut collectors, sorters or processors, Jhut traders, and wholesalers. None of the stages in the value chain follows the legal procedures for contract of sale of goods and formal documentation system appurtenant thereto.

In any kind of contract for selling and trading of goods or products, the agreement between the parties is governed by two specific laws: the Contract Act 1872 and the Sale of Goods Act 1930. The Contract Act 1872 governs the general terms and conditions of contractual issues and the Sale of Goods Act 1930 regulates the contract for sale of goods/ or moveable materials. We have already established by legal argument that Jhut is a product or moveable goods when

²⁹ "Goods made of Jhut recycling can fetch \$3b annually: BGMEA", The New Age, 13 Nov 2022; Monira & Arafat, above note 3.

³⁰ H&M always says, they need to guarantee the feedstock, they need to guarantee that there is enough Jhut (baseline product/ feedstock) to get recycled yarn into the circular manufacturing system. This justifies the analysis about the concept of 'product' attributable to Jhut when it is sold in the market for recycling and further transactions.

released from the garments factory and is transferred to any party by sale. Since Jhut becomes a goods by sale, the sale of Jhut has to be executed under the Sale of Goods Act 1930 through a contract of sale of goods. All contracts of sale of Jhut should also ensure compliance with the requirements of the Contract Act 1872, such as, they are made by the free consent of parties competent to contract, for a lawful consideration and with a lawful object.

It is important to clarify that the sale of Jhut signifies the transfer of ownership of material from the seller to the buyer for a determined price. The Jhut seller, by concluding the sales contract, transfers or agrees to transfer the property in goods (ownership) to the buyer either immediately or at future date(s) agreed between the parties. The seller must be a major--18 years or more to be able to sell the product to the buyer, and must have the ownership and title of the goods to be sold. The law enjoins that a contract of sale has to be triggered by an offer to buy or sell goods and the acceptance of such offer. The contract may provide for the immediate delivery of the goods or immediate payment of the price or both, or for the delivery or payment by instalments. **Evidence shows that observance of these legal requirements for sale of goods in the form of a formal contract is absent in the current practice of selling Jhut between the garments factory and waste collectors or between the collectors and Jhut handlers.**

If Jhut is being sold informally, it is not just enough to suggest to execute the sale through a formal contract under the Sale of Goods Act and the Contract Act, it is necessary to clarify the issues of product ownership as well. **According to the prevailing industry practice, the fabric cut pieces created from garments manufacturing remain at the disposal of the factory owners until they are released to be sold outside.** It is also evident that there is a general practice among factories of disposing of textile waste in landfills or incinerating hubs. These incidences imply that the garments producers, who are also the producers of Jhut materials, retain ownership of their waste until its final disposal. In a case where a garment factory dumps its fabric cutting waste in a landfill, it might be construed to have abandoned the ownership of waste as per the "principle of abandonment".³¹ Consequently, the ownership of textile waste is potentially transferred to the landfill owner by the factory owner's intentional act of relinquishment.

The question 'to whom does the ownership of RMG waste belong' can also be examined through the prism of "principle of accession". Accession in property law is a mode of acquiring ownership of property that involves the addition of value to the property through labour or addition of new materials. In commercial law, the principle of accession applies when a particular material or product is physically united with (or integrally connected to) other goods in such a manner that the final or combined product becomes much greater in value than the original one. The ownership of the combined material including the added value is potentially transferred to the subsequent proprietor or new owner who pays for the whole goods.³² For instance, if a garment factory mixes

³¹ The principle of abandonment connotes that an owner must take clear, decisive action that indicates he no longer wants his property. Any act indicating the owner's intention to relinquish property is sufficient to constitute abandonment provided the property is left free and open to anyone who comes along to claim it. See, Julia Kagan (2022), "Abandonment Clause: What It Means, How It Works", URL: www.investopedia.com/terms/a/abandonment-clause.asp

³² Accession (property law), Wikipedia; URL: [https://en.wikipedia.org/wiki/Accession_\(property_law\)](https://en.wikipedia.org/wiki/Accession_(property_law)); "Property Law Outline - Principle of Accession", OneLBriefs; URL: www.onelbriefs.com/outlines/property/accession.htm; Thomas Merrill (2009), "Accession and Original Ownership", Journal of Legal Analysis, Vol-1:2 (Summer), at pp: 462-463.

its textile waste with another waste like leftover cartons, the textile waste might become a part of new combined waste, and ownership of the combined waste would go to the subsequent transferee from the garments factory.

In conclusion, Jhut is a waste at the disposal of garments manufacturers who has the ownership of it until its final disposal or transfer. The final disposal or sale of Jhut transfers its ownership to the landfill owner or Jhut trader, as the case may be. **The legal concept regarding ownership of textile waste is still in evolving stage, and future legal developments or regulations may have significant impact on this aspect.**

14.3 Traceability of the Solid RMG Wastes

There is no substantial official and reliable data about the material wastes produced across Bangladesh's textile and apparel industry production chain. Further extensive data collection and analysis is needed to identify and classify the various industrial products and bi-products, their end of life pathways, where they could go (*traceability tracking*) and how best can they be recycled throughout their product life.³³

The methods of disposal, mainly incineration/burning and landfill, of cutting waste or fabric Jhut release harmful emissions and chemical substances, contributing to air pollution, resource overuse and chemical leaching causing significant environmental damage and serious human health hazards. These practices not only harm the immediate environment but also contribute to broader global environmental problems. The improper disposal of hazardous garments waste which cause harmful consequences for public health and environment is punishable under the environmental law and the penal law of the country.³⁴

14.4 Recognition of Informal Jhut Workers under the Labour Law

The Labour Act 2006 does not recognize the informal workers, whether they are involved in textile waste management or any other economic activities, are not currently entitled to the labour rights enshrined in the existing labour law. There is no specific provision in the Act mentioning about the informal sector workers working in waste management either for collection, sorting or processing of wastes. Women workers and adolescent girls are employed for cleaning and sorting of fabric Jhut in the informal Jhut processing enterprises which lack recognizable features for identification. The Jhut enterprises are considered as informal because of their low productivity, lack of appropriate formal documentation and sustainable business structure complying with relevant national laws. All workers including the women engaged in Jhut value chain should be brought under the coverage of national labour law.

In Bangladesh, the potential of the circular economy as a mechanism for creating new jobs can be leveraged by supporting the green transition and strengthening social inclusion notably under the national Constitution, National Social Security Strategy (NSSS), 8th five-year plan (2020-2025)

³³ Ferdous Ara Begum, "We need a clear strategy for a circular economy", The Business Standard, 14 May 2023.

³⁴ Ss. 7, 15 of the Environment Conservation Act 1995; Ss. 269 & 270 of the Penal Code 1860.

and the Bangladesh Labour Act 2006. This is an important aspect to be considered for formalizing the informal Jhut sub-sector of RMG industry.

14.5 Bonded Warehouse System and VAT Rules Affecting Jhut Management

The bonded warehouse system and VAT regulations have crucial implications on the management and disposal of Jhut and formalization of the Jhut supply chain. There is no restriction in Bangladesh's NBR regulations on the sale or trade of Jhut generated from the export-oriented RMG industries that use bonded warehouse raw materials (fabrics). Neither the Customs Act, 2023 and its associated laws nor the by-laws of the NBR or Customs Bond Commissionerate create any obstruction to the sale of RMG solid waste (Jhut). Any garments producer can legally sell in the open market the post-industrial Jhut created from cloths manufacturing using the duty-free raw materials imported under the bonded warehouse license.³⁵ However, they must follow the guidelines for disposal of waste under the VAT law and obtain permission of the bond authority for such sale.³⁶

All waste producing garments factories and Jhut traders are regulated under the VAT laws and NBR office order for the purpose of selling Jhut. VAT law provides guideline on how Jhuts and by-products created from garments production can be released from factories for sale outside and finally disposed of. This means, Jhut intended to be sold in the open market are releasable from the factory to the buyer subject to payment of VAT which is part of waste management in RMG.³⁷ For the sale of RMG Jhut, the manufacturing factory must obtain permission from the authority in the prescribed form ("Mushak-4.6") after taxable value of waste is determined by the VAT Commissionerate.³⁸

Jhut which is non-recyclable or inappropriate for supply for lack of commercial value, will be completely destroyed or disposed of, within or outside the production site, in environmentally sustainable manner, for example, in compliance with the Environment Conservation Act 1995 and Hazardous Waste Management Rules 2011. The Jhut recycling industry faces some major challenges related to financing and taxation, *i.e.*, due to imposition of 22.5% VAT. Currently recycling industries pay 7.5% VAT while purchasing garments waste from domestic vendors and a 15% VAT is imposed during sale of recycled yarn (fibre or cotton), produced from that waste, to spinning mills.³⁹

³⁵ Inputs imported by export-oriented RMG industries are exempted from duty and other import taxes through bonded warehouse (BWH) facility. Both the NBR and Customs Bond Commissionerate are authorized to look after the BWH system and, for that purpose, enforce the applicable laws. RMG exporting factories are required to obtain bond license from the Bond Commissionerate to avail the BWH benefits, *i.e.*, import duty free raw materials and packaging. *Vide*: S. 12, Chapter 16 of the Bangladesh Customs Act 2023, the Bonded Warehouse Licensing Rules 2008, rules and orders of NBR & Customs Commissioner (Bond).

