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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Circular textile value chains

Business case: Advancing local manufacturing of yarns and fabrics with recycled content in Morocco

The challenge

Manufacturing clothing and textiles involves a lot of resources and results in a substantial amount of waste and pollutants. In the European Union (EU), textile consumption is one of the main contributors to negative impacts on the environment and climate change, and globally, it ranks third in terms of water and land use. Despite these issues, the demand for clothing and footwear is expected to increase by 63% by 2030, from 62 million tons to 102 million tons[1]. These growth rates significantly strain the supply of textile fibers, highlighting the need for the industry to find more sustainable sources of materials for its production[2].

The generation of waste from the textile industry is a persisting issue, but it also presents an opportunity for unused resources. A waste mapping study from 2021, conducted by the United Nations Industrial Development Organization (UNIDO), revealed that Morocco's textile industry produces over 83,000 tons of textile waste each year. Of this amount, 42% comprises blends containing high amounts of cotton, and 14% comprises 100% cotton fibers, both of which are considered high value.

The scope of the pilot project

Since 2019, UNIDO has, within the framework of the EU-funded SwitchMed Programme, focused on improving the circularity in the textile industry value chains of Egypt, Morocco and Tunisia. Together with international brands, key expert organizations and national institutions, UNIDO has engaged local stakeholders in the sector to demonstrate different business models that can convert textile waste into resources and improve the environmental footprint of the textile and fashion sector.

Morocco's textile industry could substantially reduce its dependence on virgin textile resources and improve the textile waste management that the sector generates by adopting innovative circular business models. To achieve this, a "high-value" recycling concept must be implemented to efficiently utilize the pre-consumer waste, cutting scraps and unsold garments into new garment products instead of downcycling them into lower-value products.

"High-value" recycling can help reduce the environmental impact of producing jeans by substituting virgin cotton with recycled cotton, which has a smaller footprint in terms of carbon, water and the use of hazardous chemicals.

This pilot project highlights the importance of creating local value chains for textile waste recycling, valorizing the waste where it is generated to harvest economic benefits for Morocco and reducing the environmental impact related to logistics and transportation of waste.

The approach

The SwitchMed pilot project aimed to tackle the bottlenecks in developing a textile waste recycling value chain to include "high-value" recycled fibers in denim fabrics. The pilot project identified the following issues that prevented the furthering of a local ecosystem that can produce denim fabrics with recycled content:

- Shortage of local recycling capacities of high-quality cotton recycling into fibers for spinning.
- Poor management of the 100% cotton and cotton-rich textile waste generated by local garment manufacturers.
- Lack of experience and know-how in the textile high-quality recycling processes.
- Insufficient experience in spinning yarns with a high content of recycled fibers.

The pilot project initiated a partnership with EVLOX, a leading Moroccan denim producer and vertically integrated jeans manufacturer. EVLOX produces 15 million meters of high-quality denim annually in Morocco's Casablanca-Settat region. In response to fashion brands' demand for fabrics with recycled content, the company started to use recycled fibers into their spinning process, but several technical challenges to reach a sufficient quality of the yarns emerged. Therefore, EVLOX decided to begin importing recycled yarns as a temporary solution. However, EVLOX remained interested in using locally generated pre-consumer textile waste as feedstock and plans to invest in a recycling unit soon.

