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UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Toward an efficient and competitive circular textile industry

National Roadmap for minimizing and valorizing pre-consumption textile waste

Morocco

English Edition

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Generalitat de Catalunya
Departament de Territori i Sostenibilitat

Funded by the European Union, with co-funding from the Government of Italy and the Government of Catalonia, the SwitchMed Programme is implemented under the lead of the United Nations Industrial Development Organization (UNIDO) in partnership with the United Nations Environment Programme (UNEP) Economy Division and MedWaves, the United Nations Environment Programme Mediterranean Action Plan (UNEP/MAP) regional activity centre for Sustainable Consumption and Production (formerly known as SCP/RAC). The initiative is carried out closely with the European Commission's Directorate-General for Neighbourhood and Enlargement (DG NEAR).

Each implementing organization contributes specialized experience and tools to partner with the eight beneficiary countries on policy development, capacity building, business support services, demonstration activities and networking.

See other documents related to the SwitchMed project in Morocco:
https://switchmed.eu/country-hub/morocoo/

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This Roadmap aims to stimulate and guide stakeholder discussion about key steps, objectives, and timelines for developing and implementing a strategic plan for leveraging circular business models to make the Moroccan textile industry more competitive and reduce its environmental impact.

It also provides a tentative framework for coordinating actions among various stakeholders involved in industry interest representation, business activities, research and development and policy development and implementation.

An equally important role is to enhance transparency by clearly articulating the steps and processes involved in roadmap development.

The document draws from the experience and lessons learned during implementation of the UNIDO textile circular initiative within the framework of SwitchMed 2 across the textile and apparel value chain between 2019 and 2023.

The Roadmap also incorporates international experience from other projects and policies dealing with the circularity and sustainability of textiles, and is meant to complement the policy recommendations and findings from other projects concerning the circular business model for textiles that has been implemented in Morocco in recent years.

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A. CONTEXT

1. Introduction

The Circular Economy and the Fashion Industry

The concept of the circular economy is of essential importance for the fashion business today due to its potential to address and mitigate various environmental and sustainability challenges inherent in fashion's conventional linear model of production and consumption. The essential nature of the challenge for fashion is due to its position as the second largest market for household consumption, after food. The economic and material size of these sectors means that they have a significant impact on the environment and on society.

The critical factors in the circular economy framework for the fashion industry are depletion of natural resources, release of GHGs and toxic pollutants, and the enormous amount of waste generated at both the pre-consumption and post-consumption stages.

Only too often the concept is seen in a diminutive perspective, merely highlighting the "recycling route." The concept referred to as the waste hierarchy, embraced by policy-makers in many countries and regions, including the EU, has fixed this concept since the issuing of the Waste Framework Directive in the nineties. Indeed, the preferred policy for addressing the issue of waste is Prevention, by reducing the generation of waste, while the second best is Reuse, giving the products a second life before they become waste. Recycling comes third in this hierarchy, just above energy recovery through incineration and disposal, and becomes a priority when waste is created and materials cannot be reused without further transformation.

When recycling comes into play, several factors need to be considered, including:

- *Is the reclaimed material safe? Or might it be polluted by hazardous chemicals?*
- *Do the reclaimed materials come from the post-consumption or pre-consumption stages?*
- *Can the material be recycled, and what is the most suitable recycling technology?*

- *What are the best end uses for the recycled materials? Can recycled materials* re-enter *the textile and fashion businesses, or is using them in industrial symbiosis in other sectors more environmentally and technically sound?*
- *How can textile and fashion products be designed to permit better recycling?*

The answers to these questions will define the features of a circular economy business model.

Fashion brands have started to commit to the circular economy model in recent years, adopting various strategies such as developing second-hand and resale platforms, introducing circular design practices, recycling initiatives, and commitments to use recycled materials in their collections. Polyester, wool, polyamide, and cotton are the most commonly recycled fibres. The impact of a brand's circular strategies is reflected all along its supply chain, where suppliers are pressured to source recycled fibre in a market that is not yet prepared to supply the requested volumes.

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Recycled fibre market trends

The recycled fibre market scenario in the textile industry is characterized by robust expansion of demand, driven by the fashion brands' growing appetite for more sustainable materials.

According to the latest Textile Exchange Report, recycled fibre production grew by 26.5% (CAGR 4.8%) from 2017 to 2022, double the growth rate for virgin fibres (+12.7%, CAGR 2.4%). Notwithstanding this rapid growth, the market share of recycled fibres in the global textile fibre market remains below 10% (7.9% in 2022).

However, the existing production capacity limits the supply of recycled fibre, especially for recycled materials from textile applications. Over 90% of the recycled fibre currently available is polyester from plastic bottles, and less than 1% of the global fibre market is from pre- and post-consumer recycled textiles.

The supply limitations make the available recycled fibres insufficient to meet the brands' and other end users' requests, and have raised prices for rPET (recycled polyester) and recycled cotton in recent years.

2. The SwitchMed programme

Launched by the European Union and managed by the United Nations Industrial Development Organization (UNIDO), the SwitchMed Programme has demonstrated the potential for a green and circular economy in Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine, and Tunisia since 2014. SwitchMed scales up the transition towards sustainable consumption and production practices in the Southern Mediterranean region through industry demonstrations, policy development, networking opportunities, and support for start-ups and green entrepreneurs.

Stimulating the creation of business opportunities that can reduce the inefficient use of resources and the environmental footprint of industrial activities offers a chance for the region to respond to economic, social, and environmental challenges.

Designing out waste, reducing pollution, and keeping products and materials in use for longer are all cornerstones of a circular economy.

These principles also outline the activities of UNIDO in developing resource-efficient and circular industries under the second phase (2019-2023) of the SwitchMed programme. This phase launched an initiative targeting the industrial textile supply chains of Egypt, Morocco, and Tunisia. Collaborating with international brands and expert organizations, UNIDO has engaged national stakeholders in developing circular value chains to valorize post-industrial and pre-consumer textile waste, aiming to guide the textile industries toward adoption of safer chemical protocols.