³⁶ S. 117 of the Customs Act 2023.

³⁷ *Vide*, Rule 24C of the Value Added Tax (VAT) and Supplementary Duty (SD) Rules, 2016. Rule 24C was added to the VAT & SD Rules 2016 by the S.R. No. 142-Ain/2020/103-Musak.

³⁸ Rule 6, the Value Added Tax (VAT) and Supplementary Duty (fair market value determination) Rules 2019.

³⁹ Sajjadur Rahman & Jasim Uddin, above note 6; Reyad Hossain, "VAT waiver planned for potential recycled clothing backward industry", *The Business Standard*, 28 May 2023.

There is no incentive for spinning mills to use domestically recycled fibre as they can import virgin cotton free of duty. The post-industrial RMG waste, if dumped into landfill or burned in boilers, does not yield anything in value to the Government, but it becomes a value-added product when recycled properly. Formalizing the Jhut supply chain through a sustainable waste management process requires introduction of high-cost technology and industrial set up as well as regulatory back up.

Imposing such high rates of VAT on the Jhut or recycled yarns is causing adverse impacts on their prospects of becoming a mainstream formal industry. Imposing VAT is a barrier for small entrepreneurs involved in Jhut recycling business and also a barrier to formalization of the Jhut sector. Since these are at the moment challenging issues for the Jhut entrepreneurs, they cannot overcome all barriers without the governmental support. After repeated appeals from the SME business community and BGMEA for tax incentives on Jhut processing, the government has once considered withdrawing the existing 7.5% VAT on the collection of textile waste (including cotton and fibre wastes) by spinning mills. However, there is no development so far on the issue of exempting VAT on sale or procurement of garments Jhut.

The bonded warehouse system for garments factories in EPZs and Economic Zones (EZ) is different from other bonded factories with regard to disposal of garments waste generated from apparel manufacturing process using the bonded inputs or fabrics. The Standing Order and General Office Order of NBR on industrial waste management are applicable for disposal and sale of garments wastes (Jhut) from factories in EPZ and EZ to the outside buyers. Any garments establishment cannot sell Jhut upfront to any party outside of the EPZ area without requisite permission. Only wastes which have commercial value may be sold to the outside Jhut traders and recycling mills with the permission of the Customs (Bond) Commissioner and BEPZA authority. The Bond Commissionerate determines the customs value of garments waste before their sale, and only selected customers licensed from the Ministry of Commerce can buy Jhut from the EPZ/EZ factories. The wastes may be taken out of the EPZ after payment of requisite customs tariffs and other taxes applicable for sale of wastes from the classified zone.⁴⁰ Industry insiders say, even within the EPZ area, it becomes impossible for a garments manufacturer to directly sell the Jhut even to a next door recycling company situated beside it. This causes increase in the business cost that has impact on the overall supply chain.

However, in practice, Jhut materials from EPZ factories are sold outside to the local musclemen under political influence and by reportedly avoiding NBR regulations. Garments factories in general try to hide actual information about excess production of garments and accumulation of cutting wastes to avoid the bond and VAT rules to bypass payment of VAT and other duties. That is why they sell cutting waste or Jhut in the secondary or black market in clandestine way via the political musclemen. **The actual amount of Jhut created and sold to the musclemen is not known which causes the serious lack of transparency and traceability in the Jhut supply chain.**

⁴⁰ See, NBR Order no: 2(5)Customs: Export and Bond/2002(part-1)/311, date: 05/06/2007; Clause 10 (read with Cl. 8) of the Customs (Economic Zones) Procedures, 2017 related to disposal of wastage in EPZ/EZ, published under the NBR Standing Order No. 42/2017/Customs/199; Also *vide*, NBR Standing Order No. 01/2014 related to EPZ;

14.6 Gaps in Solid Waste Management Rules 2021

While the Solid Waste Management Rules provides a framework for regulating the management of solid waste generated from any source or industry, it does not lay down rule or guidelines specific to the management of pre-consumer textile Jhut. The provisions of the Rules in general, excepting a few, lack regulatory mechanism to cover RMG Jhut management along the entire value chain.

The definition of EPR under the Solid Waste Management Rules concerns only with the post-consumer solid wastes and does not incorporate the provisions necessary to cover pre-consumer wastes like textile Jhut. There is a lack of proper legal provisions under the existing definition of EPR enabling the management of pre-consumer textile Jhut. Thus, appropriate changes should be introduced in the Solid Waste Management Rules 2021 to regulate the management of RMG Jhut.

The Rules attaches more preponderance to the local government authority than the manufacturing industries regarding solid waste management issues. This delimits the purview of the law to regulate effectively the factories and industries including the textile and RMG facilities in the management of solid waste generated from the industrial process.

With regard to incentives for solid waste management, the Rules allows the Government to endorse every year official recognition of commendable or exemplary performance by the Local Government authority and other authorities in solid waste management, cleanliness and environmental management work. This is an instance of providing incentives to the entities responsible for ensuring solid waste management in environment-friendly manner. This again ignores any viable incentives to be provided to the industries for doing similar functions in general and to the RMG industries for Jhut management in particular. However, the Government has decided to provide incentives, through the local government authority, to the entrepreneurs in the form of award and financial or technical assistance for encouraging them to establish recycling factories.⁴¹

14.7 Lack of Institutional Capacity

The implementation of existing waste management laws in the textile and garments industry remains unsatisfactory due to limited resources and inadequate institutional capacity. Both the DoE and concerned industries lack of awareness and understanding of the circular economy concept.⁴² Both the DoE and garment factories have been suffering from skill shortage, non-availability of smart technologies, insufficient human resources, and lack of appropriate trainings for efficient industrial waste management.

The weak institutional capacity of the DoE can also be gleaned from its top-down or 'command and control' approach to policy implementation. As a result, the DoE has appeared to the industry owners as simply 'police' which can only impose fines rather than enhancing their implementational capacity. The top-down model seems to have failed to generate spontaneity amongst the industry owners for environmental conservation through regulatory

⁴¹ Table 1 as referred in Rule 10(2) & 11(e), the Solid Waste Management Rule 2021.

⁴² Ferdous Ara Begum, above note 30.

compliance.⁴³ Other institutional shortcomings that the DoE has been suffering from are: infrastructural limitation caused by limited number of regional offices, lack of skilled inspectors with knowledge on cutting-edge industrial technology for effectively monitoring the waste management process, lack of training and insufficient logistic support.

The system of referral from DoE and narrow jurisdiction are two major areas of weak institutional capacity which the environmental courts suffer from, for delivering environmental justice against harmful waste management practices. The system of referral from the DoE under the environmental law creates a major stumbling block to the effectiveness of the environmental court. No suit for compensation can be filed with environmental courts without reference from the Department of Environment (DoE). If the DoE does not accept any complaint about any offence and take no action within 60 days, only then the court may, after directing an inspector to investigate the matter, take cognizance of any offence.⁴⁴ Trial of cases is dependent on the submission of the investigation report by the inspector for which no maximum time limit has been fixed in the law. Moreover, the subject-matter jurisdiction of the environmental courts is very narrow as they can entertain only a handful of offences and claims for compensation under the BECA 1995. On the other hand, the judgments and directions of the Supreme Court of Bangladesh regarding industrial waste management and pollution control also remain unimplemented due to non-conformance by the parties on whom they were directed.⁴⁵

14.8 Lack of Stakeholder Collaboration

There has been visible absence of coordination and commitment amongst the stakeholders including both the DoE and industries due to loose compliance partnership. Similarly, reports of public media and social movement of civil society organizations on sustainable waste management system have been done in isolation without proper coordination.⁴⁶ There is a lack of stakeholder empowerment in Bangladesh to seek circular consumption system based on environmental justice. The same argument applies equally to the cases of informal Jhut workers who constantly undergo occupational health and safety risks at the workplace while they are engaged in sorting, storing and processing of cut fabrics and other leftover items. Since the labour law does not apply to the Jhut workers as being informal sector, their rights to claim protection against unhealthy working condition remains unheard although this can be ventilated under the environmental law. Due to the lack of stakeholder empowerment into the fabric of environmental and labour laws, the textile Jhut supply chain still remains way behind the sustainability standards enough to introduce circularity.

