

## Circular textile value chains

### Business case:

# Closed loop fashion-to-fashion recycling of second quality jeans in Tunisia

## The challenge

Textile and ready-made garment manufacturing demands significant amounts of resources and generates unprecedented volumes of waste and effluents. In the European Union (EU), the consumption of textiles, account on average, for the fourth highest negative impact on the environment and on climate change and the third highest for water and land use from a global life cycle perspective<sup>1</sup>. On the same hand, the consumption of clothing and footwear is expected to increase by 63% by 2030, from 62 million tons now to 102 million tons in 2030<sup>2</sup>. This development creates significant pressure on the virgin stock of textile fibers and calls the industry to look for alternatives to use virgin materials in their production.

In this context, overproduction and second-quality garments are ongoing and growing problems. According to a waste mapping study from 2021, commissioned by the United Nations Industrial Development Organization (UNIDO), over 31,000 tons of textile waste are annually generated in Tunisia, out of which 6,300 tons come from garment overproduction, including second-quality products and deadstock fabrics.

## The scope of the pilot project

Since 2019, UNIDO has, within the framework of the EU-funded SwitchMed Programme, focused on finding ways to improve the circularity in the textile 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 reform textile waste into resources and improve the environmental footprint of the textile and fashion sector.

Products that do not fulfill quality standards due to manufacturing specification errors are often stored or discarded as waste. This unsustainable practice for “deadstock” products creates costs for suppliers and brands and represents an untapped resource that could fulfil the demands of a growing market for recycled fibers.

Shredding and recycling the second quality products could be a solution to recover textile fibers back into garment manufacturing, at least for 100% cotton-made fabrics, and reduce the overall carbon footprint of waste recycling operations. Moreover, processing the deadstock would open the prospect for building a local value chain for recycling textile waste in Tunisia that could create additional jobs. However, before this waste can be included in “closing the loop” of locally producing brands, the disassembling and removal of buttons, zippers, tags etc., needs to be done, which implies a cost for the value chain.

## The approach

Technical expertise and know-how are needed to build a local infrastructure that can valorize textile fibres waste into value-added products and also ensure that the recycling processes correspond in mitigating environmental impacts.

To support this development and to investigate if the recycling of second-quality jeans in Tunisia has business potential and is environmentally viable, UNIDO, together with the Swedish denim brand “Nudie Jeans” and their Tunisian supply chain partner Denim Authority, collaborated on a demonstration pilot project to validate a recycling business scenario. The objectives of the demonstration pilot were:

- To test the business case for closed-loop recycling of second quality jeans manufactured by the Nudie Jeans supplier in Tunisia Denim Authority.
- To assess the environmental footprint and cost structure of a local closed-loop recycling in completely made in Tunisia vs. current waste management practices.
- To validate consumers’ acceptance of a collection of recycled jeans delivered to stores in the AW 2021/22 season.

The pilot aimed at recycling a selection of the second quality jeans of homogeneous color (indigo) stored in the warehouses of the jeans manufacturer Denim Authority.