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Textile and ready-made garment manufacturing demands significant resources and generates unprecedented volumes of waste and effluents. At the same time, the supply of resources is limited and threatened by a worldwide shortage and high price volatility.

Retaining the value of these resources and reducing the environmental footprint is not only a necessity for Morocco's textile industry, but it also provides a unique opportunity to strategically reposition production standards and improve the economic resilience of businesses to meet future demand for sustainably produced products on the market. The SwitchMed initiative concerning circular textiles in Morocco aims to demonstrate the potential for recycling pre-consumer textile waste and transfer know-how in order to develop a local value chain for recycling textile fibres, focusing on two critical components of the circular economy business model:

- The design of new garments aimed at minimizing waste and making garments easily recyclable under the concept of eco-design.
- The valorization of existing waste, primarily generated in manufacturing, also known as post-industrial and pre-consumption waste. The decision to focus the valorization pilots exclusively on post-industrial waste (spinning and weaving waste, cutting scraps) and pre-consumption waste (second quality and defective garments, overproduction, deadstock) was motivated by four considerations:
  a. Dealing with post-industrial waste is the action with the highest short-term impact on valorization of textile waste. Recycling post-consumption waste is much more challenging and requires preliminarily establishment of a complex worn garments collection and management supply chain.
  b. The volume of resources in post-industrial and pre-consumption waste is huge, and so far untapped.
  c. Working with post-industrial and pre-consumption waste directly supports companies' competitiveness.
  d. The valorization value chain created for post-industrial and pre-consumption waste can easily be extended to post-consumption waste in the future.

The elimination of hazardous chemicals from the textile supply chain is a prerequisite for safe circular production. Through collaboration with the ZDHC Foundation, UNIDO has enhanced expertise in the safer management of chemicals within the Moroccan textile industry.

The SwitchMed textile initiatives were implemented in two phases: a first phase focusing on understanding the business environment, including a waste mapping survey, and a second phase implementing three pilot projects involving circular textile business models relevant to the Moroccan context.

Phase 1: Mapping of Waste Flows

In 2021, UNIDO commissioned Blumine and Reverse Resources to conduct a waste mapping study with the support of the Association Maroccaine des Industries du Textile et de l'Habillement (AMITH). The study analyzed the textile waste value chain, engaging a representative group of key market players and estimating the pre-consumer textile waste flows generated by Morocco's textile and clothing industry to be 83,200 tons per year.

The survey was instrumental in validating the most suitable circular business models adapted to the Moroccan business sector, the key players and market dynamics in waste recycling, and the specific needs and opportunities to upgrade the sector. Three pilot projects have been defined at the end of the waste mapping phase: this Roadmap builds on the lessons learned from the practical experience of working with all the actors in the textile value chain.

Phase 2: Launch of three pilot projects in Morocco[1]

Pilot Project A: Manufacturing of quality open-end yarns with recycled content and testing of a local quality waste supply network

This pilot project was undertaken with EVLOX, a leading denim manufacturer based in Settat and part of a Spanish group. With an annual production of 15 million metres of premium denim, EVLOX intends to increase the share of recycled cotton fibre in its denim fabrics and explore the potential of investment in a recycling plant.

1. For more detailed information about the three pilot projects, please refer the Morocco Hub section in the SwitchMed website: https://switchmed.eu/country-hub/morocoo/

The pilot project had three goals: a) improving recycled and virgin cotton blend open-end spinning techniques to achieve higher quality yarns using recycled fibres; b) promoting investment in a textile waste recycling line integrated with the current EVLOX production configuration; c) creating a network of garment makers providing textile waste that is properly segregated and managed as a precondition for an efficient recycling value chain.

Achievements

- One investment of over 1 million Euros in a recycling line, decided and planned for 2024
- Five garment makers engaged and trained in a Waste Recycling Ecosystem
- 160 t of textile waste collected, segregated for recycling

Pilot Project B: Textile waste recycling for nonwoven products

This pilot project was undertaken with Novimat, a Moroccan producer of polyester fibre from mechanically recycled PET with an annual polyester fibre production capacity of 15,000 tons. The company has recently invested in manufacturing equipment for nonwoven products. The pilot project benefited from insights and assistance of other local stakeholders such as CETEMCO (Centre des Tecniques et Materiaux de Construction), FNPI (Fédération Nationale des Promoteurs Immobiliers), C2TM (Cluster des Textiles Techniques Marocain), and other companies in the construction industry.

The pilot objectives included: a) providing technical assistance to improve non-woven textile production processes at Novimat; b) conducting a market study of opportunities for using recycled textile fibres in the production of non-woven insulation boards for houses; c) evaluating the business case for investing in a textile shredding unit to feed the production of insulation panels and identifying potential investors.

Achievements

- One company was trained to improve the efficiency and quality of non-woven production
- One potential investor was identified, and one business plan delivered
- Nine potential waste suppliers were identified, and five of them were trained in waste management
- One market study was conducted on the insulation boards market, which has an estimated potential of over 500 million Dirham in Morocco

Pilot Project C: Fashion design techniques and practices for circularity and upcyling

This pilot project was undertaken with Casablanca fashion school Casa Moda Academy, and involved organizing a programme of four workshops for students and teachers. The workshops were held by renowned international experts in circular business models, sustainable materials for fashion, eco-design and upcycling/ remanufacturing of fashion items.

The students were guided and tutored in the implementation of upcycling and eco-design projects to produce a capsule collection of clothing, presented at an event held on the school's premises in Casablanca. The workshops and hands-on development of students' projects were documented with pictures and videos at the Milan White Show during Women's Fashion Week in Milan.

Achievements

- One local fashion design school was engaged and capacitated in teaching students about the principles and practices of the circular economy
- Four training workshops with international experts in circular economy and circular materials in the fashion business were delivered
- Three local companies provided textile scraps and supported the course
- Six Casa Moda Academy teachers were trained in the principles and practices of the circular economy
- Sixteen students were trained in sustainability and circular garment design
- One students' fashion show was held in Casablanca, and an exhibition was held during fashion week in Milan.