Despite Bangladesh's efforts to establish circular economy practices and reach the SDGs through policy guidelines and stakeholder involvement, there are discrepancies between the government's introduction of policies and practices and the practical implementation of these.⁴⁷ **Evidence shows that existing waste management laws and policies in Bangladesh are more structurally leaned towards top-down approach of policy implementation putting more emphasis on the 'command and control' or bureaucratic attitude.** This approach visibly

⁴³ Enayetul Kabir, above note 44, at p: 103.

⁴⁴ Ss 6,7 of the Bangladesh Environment Court Act 2010.

⁴⁵ See, observation of the High Court Division of Supreme Court in *re BELA vs. Bangladesh and ors.* (2001).

⁴⁶ Enayetul Kabir, above note 44, at p: 105.

⁴⁷ Rojbin Ewan Ismail, above note 2, at p: 8.

ignores 'bottom-up' or interactive initiatives and keeps no scope for bottom-up stakeholders' (people) performance in the policy implementation.⁴⁸ It should be considered that the policy implementation does not solely depend on the top-down efforts of the government. It requires multi-stakeholders' collective efforts. Opinion and policy feedback from stakeholders and their effective negotiation are necessary for overall growth and environmental sustainability of the textile and RMG sector.⁴⁹

Chapter 15: Overview of Regional Legal Practices in Textile Waste (Jhut) Management

This section provides a comparative analysis of how different countries - Bangladesh, Pakistan, Vietnam, Cambodia, and China - are addressing the challenges of textile waste. It encompasses an array of aspects including the existing waste management processes, the legal and regulatory frameworks in place, incentive schemes provided by governments, and the technological approaches adopted for recycling. Each of these countries presents a unique approach, reflective of their socio-economic structures and environmental policies. This comparative study not only highlights the diversity in practices but also sheds light on the potential pathways for enhancing global textile waste management strategies.

This table compares textile waste management in Bangladesh, Pakistan, Vietnam, and Cambodia, highlighting each country's unique approach. Bangladesh relies heavily on the informal sector for waste sorting and export, with minimal local recycling. Pakistan combines formal and informal practices, sorting recyclables for processing or export, while non-recyclables often face unregulated disposal. Vietnam engages in recycling, export, and downcycling, with both sectors involved in waste handling. In contrast, Cambodia, especially Phnom Penh, is exploring recycling techniques but faces technical challenges, with Chip Mong Insee industry leading research efforts. This summary underscores the varied strategies and challenges in **managing textile waste** in these countries.

Table 5: Country comparison of textile waste management practices

Country	Jhut Management Process
Bangladesh	In Bangladesh, the informal sector predominantly handles waste. Most textile waste is mechanically shredded for export, while some small-scale factories engage in recycling or rely on formal third parties for waste management. The informal sector actively sorts and segregates waste for export, but local production of fabric from recycled yarn is limited.
Pakistan	Manufacturing by Tier 1 factory generates waste, including fabric scraps and end rolls, which are then collected for further processing. This waste is manually sorted into recyclable fabric scraps suitable for recycling or resale, and non-recyclable material destined for other processing such as landfilling. Recyclable materials may be processed

⁴⁸ For example, the formation of the DoE under the BECA 1995 falls in line with the top-down approach or bureaucratic model of policy implementation. Both the 1995 Act and ECR 2023 leave no scope for bottom-up initiatives by the stakeholders for their enforcement. See, Enayetul Kabir, above note 44, at pp: 95,99.

⁴⁹ Enayetul Kabir, above note 44, at pp: 95,103.

	in a recycling plant or exported, adhering to formal waste management practices with documented transactions. Conversely, non-recyclables enter an informal flow, often lacking in compliance and record-keeping, leading to less regulated disposal or use in applications like energy recovery.
Vietnam	In Vietnam, recyclable fabric scraps can be repurposed through export, recycling into new materials, or local sale for diverse uses, including low-value products or downcycling. Non-recyclable materials are sorted, & directed to landfilling, incineration, or used in boilers for energy recovery. All the activities are conducted by both formal and informal section. Formal waste handling involves recording and tracking transactions to ensure a documented flow of materials.
Cambodia	The solid waste management structure in Cambodia, particularly in Phnom Penh city, has undergone successful and reformed operations. Despite this, there remains a shortage of technical capacity, specifically in fabric recycling technology. Presently, the sole player in Cambodia actively researching fabric waste recycling techniques is Chip Mong Insee industry.

The below table outlines the key environmental **laws and regulations** in various countries, focusing on waste management and the textile industry. Bangladesh's framework includes the Environmental Conservation Act and the National 3R Strategy for Waste Management. Pakistan's regulations, like the Environmental Protection Act, address waste disposal. Vietnam's laws, including the Environmental Protection Law, guide its solid waste management. Cambodia's strategy focuses on the Garment sector and solid waste management, while China's extensive policies, such as the Circular Economy Development Strategy, aim to foster a sustainable textile industry and circular economy.

Table 6: Country comparison of laws and regulation relating to textile waste

Country	Laws & Regulations
Bangladesh	<ul style="list-style-type: none"> • National Conservation Strategy, 1992 • Bangladesh Environmental Conservation Act 1995, amended in 2000, 2002, and 2010, • National Environmental Management Action Plan, 1995 • Environmental Conservation Rules, 2023 • National 3R Strategy for Waste Management, 2010 • Local Government (City Corporation) (Amended) Act, 2011 • National Environmental Policy, 2013 • 8th Five Year Plan July 2020 – June 2025 • Solid Waste Management Rules, 2021
Pakistan	<ul style="list-style-type: none"> • Section-14, “Disposal of wastes and effluents” address the mechanism for disposal of safe disposal. • Section 11 of Pakistan Environmental Protection Act 1997 • Draft Hazardous Substances Rules 1999 • Islamabad Capital Territory By-Laws, 1968 by Capital Development Authority Islamabad • Section 132 of the Cantonment Act 1924 • National Environmental Quality Standard 2000

	<ul style="list-style-type: none"> • Provisions in Local Government Ordinance 2001 • Lahore Solid Waste Management By-Laws 2005 • Public-Private Partnership (PPP) policy 2007 • Public-Private Partnership (PPP) Act 2010
Vietnam	<ul style="list-style-type: none"> • Law on Environmental Protection (LEP), 2020 • National Strategy on Integrated Management of Solid Waste (ISWM) • Strategy on Development of Vietnam Textile and Garment Industry, 2015-2020. • The Law on Investment
Cambodia	<ul style="list-style-type: none"> • Cambodia Garment, Footwear and Travel Goods (GFT) Sector Development Strategy 2022-2027 • Royal Kram No.02/NS/94 dated on July 20, 1994, on Established the Ministry of Environment • Royal Kram No. NS.RKM 0194/21dated on January 24, 1996, on Law on Environmental Protection and Natural Resources Management • Sub-decree No. 36 ANRK.BK dated on April 27, 1999, on Solid Waste Management • Prakas No. 83 dated April 10, 2001, on granted the licenses to Sa Rom Trading Co. Ltd • Prakas No. 156 dated July 3, 2001, on granted the licenses to Sa Rom Trading Co. Ltd • Prakas No. 148 dated August 20, 2002, on grant the licenses to Sa Rom Trading Co. Ltd • Environmental Guideline on Solid Waste Management in Cambodia • Prakas No. 86 dated April 1, 2011, on granted renewal the licenses to Sa Rom Trading Co. Ltd • Sub-decree No. 113 ANK/BK on Urban Solid Waste Management • National Environment Strategy and Action Plan (NESAP) 2016-2023 • Cambodia's Updated Nationally Determined Contribution (NDC) • Prakas No. 458 dated March 23, 2022, on grant the licenses to Sa Rom Trading Co. Ltd
China	<ul style="list-style-type: none"> • Notice on Measures for the Prohibition of the Usage of Raw Materials for Wadding fibre Products, 2002 • Technology Policy Outline of Resources Comprehensive Utilization in China, 2010 • Circular Economy Development Strategy and Recent Action Plan, 2013 • Notice on the Construction of Circular Economy Demonstration Cities (Counties), 2015 • Textile Industry Development Plan (2016-2020) • Leading Action for Circular Development, 2017 • Catalogue of Prohibited Imported Solid Wastes, 2017 • Law of the People's Republic of China on the Promotion of Circular Economy, 2018

	<ul style="list-style-type: none"> ● Industrial Transformation and Upgrading Funds Work Guide, 2018 ● The code of the textile waste collection and recycling, 2019 ● Classification and Code of Waste Textiles Standard, 2020 ● The “Fourteenth Five-Year Plan” Development Framework for the Textile Industry, 2021 ● Implementation Guidance on Accelerating the Recycling of Waste Textiles, 2022
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This table summarizes the **government incentives** for textile scrap management in Bangladesh, Pakistan, Vietnam, and Cambodia. Bangladesh offers a 10% cash incentive for exporting garment textile scrap. Pakistan, however, has no such incentives. Vietnam provides tax incentives and support for recycling project investments through its Environmental Protection Fund. In Cambodia, investors can choose between income tax exemptions for 3 to 9 years or capital expenditure deductions, including up to 200% of specific expenses under the Quality Investment Project (QIP). This overview highlights the diverse governmental strategies in promoting textile waste management across these countries.