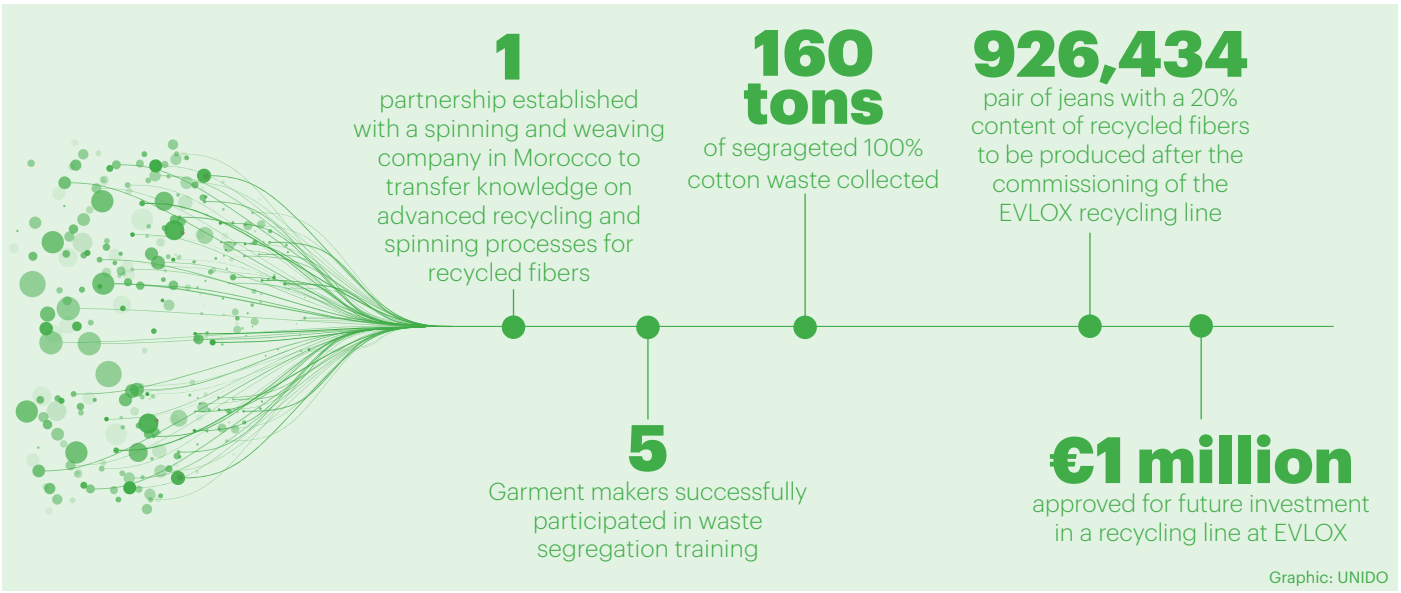
The main pilot project actions focused on:

- Provide hands-on knowledge transfer and training to EVLOX on recycling and spinning processes to reach high-quality recycled fabrics as required by the brands.
- Assist EVLOX in the techno-economic assessment to inform decision-making for investing in a textile waste recycling unit by preparing a business plan and conducting a study tour of equipment providers.
- Train a group of garment makers in waste segregation techniques to supply the high-quality waste needed for processing the EVLOX recycling unit.

1 EEA (2022) Textiles and the environment: the role of design in Europe's circular economy

2 Ibid.

Outcomes from the industry pilot for developing a post-industrial textile waste recycling ecosystem in Morocco's denim sector



Graphic: UNIDO

Pilot project results

At the start of the pilot, EVLOX managers received training from European recycling and spinning experts. The training was designed after an auditing visit by experts from the Centre for Applied Research and Textile Innovation (CETI) to assess the company's training needs and existing equipment. It covered various mechanical recycling techniques, recycling input and output characterization, and technical characteristics of tearing, blending, and carding processes. Practical demonstrations were also conducted during visits to textile recyclers in Spain. The managers were also trained in recycled fiber spinning practices, including fiber selection, blending, carding, and spinning. CETI experts also visited the EVLOX facility in Settat to apply the principles learned during the training. A manual on "Improvement of Recycled Fibers Carding & Spinning" was also released to EVLOX.

During the project, EVLOX audited a group of garment makers that supply textile waste. These companies had no waste management practices in place; therefore, the waste was segregated by EVLOX after collection in a central storage place.

Over four months, approximately 160 tons of cotton waste, consisting of 50 tons of white waste and 110 tons of denim-colored waste, were gathered, sorted, and saved for future recycling. This quantity is enough to create 1,204,364 meters of denim fabric at 0.55 kg per meter, with 20% of recycled fibers, which could be used to produce 926,434 pairs of jeans.

Apart from the collection, this experience offered valuable insight into waste management organization and the associated costs. Post-collection segregation involves high costs, and the transportation cost can comprise 30-40% of the total cost of recycling textile waste. Therefore, training for "in-factory" segregation was delivered to the engaged garment makers; all five companies are located within 70 km of the EVLOX facilities. The potential volume of waste generated annually by the five companies is approximately 500 tons. Sourcing textile waste from local garment producers is an example of how actors along the value chain can save costs, and CO_2 emissions from transportation while retaining the value of an already available resource locally.

By the end of the pilot project, EVLOX agreed with a Spanish recycling company to recycle all the 160 tons of waste segregated by 2023 and supply recycled fibers that EVLOX will then spin into yarn with up to 20% recycled fibers, which will be used for tests and experiments at EVLOX for producing denim fabrics until the planned in-house recycling line is purchased and commissioned. The company has finalized the business plan, selected the technology provider, and approved a future investment of approximately €1 million in the recycling line.

> "Through this pilot project, we will be able to create an ecosystem to recover waste that is currently not exploited and support a circular supply of materials, from waste to fiber in Morocco."
>
> Khalid Kairouch,
> Production Manager
> EVLOX

For more information, please contact:

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Visit SwitchMed.eu

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