3. The textile recycling value chain

Textile waste valorization as an "ecosystem"

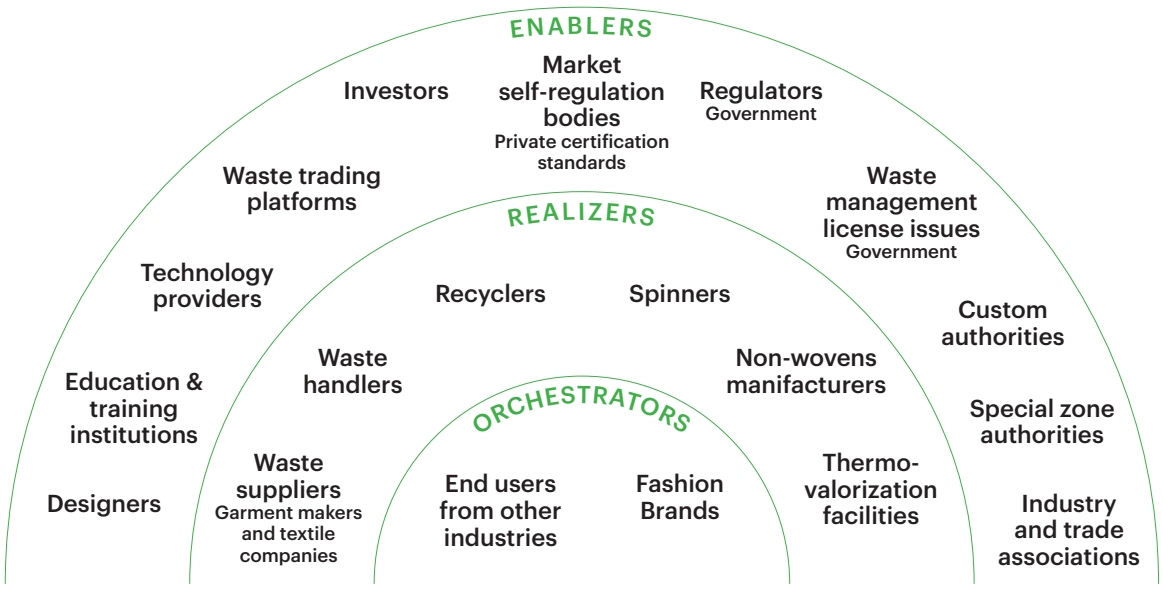
The textile waste valorization ecosystem engages a network of interconnected participants ("stakeholders") across industry boundaries and with different roles. (Figure 1)

Some of these participants play the role of *Orchestrators*, maintaining direct contact with the final markets; they may be in the fashion business (fashion brands, fabric makers, etc.) or other end-user industries of textile fibres in different sectors (automotive, furniture, construction, etc.). These business players identify the needs and requirements of the market and match them with the *Realizers*' capabilities.

Realizers are providers of products, such as recycled fibres and yarns, and services, such as collection, transportation treatment and recycling of textile materials, in the waste valorization value chain.

Enablers are supporters of both *Realizers* and *Orchestrators*. They can be private organizations or government institutions, and contribute as regulators, voluntary standards maintainers, market connectors, such as trade or traceability platforms, or technology providers. It is also interesting to note that the same player can take on several roles in the ecosystem. For example, a textile company or a brand can simultaneously act as supplier (of textile waste) and buyer (of recycled fibres).

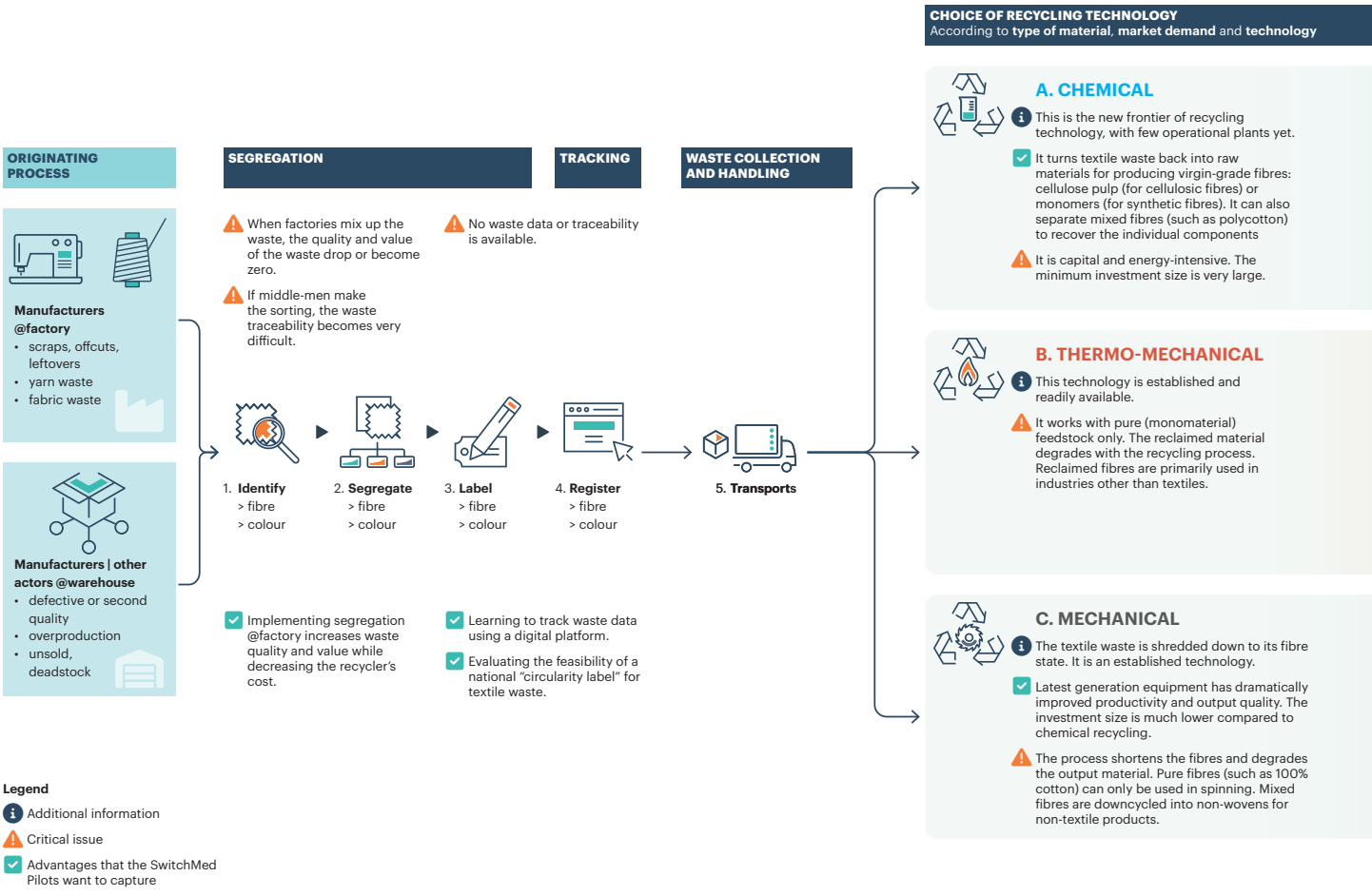
Policies aimed at valorizing textile waste and promoting circular business models in the textile and fashion supply chain are expected to address the ecosystem's various components and stakeholders and go beyond the strict boundaries of the textiles value chain.