Table 7: Country comparison of incentive schemes

Country	Incentive Schemes
Bangladesh	The Government is providing 10% cash incentive for exporting garments’ textile scrap (Jhut). [Source: FE Circular No 29, Department of Foreign Exchange Policy]
Pakistan	No incentive is provided
Vietnam	To attract investment on recycling project, government provide tax incentives and different support in term of land and so on via Environmental Protection Fund.
Cambodia	Investors are entitled to choose between 2 basic incentives under Quality Investment Project (QIP): 1. An Income Tax exemption for 3 to 9 years, depending on the sector and investment activities, from the time of earning of first income. 2. Deduction of capital expenditure through special depreciation as stated in the tax regulations (e.g. Eligibility of deducting up to 200 % of specific expenses incurred for up to 9 years, Export Tax exemption etc.).

Chapter 16: European Circular Textile Legislation

While European nations have established comprehensive regulatory frameworks such as the Waste Framework Directive (WFD), Waste Electrical and Electronic Equipment Directive (WEEE Directive), and the Packaging and Packaging Waste Directive (PPWD) to oversee and control waste management, Bangladesh's approach is yet to reach this level of specificity and comprehensiveness, particularly regarding Jhut.

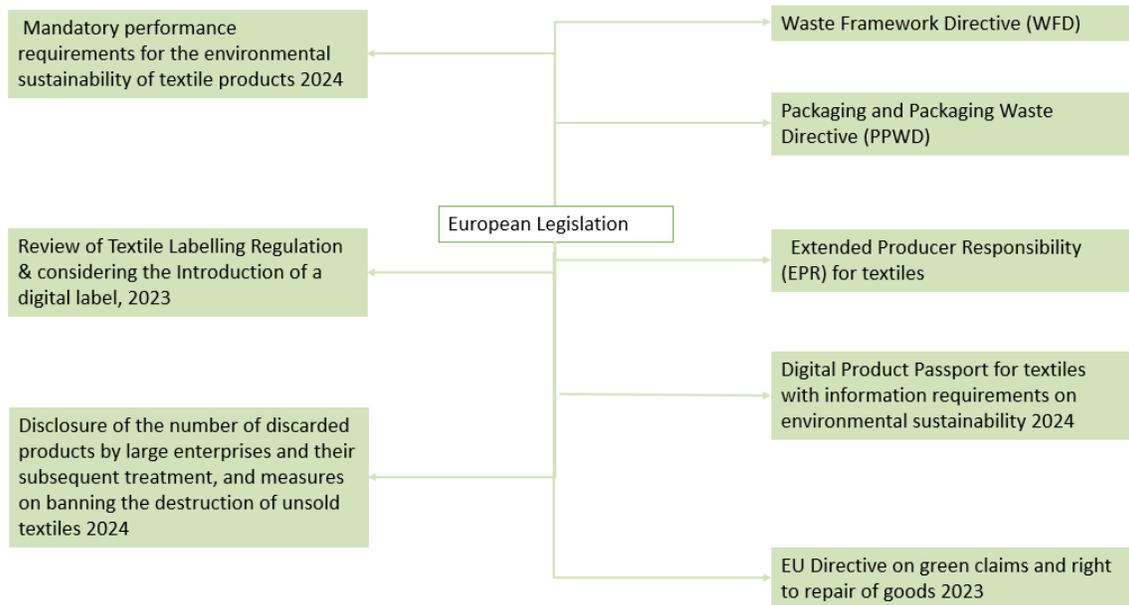


Figure 25: Overview of European Union sustainable textile policies

1. **Waste Framework Directive (WFD):** This sets out the general principles of waste management in the European Union, including provisions on the prevention, recycling, and disposal of waste, as well as the responsibility of producers and waste holders.
2. **Packaging and Packaging Waste Directive (PPWD):** This directive sets out requirements for the management of packaging waste in the EU, including Jhut due to the recyclable materials like paper, plastic, and metal often found in packaging.
3. The EU Commission is introducing the **Extended Producer Responsibility (EPR) for textiles:** This mandate producers to be accountable for the entire lifecycle of textile products, emphasizing sustainable textile waste management. The primary focus of this legislation is to bolster the separate collection, sorting, reuse, and recycling of textiles in the EU, aligning with the EU Strategy for Sustainable and Circular Textiles. Producers will bear the textile waste management costs, encouraging them to minimize waste and enhance the circularity of their products. The amount they contribute to the EPR scheme will be influenced by the environmental performance of their textiles; a concept termed 'eco-modulation'. This initiative will not only facilitate the separate collection of textiles by 2025 but also fund investments in the recycling sector. Businesses, especially social enterprises involved in textile collection and treatment, will witness expanded opportunities and a larger second-hand textile market. Additionally, the proposal will stimulate R&D in innovative textile recycling technologies and address the challenge of illegal textile waste exports, ensuring environmentally responsible waste management.

Impact of EPR on Textile Waste Management:

Regarding the reduction of fabric waste, EPR can be particularly impactful in the textile industry. Textile producers, under EPR, would be financially responsible for the environmental impact of their products post-sale, which includes the waste stage. This incentivizes them to produce more sustainable goods and adopt circular business models. By making producers responsible for the entire lifecycle of their products, including end-of-life management, EPR can significantly reduce fabric waste. In relation to Jhut (discarded fabric waste from garment factories), EPR can play a vital role. If textile producers are held accountable for the waste generated by their products, they are more likely to integrate sustainable practices throughout their production processes. This could include using more recycled materials, like Jhut, in new products, thus creating a market for these discarded textiles and reducing overall waste.

The implementation of EPR in the EU varies among member states, and it faces certain challenges, such as the need for consistent policy design and enforcement across different nations. For textiles, specific requirements and harmonization efforts are necessary to ensure the effective implementation of EPR schemes. The EU aims to propose an EPR scheme for textiles as part of the EU **Waste Framework Directive** revision, which is expected to significantly impact the management of textile waste and promote circularity in the textile sector.

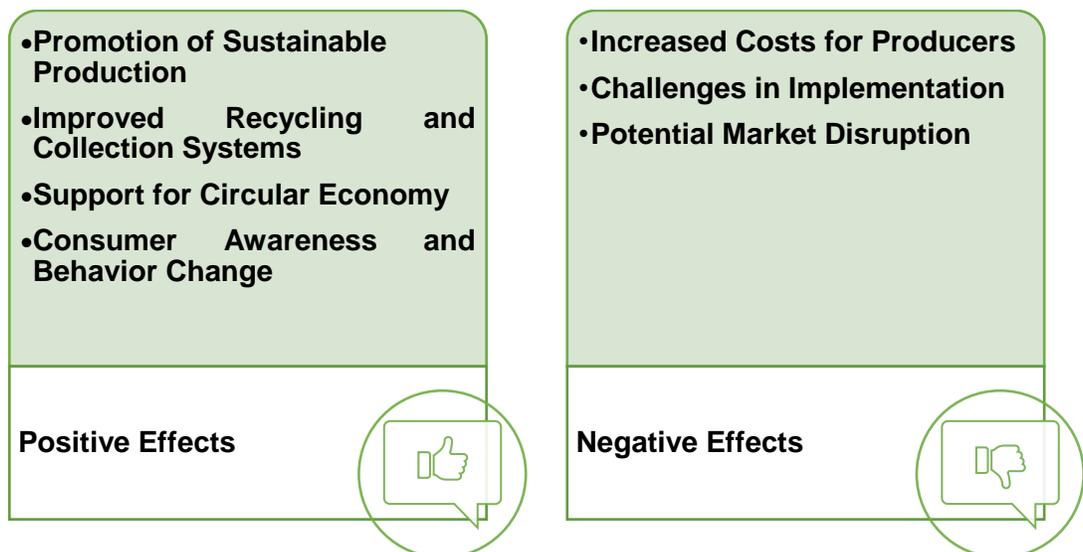


Figure 26: Positive and negative effects of EPR legislation

Positive Effects:

- **Promotion of Sustainable Production:** EPR incentivizes textile producers to design and manufacture products that are more sustainable, durable, and easier to recycle, thus reducing waste and environmental impact.
- **Improved Recycling and Collection Systems:** EPR policies mandate producers to finance and organize the collection and recycling of their products, leading to

the development of more efficient recycling systems and increased textile recycling rates.