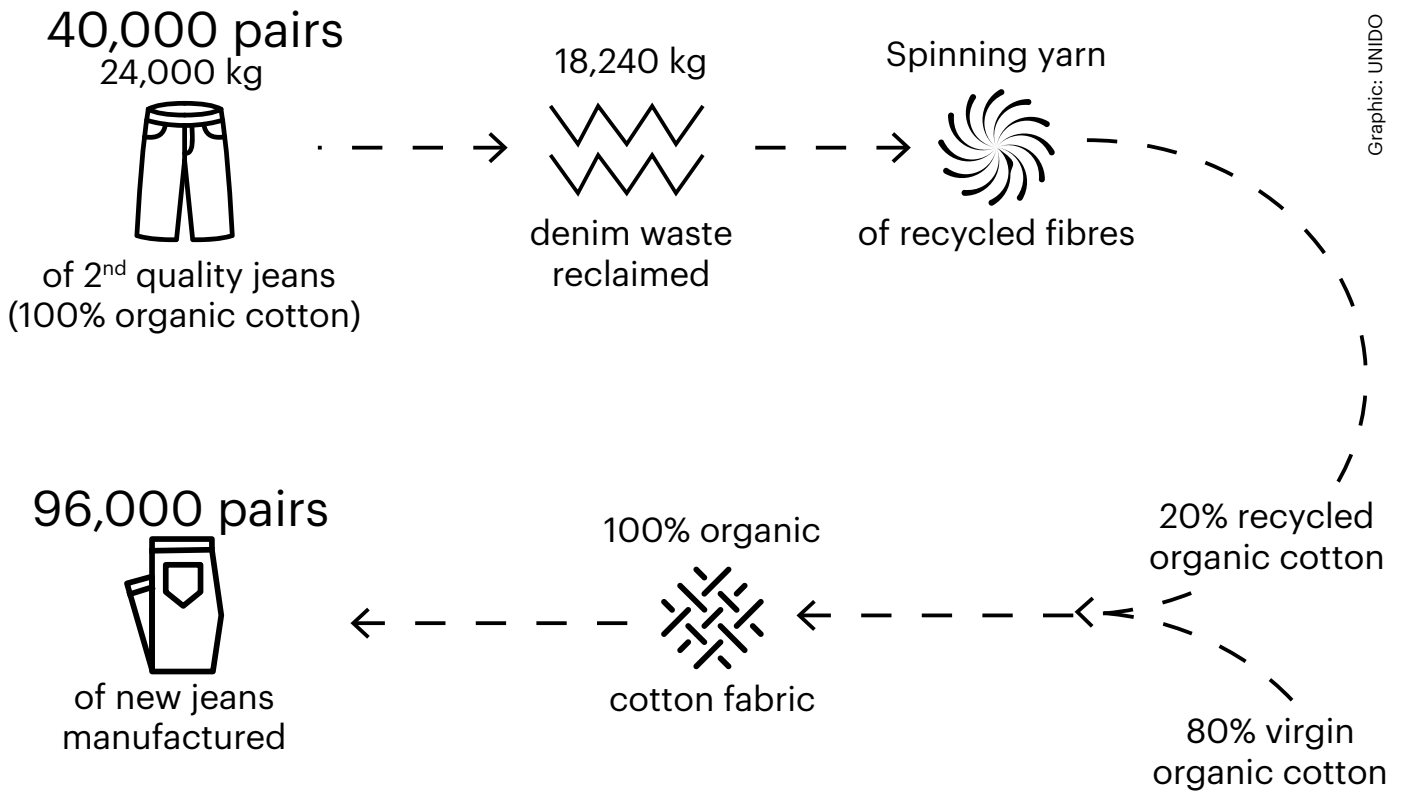
The jeans were prepared at the Denim Authority site for further processing into fibers. This phase consisted of cutting the garments into smaller parts and removing zips, buttons, and other non-recyclable elements. The material was then sent to “Swift/Sitex”, a spinning and weaving company in Tunisia for shredding into recycled fibers, spun into yarns mixed with virgin fibers and finally weaved into new fabrics with a 20% recycled content. These fabrics were sent back to “Denim Authority” to be converted into new jeans fabric, following the design specification of the brand (Nudie Jeans).

## The potential for recycled fibres from second-quality jeans

At the end of 2022, Nudie Jeans and their local suppliers in Tunisia have produced 96,000 pairs of new jeans made out of 20% recycled cotton from 40,000 pairs of second-quality jeans. The jeans are already on the market, and while the stock of second quality blue-coloured denim is decreasing, Nudie Jeans currently explores opportunities to re-process black-coloured denim deadstock products from their production in Tunisia in a similar fashion. Furthermore, the company has asked its supplier to sort out and save cutting waste from their production, which has so far assembled 2,800 kg of cutting waste that can be used in future recycling projects.

<sup>1</sup> EEA (2022) Textiles and the environment: the role of design in Europe’s circular economy

<sup>2</sup> Ibid.



### Building a local value chain for recycling post-industrial textile waste

Collecting waste and sending it to other countries for recycling is a common practice in western countries. The outcomes from a recycling model, when the denim jeans are shipped from Europe to Asia for recycling, are high transportation costs and an excessive carbon footprint, which can account for up to two-thirds of the total cost and carbon footprint.

The pilot project in Tunisia showcased the feasibility for processing second quality products locally in Tunisia. All the recycling and re-manufacturing processes were undertaken within a radius of 180 km, on 300 km by route. This has enabled the actors along the value chain to save costs and CO<sub>2</sub> emissions from transportation, while retaining the value of and already available resource locally.

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At Nudie Jeans, we are constantly exploring new ways that can improve our environmental footprint. Using post-industrial waste as recycled input to new denim fabric is one of the multiple methods we need to work with to decrease the resource use in the production of our products.

Eliina Brinkberg

Environmental Manager

Nudie Jeans

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As part of the EU-funded SwitchMed programme, UNIDO demonstrates in the MED TEST III project pathways for industries in the Southern Mediterranean to become more resource efficient and to generate savings for improved competitiveness and environmental performance.

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