SOURCE: BLUMINE

Figure 1 – The textile waste valorization ecosystem

Figure 2 – The post-industrial textile recycling value chain



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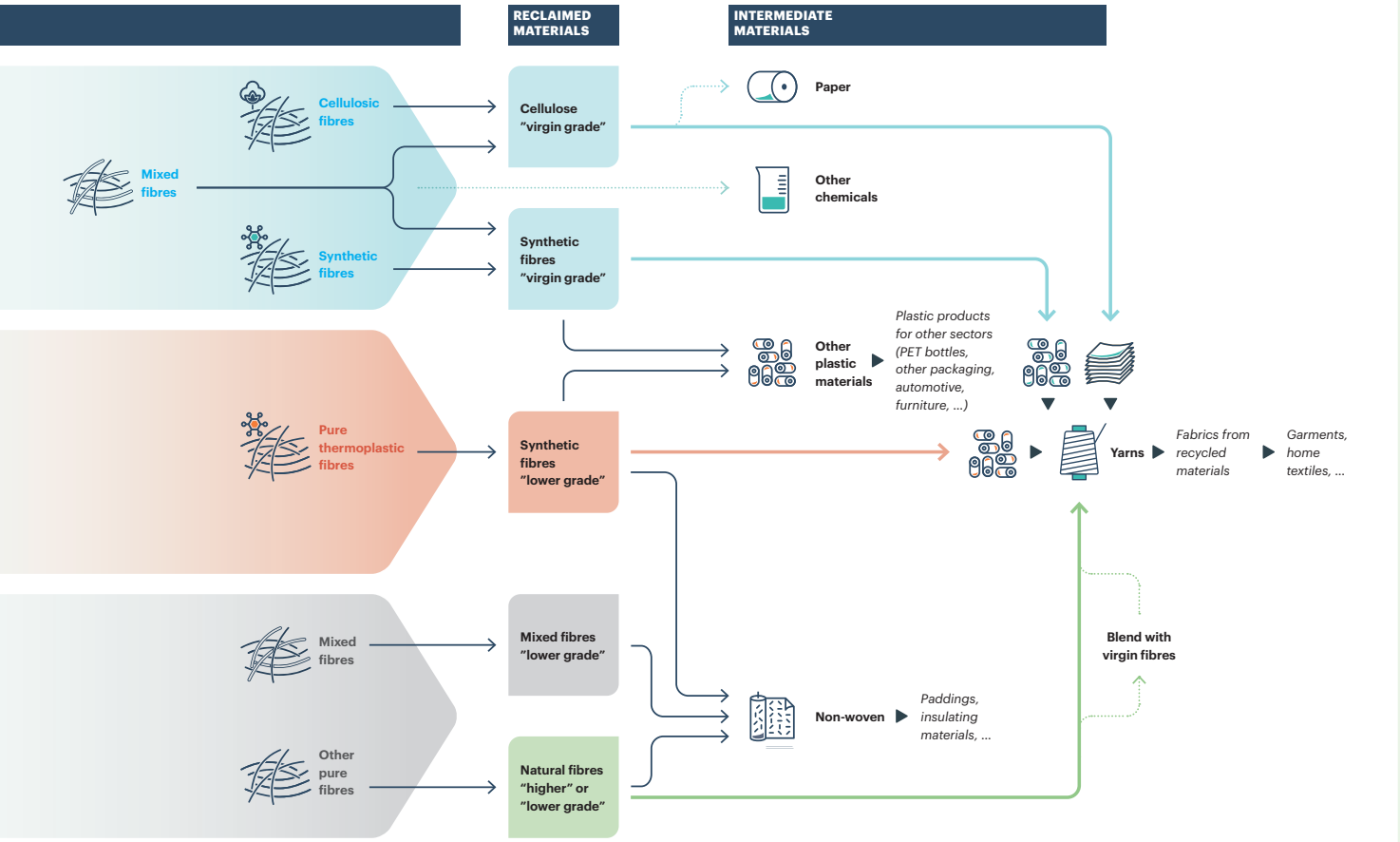

RECLAIMED MATERIALS
INTERMEDIATE MATERIALS
Cellulosic fibres
Mixed fibres
Synthetic fibres
Pure thermoplastic fibres
Mixed fibres
Other pure fibres
Cellulose "virgin grade"
Synthetic fibres "virgin grade"
Synthetic fibres "lower grade"
Mixed fibres "lower grade"
Natural fibres "higher" or "lower grade"
Paper
Other chemicals
Other plastic materials
Plastic products for other sectors (PET bottles, other packaging, automotive, furniture, ...)
Yarns
Fabrics from recycled materials
Garments, home textiles, ...
Non-woven
Paddings, insulating materials, ...
Blend with virgin fibres

The textile recycling value chain in Morocco

Baseline Analysis

According to the waste mapping study, pure-cotton and cotton-rich (>85% cotton) waste accounts for 56% of the 83,200 tons per year of pre-consumer textile waste generated by Morocco's textile and clothing industry. This is a remarkable volume, the majority of which could be channelled into textile-to-textile recycling in the cotton supply chain. On the other hand, most of the remaining 44%, consisting of blends of various fibres – synthetic, cellulosic, natural, or pure synthetic – needs to find a different end use. For most of it, nonwoven applications will be the primary option.