- **Support for Circular Economy:** EPR supports the transition to a circular economy in textiles, encouraging the reuse and recycling of materials, thereby reducing dependency on new resources.
- **Consumer Awareness and Behaviour Change:** EPR can lead to increased consumer awareness about the environmental impact of textiles and encourage more responsible consumption behaviours.

Negative Effects:

- **Increased Costs for Producers:** Implementing EPR systems can lead to increased operational and compliance costs for producers. These costs may be passed on to consumers, potentially leading to higher product prices.
- **Challenges in Implementation:** Ensuring compliance with EPR requirements across different regions can be challenging, especially for smaller companies or those with limited resources.
- **Potential Market Disruption:** The introduction of EPR might disrupt existing market dynamics, especially in regions where waste management systems are not yet fully developed or are inefficient.

4. **EU Directive on green claims and right to repair of goods 2023:** This law can significantly impact fabric waste or Jhut management. It mandates truthful environmental claims by textile companies, promoting genuine sustainable practices and reducing misleading information. Additionally, by advocating for the right to repair, the directive encourages the production of durable, repairable textiles, thereby reducing fabric waste. This approach aligns with circular economy principles, fostering a textile industry that is more sustainable and environmentally responsible.

Impact of the Directive on Textile Waste Management: The 2023 EU Directive on green claims and the right to repair of goods can be related to Jhut in several ways.

- **Reducing Overall Waste:** By encouraging the repair and reuse of goods, the directive aims to decrease the volume of waste, including fabric waste. When consumers choose to repair items such as clothing or household textiles, it directly contributes to reducing the amount of discarded fabric that might end up as Jhut.
- **Sustainable Consumption:** The directive encourages sustainable consumption patterns, which can lead to a greater demand for products made from recycled or upcycled materials, including Jhut. This could stimulate markets for upcycled textile products, providing an incentive for businesses to utilize Jhut more effectively.
- **Environmental Claims and Transparency:** The directive on green claims requires companies to substantiate their environmental claims, which includes

claims about using recycled materials. This transparency can increase consumer trust and demand for products made from recycled textiles, potentially boosting the market for Jhut-based products.

- **Circular Economy Model:** The overarching goal of these directives aligns with the principles of a circular economy, where waste, including Jhut, is minimized and resources are kept in use for as long as possible. By promoting the repair, reuse, and recycling of products, the directive indirectly supports the utilization of Jhut as a resource rather than viewing it as waste.
 - **Encouraging Eco-Design:** The directive encourages eco-design in products, which could lead to increased demand for sustainable materials, including repurposed Jhut, in the manufacturing process. Companies might be incentivized to design products that are easier to repair, reuse, and recycle, thus integrating Jhut into the product lifecycle.
5. **Review of Textile Labelling Regulation and considering the Introduction of a digital label, 2023:** The 2023 review of Textile Labelling Regulation and the consideration of introducing digital labels can be connected to fabric waste or Jhut management. This law, by enhancing label accuracy and transparency, will allow consumers to make more informed choices regarding the sustainability and environmental impact of their textile purchases.
 6. **Mandatory performance requirements for the environmental sustainability of textile products 2024:** This will significantly impact fabric waste management. By establishing strict environmental standards for textile products, manufacturers will be encouraged to adopt more sustainable and waste efficient product methods. This could result in reduced fabric waste generation during the production process and an increase in the recycling and reusing of textiles, aligning with a more sustainable and eco-friendly approach in the textile industry. This directive covers Mandatory Eco-design requirements, Transparency and Digital Product Passport, Tackling microplastics pollution, Consumer Information, Extended Producer Responsibility (EPR) for textile waste management.
 7. **Digital Product Passport for textiles with information requirements on environmental sustainability 2024:** This will play a significant role in managing fabric waste. This passport will serve as a comprehensive archive containing detailed information about each textile product, including data on every component, the supply chain history, cost, environmental impact, and recycling or disposal recommendations.
 8. **Disclosure of the number of discarded products by large enterprises and their subsequent treatment, and measures on banning the destruction of unsold textiles 2024:** This law requires large enterprises to report the amount of textile waste they produce and how it's managed. Moreover, it prohibits the destruction of unsold textiles. These measures directly target the reduction of fabric waste, encouraging more responsible production and waste management practices in the textile industry.

If brands and producers does not follow the EU legislation, several changes and challenges could arise for the textile industry:

- **Increased Scrutiny and Penalties:** In the European Union, penalties for non-compliance with regulations like those related to the SCIP database vary across member states, as each state sets its own penalties. This lack of uniformity means companies must be acutely aware of specific regulations in each country they operate. Penalties can be severe, including fines up to 4% of a company's annual turnover in cases of cross-border infringements. Consequently, compliance is crucial for companies to avoid significant financial repercussions.
- **Increased Environmental Impact:** Failure to comply with EPR means continuing with less sustainable production and waste management practices, potentially leading to higher levels of pollution and resource reduction.
- **Damage to Brand Reputation:** Non-compliance could damage the brand reputation of textile companies, as consumers are increasingly aware of environmental issues and expect transparency and responsibility from brands.
- **Market Access Challenges:** Companies that do not comply may face challenges in accessing markets, as compliance is likely to become a prerequisite for doing business in the EU.
- **Increased Costs:** Textile companies may incur increased costs due to the need to adjust their practices to comply with the new directives. This includes the costs associated with verifying environmental claims and adapting products to be more repairable.

16.1 Potential for Extended Producer Responsibility (EPR) in Bangladesh

The empirical evidence of the study indicates a predominant practice among factories of disposing of textile waste in landfills. This trend could imply a prevailing belief among factories that they retain ownership of their waste until its final disposal. However, legal clarity on this matter remains elusive.

Bangladesh could consider introducing EPR legislation for sustainable textile waste management, an example could be the EU model.⁵⁰ The Extended Producer Responsibility (EPR) principle holds the waste (Jhut) producers accountable and financially responsible for the environmental impacts of their textile products throughout their lifecycle, encompassing post-consumer disposal and waste recycling.

A key legal concept pertinent to textile waste ownership is the principle of abandonment. This principle is invoked when a property owner intentionally relinquishes their ownership rights. In scenarios where a garment factory deposits its textile waste in a landfill, it might be construed as

⁵⁰ The EU aims to propose an EPR scheme for textiles aligning with the EU Strategy for Sustainable and Circular Textiles and EU Waste Framework Directive, which is expected to significantly impact the management of textile waste and promote circularity in the textile sector.

having abandoned the waste. Consequently, ownership could potentially transfer to the landfill owner.

Another significant legal principle is that of accession. This principle applies when one property becomes integrally connected to another, rendering them inseparable. For instance, if a garment factory amalgamates its textile waste with other forms of waste, such as plastic, the textile waste might become indistinguishable from the other waste, potentially transferring ownership to the proprietor of the combined waste.

In Bangladesh, these principles of abandonment and accession could be instrumental in discerning the ownership of textile waste. Furthermore, several other legal doctrines relevant to Bangladesh's context should be considered, particularly within the framework of its Environmental Laws. These include:

- The Polluter Pays Principle: This doctrine posits that the originator of pollution should bear the costs associated with pollution prevention and control. Applied to textile waste management, this could imply that the producing garment factory bears responsibility for the waste's disposal and recycling.
- Extended Producer Responsibility (EPR): This principle holds producers accountable for the environmental impacts of their products throughout their lifecycle, encompassing post-consumer disposal and recycling. In the textile industry, this could mean garment factories are responsible for the end-of-life management of their products.
- The Public Trust Doctrine: This doctrine obligates the government to safeguard the environment for public welfare. In the context of textile waste, this could empower the government to regulate the disposal and recycling of such waste, irrespective of private ownership.