Cutting scraps are the most significant part (62%) of the waste flow, and more than 75% originates in just two regions, Greater Casablanca and Tangier. The concentration of waste in the two areas minimizes transportation costs and maximizes synergies through collaborations and shared facilities, keeping costs down for recycling operations in Morocco. The mapping study also found significant economic potential for recycling high-value 100% cotton and cotton-rich pre-consumer textile waste in Morocco.

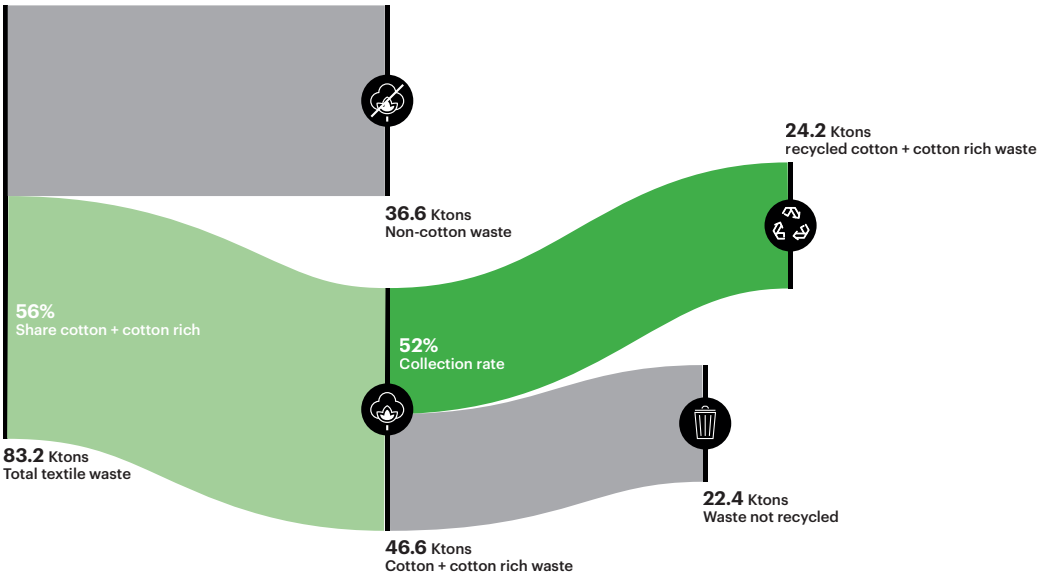
The information collected during the SwitchMed project does not provide evidence of a structured textile value chain for higher-value (cotton and cotton-rich) or lower-value (other blends and synthetics) waste. With a few remarkable exceptions, limited to recycling for non-woven applications (wadding, felt, insulation boards, and mattresses), the information indicates that higher-value waste is often exported as-is, without undergoing any transformation.

On the other hand, garment makers seldom or never have information about the destination of the waste they deliver to waste handlers. Lack of information and traceability pose significant obstacles to the successful implementation of circular business models.

Without adequate information on the origin, composition, and condition of these materials:

- ensuring the quality and safety of products made with recycled materials becomes challenging
- compliance with regulations promoting sustainability and waste reduction can be impossible, leading to legal and reputational risks for businesses
- sustainability claims regarding circularity in terms of both the use of recycled materials and responsible management of the brand's own waste can be considered greenwashing
- the accurate assessment of products' environmental footprint with LCA or LCA-like approaches is a challenging task

Overcoming the obstacles created by the lack of information and traceability requires collaboration between stakeholders, adopting standardized tracking systems, and appropriate digital technology to enable accurate data collection and sharing throughout the supply chain.



SOURCE: DATA FROM BLUMINE AND REVERSE RESOURCES

Figure 3 – Estimate of cotton + cotton-rich waste available for recycling into the textile-to-textile value chain

Opportunities

Pure cotton or cotton-rich waste accounts for 56% of the 83.2 Ktons of post-industrial and pre-consumption waste generated by the textile value chain in Morocco. The collection rate in best international practices is in the 50%-55% range.

Considering the midpoint of the best practices range and assuming a medium-term 52% collection rate for Morocco leads to a 24Ktons target for higher-value cotton-rich waste segregated, collected, and recycled locally in the medium term.

Challenges

The pilot projects demonstrated that waste segregation at the source, i.e. right on the textile or ready-made garments (RMG) company's "factory floor," is more efficient and increases the opportunity to generate value from waste. However, textile and RMG companies do not see segregation as part of their business, and it is considered just another additional cost, and so selling the concept of efficient waste segregation and management to these companies can be a challenge. Some form of public support or incentive could help overcome the obstacle.

The competitive landscape in the textile recycling value chain is evolving quickly. Several ambitious textile recycling projects were announced in 2023, some in Morocco and others in the broader Mediterranean region and Europe.

- The Spanish company Recyclados' 60 million Euro integrated recycling and spinning facility investment in the Tanger Region, supported by IFC, the International Finance Corporation, part of the World Bank Group
- The Portuguese company Valérius Têxteis' 90 million Euro planned investment in a recycling facility in association with the Moroccan company SG3H.

Investments in recycling capacity have been announced in neighbouring countries.

- In Spain, the company Recover specializes in textile recycling and spinning. It raised new capital in 2023 for a significant investment to scale up the production of recycled fibres and yarns to over 350 thousand metric tons by 2026
- Demand for textile waste is expected to escalate steeply as the first chemical recycling plants are scaling up from demonstration unit to industrial size investments, such as the Re:Newcell plant already in operation in Sweden, as well as new players expected on the scene, such as Infinited Fiber in Finland and GR3N/Intecsa in Spain.

The swift rise of textile recycling capacity and demand for textile waste could trigger a spike in feedstock price and speculative behaviour on the part of waste handlers and put the economic viability of investments in the recycling value chain at risk, especially if brands will not accept a premium price for recycled fibres.

On the other hand, orderly growth in the prices of textile waste and recycled fibres, reflecting the forces of supply and demand without being influenced by speculative positions or lack of transparency on the market, could serve as a valuable incentive for establishing new recycling facilities.

Stakeholder engagement

Besides the fashion and textile industry, which is the core industry involved in the input phase of the recycling value chain and a key player in higher-value recycled fibres for textile-to-textile applications, other industries could also be involved:

- The furniture and bedding industry uses lower-value recycled fibres to fill mattresses and other upholstered items of furniture such as sofas, chairs, etc.
- The automotive industry uses lower-value recycled textiles in rigid shapes for sound insulation
- The construction industry is a destination for thermal and acoustic insulation materials that can be produced locally using lower-value recycled textiles, making panels and sheets to be applied to walls and ceilings.

4. Lesson learned from SwitchMed pilot projects: a summary

The implementation of the pilot projects highlighted critical factors and priorities that helped shape the action plan.

The following lessons may be learned, not necessarily listed in order of importance:

- Waste handlers play a crucial role in the circular value chain: an increase in the quantity and quality of the collected waste can hardly be achieved without their involvement.
  The challenge is to make it profitable and convenient for informal waste handlers to transition to more formal, efficient and transparent business models.
- At this stage, fashion brands (the *"donneur d'ordres"*) are essential in engaging the local supply chain in circular projects.
  Many Moroccan RMG manufacturers act as subcontractors. They have limited decision-making power and lack awareness and transparency about the destination of their waste after it is delivered to waste handlers.
  On the other hand, fashion brands are interested in evaluating new projects for sustainability and circular business models on the condition that they are credible, i.e. the proposing company has the know-how and the capacity to manage such projects.
  RMG companies investing in developing these capacities and know-how gain competitiveness and can improve their dialogue with brands.

Waste segregation at source, i.e. right at the garment maker's facility, is more efficient and can produce economic advantages for all players in the recycling value chain in cascade.

- Individual companies can hardly succeed in implementing a circular business model alone. A collaborative approach is required involving all parties – waste suppliers, waste handlers, recyclers, textile companies and garment makers – to behave efficiently and transparently.
- Lack of cooperation and transparency can jeopardize the best efforts and dramatically increase costs.
- Waste segregation at source, i.e. right at the garment maker's facility, is more efficient and can produce economic advantages for all players in the recycling value chain in cascade.
- Guidance from experts in sustainability and the circular economy is essential, given the current state of awareness and know-how in the country.

5. Textile waste valorization strategy: SWOT analysis

The implementation of the pilot projects clearly revealed the Moroccan textile industry's strengths and weaknesses as well as some clear business opportunities and potential threats to be considered in defining a strategy and an action plan for an efficient and competitive circular textile industry in Morocco.

Strengths

Morocco is an established sourcing destination for big fashion brands.

Textile waste transportation costs are low in Morocco since over 75% of textile waste is concentrated in three neighbouring regions.

Good practices exist in Morocco for nonwoven applications.

Geographic and logistic proximity to the European market is a valuable advantage over Asian suppliers.

Weaknesses

The valorization of waste flows is limited by non-existent or poor on-site waste segregation and sorting; waste collection is mainly managed by the informal sector.

No traceability system for waste handling and recycling has been established in the country, and no transparent waste trading platform is available locally.

Local garment makers and their customer fashion brands have no awareness or information about the destination of cutting waste after it is delivered to waste handlers.

There is a lack of modern recycling capacity and spinning facilities dedicated to or specializing in making yarn from shorter fibres of recycled origin.

Awareness of waste management laws and regulations is poor, and the legal framework for waste management is weak and needs to be modernized to promote circular business models.

Opportunities

International brands want to manage waste responsibly and increasingly demand recycled yarns or fabrics in their collections.

The Règlement Thermique de Construction au Maroc (RTCM) has created excellent market potential for insulation boards from recycled textiles in the building industry.

Demand is growing for quality textile waste from local recyclers and brands. The domestic market for nonwoven applications (automotive, construction, bedding) is growing.

Threats

Investment in textile waste recycling capacity in competing Mediterranean countries is booming. The race to become the favoured circular sourcing destination for international fashion brands has begun.

Waste is a resource that must be valorized domestically; large-scale chemical recycling projects are hunting for waste on a regional scale.

SOURCE: BLUMINE

Figure 4 – SWOT Analysis.

B. ROADMAP

6. The way ahead

Goals & Objectives of the Roadmap

The Roadmap has been articulated on the basis of ten main objectives, categorized according to four main areas of priority[2] and expressed through eleven key actions. A card has been created for each action, including a description, a set of Key Performance Indicators (KPIs), and the stakeholders responsible for implementation.

Ten of the eleven Action Cards are addressed to Moroccan industry and society; an additional action aims to engage international brands in the journey toward establishing an efficient and competitive circular textile industry in Morocco. The table below summarizes the objectives and actions of the Roadmap.