Bangladesh could introduce EPR legislation emphasizing sustainable textile waste management, by following the EU model.⁵¹ The Extended Producer Responsibility (EPR) principle holds the waste (Jhut) producers accountable and financially responsible for the environmental impacts of their textile products throughout their lifecycle, encompassing post-consumer disposal and waste recycling. The proposed law would mandate garments manufacturers to manage their Jhut waste throughout its lifecycle, via an EPR system. It would require the manufacturers to take responsibility for the end-of-life management of their products such as, disposal of their goods, possibly by offering return (take-back) policies or paying a portion of the waste management expenses. This EPR can incentivize Bangladeshi garments manufacturers to use recycled materials (Jhut) in new products, integrate sustainable production practices, reduce waste creation and enhance the circularity of their products. For businesses specializing in fabric waste management technologies, EPR can open up new markets.

⁵¹ The EU aims to propose an EPR scheme for textiles aligning with the EU Strategy for Sustainable and Circular Textiles and EU Waste Framework Directive, which is expected to significantly impact the management of textile waste and promote circularity in the textile sector.

PART 3 – Recommendations for legislative and policy reforms:

It is essential for the government to develop clear industry guidelines and a standardized framework that can introduce a comprehensive system for Jhut management and streamline Jhut management, including collection, sorting and processing in the manufacturing sector.

Based on the findings, the following are some of the most important recommendations that are needed to transform the Jhut sector:

- **Collaborative Stakeholder Engagement:** There is a critical need for enhanced collaboration among key stakeholders, including government bodies, manufacturers, NGOs, and recycling companies. Joint efforts are essential in developing and implementing sustainable infrastructure, adopting innovative technology, and establishing efficient waste management systems. This collaborative approach would facilitate the sharing of resources, expertise, and responsibility, leading to more impactful results.
- **Protection of Workers' Rights and Safety:** The report stresses the importance of enforcing existing labour laws and introducing new regulations to safeguard the rights and safety of workers in the Jhut recycling industry. This includes ensuring proper occupational health and safety standards, eliminating child labour, and addressing gender-based challenges. Strengthening these protections will not only improve working conditions but also contribute to the overall well-being and dignity of the workforce, which is crucial for sustainable industry practices.
- **Promotion of Circular Textile Economy Practices:** Encouraging the adoption of a circular economy within the textile industry is vital. Brands and suppliers need to take the lead in this transformation by incorporating recycled materials into their product lines, thereby setting an industry standard for sustainable production. This approach will not only help in reducing waste but also in fostering consumer awareness and demand for eco-friendly products. The promotion of circular economy principles will drive innovation and open new markets for recycled products, contributing to both environmental sustainability and economic growth.
- **Capacity Building and Technology Adaptation:** Investing in the development of advanced recycling technologies and building the capacity of local enterprises is essential for the effective management of Jhut. This includes training programmes for workers, technological upgrades in recycling processes, and research into new methods of waste conversion. Such initiatives would improve the quality and efficiency of recycling, reduce environmental impact, and enhance the competitiveness of the Bangladeshi textile industry in the global market. In recent years, Bangladesh has seen various initiatives aimed at attracting innovative recycling technologies. However, challenges persist, including insufficient transparency, particularly within the informal sector.

The enactment and enforcement of existing legislative frameworks (laws and policies) will be important to mandate the responsible management of textile Jhut. Furthermore, a new legislative framework should incorporate specific components and principles to facilitate the overall management of textile waste including recycling and re-use, such as, end-of-waste criteria for textiles, extended producer responsibility (EPR) scheme, eco-design requirements, labelling

and preventing green claims, preventing illegal waste shipments, incentives for minimizing waste generation.

Formalizing Bangladesh's informal RMG Jhut sub-sector is essential for ensuring workers' rights and safety, particularly women and adolescent girls involved in Jhut processing.

This should involve legal recognition, regulation, and ensuring worker safety. Implementing labour rights, benefits, training, and skill development are also crucial. Integrating the Jhut sector under labour law will enhance working conditions and contribute to economic growth. Furthermore, adopting a circular economy model, in line with Bangladesh's Constitution, National Social Security Strategy, 8th Five-Year Plan, and Labour Act 2006, will create jobs and promote environmental sustainability and social inclusion. This will significantly bolster the Jhut sub-sector's role in Bangladesh's socio-economic development.

Six Policy Recommendations for the Informal Textile Jhut Sector in Bangladesh

Based on the regulatory analysis and evaluation of the key contexts of RMG Jhut management in Bangladesh, the following recommendations should be considered for implementing the existing solid waste management regulations and for formalizing the whole Jhut supply chain.

This set of policies provides a sequence of actions that need to be implemented for effective policy support to the sector:

1. Improve data availability, transparency and traceability through a national Jhut database
2. Establish clear definitions and standards, and introduce industry guidelines for Jhut management
3. Implement changes in existing VAT and tariff rules for Jhut transactions
4. Provide economic incentives to formalize Jhut collection, handling and sorting
5. Establish a central depository system and cluster-based Jhut sorting hubs for decent work and social inclusion
6. Improve investment environment for state-of-the-art recycling technologies

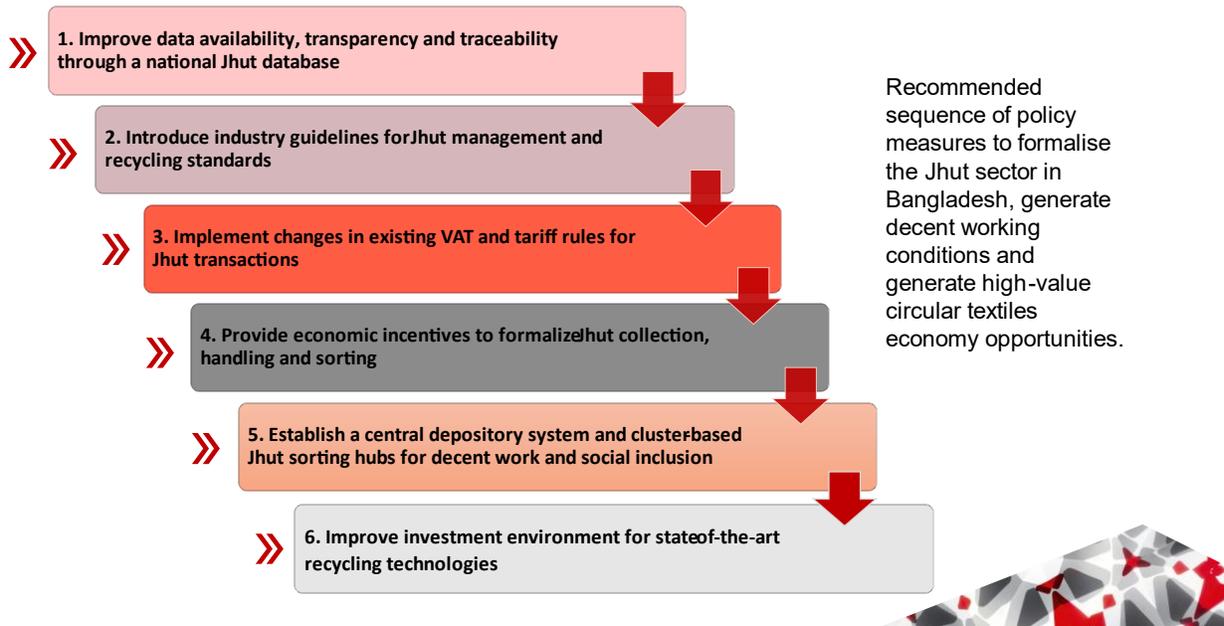


Figure 27: Recommended sequence of policy measures to formalize the Jhut sector in Bangladesh

These recommendations are ‘no regret’ strategies that will help to ensure long-term competitiveness and sustainability of the Bangladesh RMG sector. Furthermore, they will help to ensure meeting upcoming requirements from markets in the EU and US regarding due diligence and material traceability. The specific recommendations are outlined further below. The issues of gender and Just Transition principles should be considered in all policy areas. The recommendations consider feasibility, benefits, and challenges, and identify responsible government bodies and potential timelines for implementation.

Policy Recommendation 1: Improving data availability, transparency and traceability through national Jhut database

There is significant lack of reliable data on Jhut materials including volumes, prices, types and material flows which impedes the development and formalization of the sector. It is necessary for the government to develop a comprehensive official textile waste baseline mapping, covering the Jhut supply chain to effectively manage material flows. This database should document waste produced at different stages of production, handling, and sorting. It should involve identifying, classifying, and mapping the waste streams, as well as assessing the potential for adding economic value to material waste. This process should also explore new business possibilities in the upstream manufacturing sector.

Existing databases on production and waste volumes by manufacturers that are maintained by organisations such as the BGMEA, SME Foundation and BEPZA can be used to consolidate existing data and identify gaps. Furthermore, a public national database of Jhut textile materials and apparel solid waste generated in various stages of production, handling and sorting will be

needed to identify, categorize, and determine the economic value addition of material waste alongside new business opportunities in the upstream manufacturing context. The introduction and enforcement of mandatory and accurate reporting on Jhut generation at factory level will be needed. The government's SDG Tracker database, a web-based information repository, which monitors progress towards attainment of SDGs and other national development goals could be used and a national Jhut database could be linked to this existing repository.

In addition, the *Manifest system* is an effective tool for waste traceability and can be introduced to track non-hazardous industrial waste like Jhut to identify the volume and type of waste generated. Textile Jhut which will be disposed by recycling has to go through MENIFESTO mechanism. While sending the waste to the recycling facility, the garments producer has to enter the detailed description of waste (what kind of waste) including its destination in a prescribed form. The MENIFESTO system will be helpful for the DoE or any monitoring authority to track the waste supply chain, *i.e.*, to see that the waste has been disposed of properly. Once this becomes incorporated into law, the government can start to implement it and the fashion brands will require factories to follow the manifest system in compliance with the local law.⁵²

Recommended lead agencies: Ministry of Commerce and Bangladesh Bureau of Statistics

Policy Recommendation 2: Establish clear legal definitions and standards for classification and recycling, Introduce industry guidelines for Jhut management

The Environment Conservation Act of 1995 in Bangladesh broadly defines 'wastes' but does not specifically mention textile waste or Jhut. The Solid Waste Management Rules 2021 describe 'solid waste' as discarded or hazardous materials but do not explicitly include Jhut in this category. This creates legal ambiguity regarding Jhut's classification and management as solid waste. An enabling legal framework should incorporate clear legal definition of Jhut both as a post-industrial garments 'waste' and, as a 'product' when the material enters into the supply chain after being released from the factory. Textile waste can be turned into a helpful resource and value-added product by defining end-of-waste requirements in the regulatory frameworks related to waste management, customs bond, VAT, income tax and others affecting the Jhut supply chain.

Furthermore, there is no specific industry guideline applicable across the country for sorting, collection, and reuse/recycling of post-industrial waste in the RMG sector, covering all aspects of waste management, from waste reduction, sorting, collection to the use of alternative materials. The development of comprehensive industry guidelines to ensure quality and standardization for upcycling is required. To develop and implement these guidelines and standards, BEPZA's existing categorization system of Jhut into textile wastage (scraps larger than 18 inches in size) and garbage (less than 18 inches in size) could be applied or adjusted. Jhut generation and collection is already recorded by BEPZA according to these categories. Furthermore, BEPZA has

⁵² There is a debate about which legal approach will be used for adopting the legal framework of MENIFESTO system. Some argue that the system could be very useful from administrative perspective, while others say that it has to be operated from commercial law perspective. Some also argue that such manifesto system will not be necessary for let's say a 100% cotton or unicolor cotton waste, because it is such a good resource to track easily. The government has to determine that whoever authority would administer the manifesto system.

formal license requirement for procuring and collection of Jhut. These existing protocols and operating practices could potentially become the basis for national guidelines and standards.

Introducing mandatory transparency and reporting of production and management of Jhut waste to buyers and government would ensure data transparency and help promote circularity in textile industry. Accurate record keeping is essential in the formalization process. It is necessary to keep detailed records of Jhut management operations, including the volume of Jhut waste collected, transported, and recycled. Reporting of production and management of Jhut waste should be overseen by a dedicated regulatory body under the government of Bangladesh. The manufacturers should be required to report their practices to the government through a prescribed procedure for effective monitoring and enforcement.

Recommended lead agencies: Ministry of Commerce, BIDA, BEPZA, Ministry of Industries

Policy Recommendation 3: Implement changes in existing VAT and tariff rules for Jhut transactions

The current taxation structure does not incentivize circular practices and transparent Jhut management by manufacturers and factories. Furthermore, there is no direct reference in the Income Tax Act 2023 for textile Jhut management. It will be important to offer various effective incentives to the Jhut recyclers, collectors, sorters or traders who will trade Jhut in transparent and traceable way. This will encourage the RMG manufacturers and actors of Jhut supply chain to adopt circularity practices in solid textile waste management in Bangladesh.

The government of Bangladesh needs to extend its support to Jhut sector in terms of policy formulation, tax benefits such as withdrawal of VAT and other taxes imposed on Jhut trade and cash incentives to encourage the entrepreneurs planning for setting up Jhut recycling mills. Tax incentives like income tax rebate for adopting sustainable waste management practices and investment in green technologies could motivate manufacturers to opt for circular Jhut recycling model. Incentives can also be offered based on performance of sustainable Jhut management. This approach involves rewarding stakeholders that demonstrate effective and environmentally responsible practices in handling Jhut. The criteria for performance could include efficient recycling methods, reduced environmental impact, innovative approaches to repurposing or reusing textile waste, and adherence to sustainable disposal practices.

According to the National Industrial Policy 2022 (cl. 12.5), the Government has the authority to declare Jhut recycling as the priority sector enabling it to enjoy special incentives, tax exemption and financial support. The whole world is now encouraging the production of recycled clothing and if, in this case, the government removes VAT on textile waste, it will have a positive impact on growth of recycling industries boosting garment manufacturing from recycled fibres and will potentially open a window of engaging with the informal Jhut processing sector. Granting VAT exemption and tax amnesty for textile waste handling would be a useful policy reform to encourage the uptake of locally produced recycled yarn and leverage the competitiveness of Jhut recycling industry as a backward linkage of the garment sector. It is also recommended to relax the EPZ rule on sale of Jhut and allow direct sale to the recyclers.

Taxation measures will be a particularly necessary to ensure that the industry will implement any circular Jhut industry guidelines (see recommendation 2 above). Tax incentives for garment

factories to engage in Jhut sorting and become transparent about the percentage of Jhut generated during garment production is a key issue. In current practice factories do not sort Jhut at factory level and are not interested in crossing the exemption range for waste to avoid financial consequences. Furthermore, recyclers need to pay 7.5 per cent VAT when purchasing Jhut from the vendors and 15 per cent VAT applicable for selling recycled fibre to spinning and yarn mills. In the case of bonded warehouses, selling Jhut from a bonded warehouse is considered as selling imported goods from outside Bangladesh, which is subject to VAT. Removing the VAT charge is recommended as incentive for factories as the current system which does neither generate significant revenue to the government while encouraging underreporting by factories. Furthermore, existing provisions in the Income Tax Act can be used for promoting circularity in the RMG Jhut sub-sector in Economic Zones. Special tax rate for the companies for investment in Economic Zones which can be relevant for the industries involved in textile Jhut management. Furthermore, revision of VAT rules on textile waste transactions to reduce price differences with virgin cotton will promote transparency and recycling (and incentivise accurate reporting on traded Jhut volumes).

Recent developments by the Bangladesh Trade and Tariff Commission (BTTC) to exempting value-added tax (VAT) from domestically manufactured recycled fiber and its raw materials to boost the industry and eventually reduce dependency on cotton imports is a good way forward.

Recommended lead agencies: Bangladesh National Board of Revenues, Ministry of Commerce, Bangladesh Trade and Tariff Commission (BTTC).

Policy recommendation 4: Provide economic incentives to formalize Jhut collection, handling and sorting

The regulatory and policy framework needs include economic provisions and financial incentives for informal stakeholders to move towards transparent circular business models in collection, sorting and trading. Either direct public funding, cash payments and other economic incentives are needed to formalise the Jhut sector and create decent jobs in the textiles Jhut ecosystem. Offering access to finance, preferential loans and credit facilities for informal sector participants to upgrade operations in line with new government requirements and guidelines, is needed. Economic activities such as collection, sorting and processing should be considered for public funding (e.g. under the Green Technology Fund of Bangladesh Bank).

Recommended lead agencies: Bangladesh Bank, NBR, Ministry of Commerce, Ministry of Labour

Policy Recommendation 5: Establishment of central depository system and cluster-based Jhut collection and sorting centres and hubs for decent work and social inclusion

Key stages of the Jhut supply chain are highly informal and controlled by political interests. This can be addressed by establishing a central depository system for Jhut and upgrading existing informal Jhut hubs. Women workers and entrepreneurs have particular challenges in accessing Jhut and are often discriminated as low-cost labour in informal sorting facilities.