Goals	Roadmaps actions
Establish a clear and modern legal framework for efficient, competitive and transparent circular business models.	**1**
Modernize and integrate the waste collection handling and recycling sector to make the recycling value chain more efficient.	**2**
Expand recycling capacity and modernize recycling equipment to increase productivity, quality and profitability.	**6**
Create physical and digital infrastructures specializing in circular business models.	**8**
Reduce waste in textile and RMG manufacturing.	**5**
Increase waste segregation and collection rates.	**7**
Increase use of recycled fibres in the value chains textile-to-textile and nonwoven applications.	**3,4**
Upgrade education in sustainability and circularity for future technicians, engineers, product managers and designers.	**9**
Make Moroccan industry and society aware of the advantages of a proper waste management system.	**10**
Publicize the achievements of Morocco's textile and garments industry and engage international brands.	**11**

Figure 5 – Roadmap objectives and actions

2. These are: Policy reform, Information system and capacity building, Market-based incentives for investments, Training and awareness-raising.

Actions in the Roadmap

Toward an efficient and competitive circular textile industry

1 – Reform of the Law No. 28-00 on waste management and disposal

Type of Action	Policy reform
Description	Notwithstanding some later modifications regarding the definition of hazardous waste and regulations restricting waste imports and exports, the structure of Morocco's legal framework for waste management is still based on Law No. 28-00, introduced 24 years ago and primarily concerned with safe dumping of hazardous waste in landfills. The reform and modernization of the Law are critical factors for developing an efficient and effective ecosystem for valorizing textile waste in the country. Aligning the law with the principles introduced by the most recent developments in waste management regulations in the EU and other Mediterranean countries such as Egypt and Tunisia will be essential. The key innovations in a reformed waste management law should be the introduction of principles such as "Polluter pays" and "Extended Producer Responsibility" and clear criteria for "End of waste" status. Further critical provisions include: • the establishment of a public registry of licenced waste collectors, handlers and recyclers; • the enforcement of a mandatory industrial waste register for companies managing industrial activities; • the obligation for recycling supply chain businesses to disclose information on the volumes and types of waste generated, delivered, traded and recycled to a newly established National Waste Management Authority. Finally, a national traceability system and a clear framework for waste management and trade in the Free Trade Zones would facilitate transparency in the textile recycling business.
Objective	Establish a clear, modern legal framework for efficient, competitive, transparent circular business models.
KPIs	Law approved, executive decrees issued, and the National Waste Management Authority established.
Key Stakeholders	Government institutions and ministries, waste handlers, recyclers, textile and garment companies.

2 – Programmes supporting modernization, efficiency, and traceability in the waste handlers' subsector and promoting integration of the informal recycling business sector

Type of Action	Information system and capacity building
Description	A significant portion of the recycling value chain still operates in the informal market, limiting overall efficiency and significantly reducing transparency and traceability in the value chain. Policy actions aimed at integrating the informal sector pose a real challenge for governments. On the other hand, they can contribute to creating a favourable environment for informal businesses to gradually integrate into the formal economy, promoting efficiency and transparency while simultaneously improving the well-being of workers. Eventually, these actions can contribute to upgrading and aligning the informal sector with a circular vision and market for textiles. Policy actions could include: • Establishment of a national registry of waste handlers and collectors, following licencing and compliance inspection procedures. • Guidelines and mandatory requirements for sorting and collection of post-industrial waste. • The creation of a mandatory information system regarding waste generation in garment factories. • Creation of a national digital platform to address the lack of data on volumes, types, and quality of waste and prices. Additional measures involve: • Providing access to finance and credit facilities to improve operations. • Offering non-financial incentives and training in the fields of traceability, digitalization, and transparency.
Objective	Modernize and integrate the waste collection handling and recycling sector to make the recycling value chain more efficient.
KPIs	Implementation of regulations/guidelines, number of licenced waste management companies, number of employees of formalized waste handling operations.
Key Stakeholders	Government institutions and ministries, specialized government agencies and task forces, SMEs and micro companies, and workers in the informal sector.

3 – Supporting the national demand for materials of recycled origin	
Type of Action	Policy reform
Description	Further to the direct impact of Law No. 28-00, other regulatory decisions can influence the domestic demand for recycled fibres. An example is the introduction of "green procurement" criteria in public expenditure, such as a minimum recycled content for textiles and uniforms purchased by the public administration. Establishing Green Procurement criteria will boost the national demand for fabrics/garments with recycled content.
Objective	Increase the use of recycled fibres in the textile-to-textile and nonwoven applications value chains.
KPIs	Share of "Green purchases" in the public administration's overall purchases of textiles and garments.
Key Stakeholders	Government bodies and administration.

4 – Enforcing Decree No. 2-13-874 Règlement Thermique de Construction au Maroc (RTCM)	
Type of Action	Policy reform
Description	According to the evidence collected during the pilot projects, enforcement of the law is still poor, and only a small number of the new buildings in Morocco effectively comply with the RTCM. The law is a crucial driver in boosting demand for recycled textile waste and production of insulating boards.
Objective	Increase the use of recycled fibres in the textile-to-textile and nonwoven applications value chains.
KPIs	Share of new buildings compliant with the RTCM.
Key Stakeholders	Government bodies and administration, construction companies, architects, real estate developers.

5 – Incentivize investment in waste reduction technology

Type of Action	Market-based incentives for investments
Description	Modern digital and automated systems, such as pattern-making software and automated cutting machines, will help substantially reduce waste volumes and save resources for garment makers. Green and resource-saving investments can be fast-tracked or prioritized in existing investment incentive schemes. Incentives in the form of grants, low-interest-rate loans, guarantee schemes, or accelerated depreciation can be a deal-maker.
Objective	Reduce waste in textile and RMG manufacturing.
KPIs	Total value of investments leveraged.
Key Stakeholders	Government institutions and ministries, specialized government agencies and task forces, recyclers, textile and garment companies.

6– Incentivize investment in recycling equipment

Type of Action	Market-based incentives for investments
Description	The business plan prepared for the pilot projects demonstrated that investment in mechanical recycling equipment quickly pays back. However, the amount of investment required can be high for SMEs. Green and resource-saving investments could be fast-tracked or prioritized in existing investment incentive schemes. Incentives in the form of grants, low-interest-rate loans, guarantee schemes or accelerated depreciation could be a deal-maker.
Objective	Expand recycling capacity and modernize equipment to increase productivity, quality and profitability.
KPIs	Total value of investments leveraged.
Key Stakeholders	Government institutions and ministries, specialized government agencies and task forces, recyclers, textile and garment companies.

7 – Training in proper and efficient waste segregation and management procedures for garment-makers

Type of Action	Training and awareness-raising
Description	Waste segregation at source has proven to be a fundamental prerequisite for cutting waste management costs and increasing the value of waste delivered to the recycler. However, garment-makers can be reluctant to embark on the audit and training sessions, which can be perceived as a pure cost in the short term. • A national training programme in segregation of textile waste should be planned to promote a circular economy. It could include "training the trainers" and financing for audits of waste management procedures, hands-on in-factory training, and verification of the implementation of quality waste management procedures. • A national certificate or quality label in waste management could also be established for companies that successfully complete the audit, training, and verification stages. The two actions have a clear link to the digitalization of waste management procedures, information flows, and trade infrastructures. This action should therefore be planned in connection with action 8.
Objective	Increase textile waste segregation and collection rates.
KPIs	Number of companies trained.
Key Stakeholders	Government institutions and ministries, specialized government agencies and task forces; textile business associations, textile schools and technical research institutes; textile companies and garment makers.

8 – Incentivize investment in digital and physical waste management infrastructure	
Type of Action	Market-based incentives for investment
Description	The circular textile value chain is not limited to waste segregation and shredding. It requires significant physical infrastructure, such as storage and logistics hubs, and digital infrastructure, such as tracking and traceability systems and platforms, including dedicated marketplaces for trading and exchanging waste. Policy actions can include: • Financial incentives such as tax credits for businesses that invest in digitalization technologies for their supply chains, or grants to offset the initial costs of implementing or developing digital solutions. • Streamlining regulations to facilitate the adoption of digital technologies to support traceability and transparency in the waste management supply chain. • Providing training programmes and capacity-building initiatives to help businesses develop the skills required to integrate digital technologies into their supply chains effectively. This action should be planned in connection with action 7.
Objective	Create physical and digital infrastructures for textile waste recycling.
KPIs	The total value of investment leveraged, volumes of waste traded on digital infrastructure.
Key Stakeholders	Government institutions and ministries, specialized government agencies and task forces, waste handlers, recyclers, textile and garment companies, software houses, and digital platforms.

9 – Introducing circular business models and design for circularity in the higher education curricula	
Type of Action	Training and awareness-raising
Description	The principles and practices of sustainability and circularity regarding textile and fashion processes and materials must be integrated into higher education course syllabi for textile engineering and management and Technical Vocational Education and Training (TVET). This includes the development of higher education courses focused on sustainability and circularity for aspiring fashion designers.
Objective	Upgrade education in sustainability and circularity for future technicians, engineers, product managers and designers.
KPIs	Number of courses taught, number of students attending.
Key Stakeholders	Ministry of Education, Universities, Fashion and Design schools.

10 – Awareness-raising actions aimed at the Moroccan textile industry and society	
Type of Action	Training and awareness-raising
Description	Target of the actions: the local textile business community. • Workshops on eco-design practices, proper waste management, and opportunities for valorization. • Dissemination of case studies, good practices, and guides or toolkits on the transition to circular business models in the textile industry. • Communication campaigns involving local companies, international brands, and technology providers. Target of the actions: citizens and the general public. • Educational campaigns to inform, educate, and inspire individuals about the benefits of textiles from recycled rather than virgin fibres and the preference for durable rather than disposable garments. • Social media campaigns targeting millennials and young generations, involving international brands' sustainability ambassadors and local companies committed to sustainability and the circular economy.
Objective	Make Moroccan industry and society aware of the advantages and business opportunities associated with textile waste management and recycling.
KPIs	Number of events, number of companies participating in the events.
Key Stakeholders	Textile and Clothing Federation (AMITH), Ministry of Industry, Ministry of Environment, civil society actors (NGOs), consumers' associations, citizens.

11 – Engagement of international brands in circular economy projects	
Type of Action	Communication outreach for new partnerships
Description	Brands play a crucial role in engaging the local supply chain in circular projects. Much of the Moroccan RMG sector operates as subcontractors with limited independence when it comes to decision-making. Conversely, brands are keen on evaluating new projects to move forward in circular business models. • Launch a communication plan targeting international brands sourcing in Morocco, demonstrating the Moroccan textile industry's achievement and efforts in sustainability and the circular economy, in order to establish new partnerships.
Objective	Showcase the Moroccan textile and garments industry's achievement and engage international brands.
KPIs	Number of brands engaged, new partnership/programmes launched.
Key Stakeholders	Ministry of Industry, business textile associations (AMITH), international organizations (e.g. UNIDO), brands, donors.

Implementation Timeline

The implementation of the Roadmap is organized into phases according to the priority of intervention. Almost all the measures, except one, are short-term priority interventions for 2024-2027, while approximately 40% of the measures are expected to continue during 2027-2030 to generate the impact required to transform the recycling value chain into an efficient, modern circular economy.

	Priority 2024-2027	Advanced 2027-2030
1) Reform of Law No. 28-00 on waste management and disposal	✓	
2 Programmes supporting modernization, efficiency, and traceability in the waste handlers' subsector and promoting integration of the informal recycling business informal sector	✓	✓
3) Supporting national demand for materials of recycled origin		✓
4) Enforcing Decree No. 2-13-874 Règlement Thermique de Construction au Maroc (RTCM)	✓	
5) Incentivize investment in waste reduction technology	✓	
6) Incentivize investment in recycling equipment	✓	
7) Training in proper and efficient waste segregation and management for RMG makers	✓	
8) Incentivize investments in digital and physical waste management infrastructures	✓	✓
9) Introducing circular business models and design for circularity in the higher education curricula	✓	✓
10) Awareness-raising actions aimed at the Moroccan textile industry and the society	✓	
11) Engagement of international brands in circular economy projects	✓