Currently, the Labour Act has no specific provision about the informal sector workers working in waste management either for collection, sorting or processing of wastes. Informal workers,

whether they are involved in waste management or any other economic activities, are currently not entitled to the labour rights enshrined in the existing labour law. Given the unsafe working conditions in Jhut sorting and processing, it should be declared by the Government as 'hazardous work' u/s 39 of the Labour Act 2006. Employment of all under-18 workers should be strictly prohibited in any Jhut processing and recycling enterprise, as being hazardous child labour, according to ILO Conventions 182 and 138, the Bangladesh Labour Act 2006 and the Children Act 2013. Institutional support is required for female informal workers to ensure protection of rights, health and safety in work environments.

One possible way would be the establishment of one or more 'Jhut Hubs', central depository system, that would manage the sorting and redistribution of Jhut resources in a transparent manner without interference from middlemen. These 'Jhut hubs' would operate with best available sorting technologies, adhere to high labour and health standards and maintain a publicly available database and marketplace for Jhut (see recommendation 1). The recycling facilities can source their required feedstock from these hubs.⁵³

Capacity building trainings and upgrading of existing sorting and processing facilities into formal Jhut hubs with international health and safety standards is urgently needed. Following the example of LEED certified factories, Jhut warehouses and sorting facilities should require similar certification and accreditation. Creating a Common Facility Centre (CFC) to provide the necessary equipment for handling and sorting Jhut efficiently. The SME Foundation has experience in running CFC at different clusters and could support develop some high-tech CFCs at Jhut clusters to enable small entrepreneurs (SMEs) to be suppliers of feedstock to the large textile factories in future.

The initiatives like the Accord on Fire and Building Safety in Bangladesh and the Alliance for Bangladesh Worker Safety, which collaborate with various stakeholders to oversee social compliance in garment factories, should also encompass the Jhut sector and clusters. This expansion would include addressing fire safety and worker safety concerns specific to industrial Jhut waste management.

Recommended lead agencies: Ministry of Commerce, Ministry of Labour and Employment

Policy Recommendation 6: Address regulatory barriers and provide incentives to attract foreign and domestic investment into new technologies and facilities for high-value circularity including fibre-to-fibre recycling.

Despite the country's burgeoning textile industry, there is a conspicuous lack of investments directed towards advanced recycling technologies and high-standard facilities. The existing investment regulatory framework has struggled to incentivize the influx of capital required to establish cutting-edge recycling infrastructure. This gap in foreign investments hampers the sector's ability to embrace sustainable circular practices and modernize its textile waste management sector. Addressing these barriers and revisiting the regulatory framework will be essential to attract the necessary investments that can propel Bangladesh towards a circular textile sector and technologically advanced approach to textile recycling. Tax credits can be used

⁵³ This recommendation was suggested by the Jhut suppliers and exporters during the survey and interview.

to promote the growth of the domestic garment recycling industry in the 2024 budget and provide certainty for investors in textile recycling facilities.

Recommended lead agencies: Bangladesh Investment Development Authority (BIDA), Ministry of Commerce

In addition to these six policy recommendations for inclusion of informal sector stakeholders, the report proposes a set of recommendations for wider shift towards circular and sustainable textile sector:

Ensuring the enforcement of existing waste management policies: Strengthen regulatory frameworks and enforcement mechanisms to ensure compliance with existing waste management policies, especially the Solid Waste Management Rules 2021, for the textile sector. Increase monitoring and inspection efforts to ensure compliance.

Addressing incineration of textile waste: Implement comprehensive measures to mitigate the incineration of textile waste, such as promoting recycling and upcycling initiatives by factories. Collaborate with industry stakeholders to establish guidelines for responsible disposal methods, prioritizing reuse and recycling over incineration, as part of the industry guidelines for Jhut management.

Economic incentives for factories to upgrade boilers for heat generation: Introduce financial incentives for factories to transition to cleaner and more efficient boiler systems. This could include tax breaks, grants, or subsidies for the installation of energy-efficient boilers or the adoption of renewable energy sources such as biomass or solar thermal energy.

Adopt effective approaches from other countries for informal sector inclusion of wastepickers and economic incentives schemes: Identify key lessons learned and best practices on formalization from other textile producer countries like Turkey or Thailand that can be adapted to the local context. Customize proven approaches to suit the specific needs and challenges of Bangladesh's domestic textile industry, taking into account factors such as infrastructure, regulatory framework, and socio-economic dynamics.

Consider the development of a national strategy for circular textile: Formulate a comprehensive national strategy for circular textile management to guide the transformation of the sector over the next 5-10 years, encompassing the entire lifecycle of textile products from production to disposal.

Annex: Recycling Technology used in Bangladesh

	Organization Name	Facility Name	Region	Technology	Installed Capacity/Tons Day
1	Aman Spinning	Aman Spinning	Gazipur	Mech Cotton (Spinning)	0
2	Armada Spinning Ltd	Armada Spinning Mills Ltd	Gazipur	Mech Cotton (shredding & Spinning)	1
3	Badsha Spinning	Badsha Spinning Mills	Mymensingh	Mech Cotton (shredding & Spinning)	20
4	CHP	Classical Handmade Products BD Ltd	Nilfamari	Mech Cotton (shredding & Spinning)	5
5	CYCLO(R) Recycled Fibres	SIMCO Spinning & Textiles Ltd.	Mymensingh	Mech Cotton (shredding & Spinning)	40
6	Envoy Textiles Limited	Envoy Textiles Limited (Denim Fabric Mfg. Unit)	Mymensingh	Mech Cotton (shredding & Spinning)	0
7	Fujian Onan Textile	Fujian Onan Textile Co. BD. Ltd.	Narsingdi	Mech Cotton (Spinning)	
8	Hameem Denim		Mymensingh	Mech Cotton (shredding & Spinning)	16
9	Huashin	Huashin	Gazipur	Mech Cotton (Spinning)	
10	Jannat Cotton	Jannat Cotton	Narayanganj	Mech Cotton (shredding & Spinning)	
11	Karim Textiles Limited	Purbani Rotor Spinning Limited	Gazipur	Mech Cotton (shredding & Spinning)	
12	Matin Spinning Mills	Matin Spinning Mills Ltd	Gazipur	Mech Cotton (shredding & Spinning)	1.5
13	Moni Fashion	Moni Fashion	Gazipur	Mech Cotton (shredding)	
14	Mosharaf Group	Mosharraf Spinning Mills Ltd	Dhaka	Mech Cotton (shredding & Spinning)	15
15	Noman Group/Z&Z	Zaber and Zubair Textile Mills Ltd	Gazipur	Mech Cotton (shredding & Spinning)	10
16	NZ TEX GROUP	NZ Spinning Mills Ltd	Narayanganj	Mech Cotton (shredding & Spinning)	20
17	Recover Textile Systems	Recover Bangladesh	Narayanganj	Mech Cotton (shredding)	200
18	Reedisha Group		Gazipur	Mech Cotton (shredding & Spinning)	14
19	Rising Textiles		Gazipur	Mech Cotton (shredding & Spinning)	0
20	Saraz Fibre Tech Ltd.	Saraz Fibre Tech Ltd.	Mymensingh	Mech Cotton (shredding & Spinning)	
21	Shahjalal Poly Industries Ltd	Cumilla EPZ Factory	Cumilla	Mech Cotton (shredding & Spinning)	
22	Shoucheng Textile	Shoucheng Textile	Gazipur	Mech Cotton (Spinning)	
23	Sosan	Sosan	Narsingdi	Mech Cotton (shredding & Spinning)	
24	Square Textiles Ltd.	Square Yarns Ltd.	Mymensingh	Mech Cotton (shredding & Spinning)	15
25	Multazim Spinning	Multazim Spinning Mills Ltd	Mymensingh	Mech Cotton (shredding & Spinning)	16
26	DBL Group	DBL Textile Recycling Ltd	Gazipur	Mech Cotton (shredding & Spinning)	16
12	Salma Group	Humaira Composite Textile Mills Ltd	Mymensingh	Mech Cotton (shredding & Spinning)	12
28	AKIJ Textile	AKIJ Textile Mills Ltd	Manikganj	Mech Cotton (shredding & Spinning)	15
29	Broadway Recycling	Broadway Exim Co. Ltd.	Narsingdi	Mech Cotton (shredding & Spinning)	15
30	Alhaj Karim Textiles	Alhaj Karim Textiles Ltd	Kalampur, Savar	Mech Cotton (shredding & Spinning)	5
31	Pacific Jeans	Pacific Jeans	Chittagong	Mech Cotton (shredding)	10
35	Roshawa Spinning	Roshawa Spinning Mills Ltd	Gazipur	Mech Cotton (shredding & Spinning)	1
38	G Sourcing	G Sourcing	Tongi	Mech Cotton (shredding)	3
39	MSA Spinning	AA Yarn Limited	Gazipur	Mech Cotton (shredding & Spinning)	80

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