

Local recycling of 2nd quality jeans into new jeans in Tunisia

A pilot project in collaboration with Nudie Jeans

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Evaluation report summary for public disclosure

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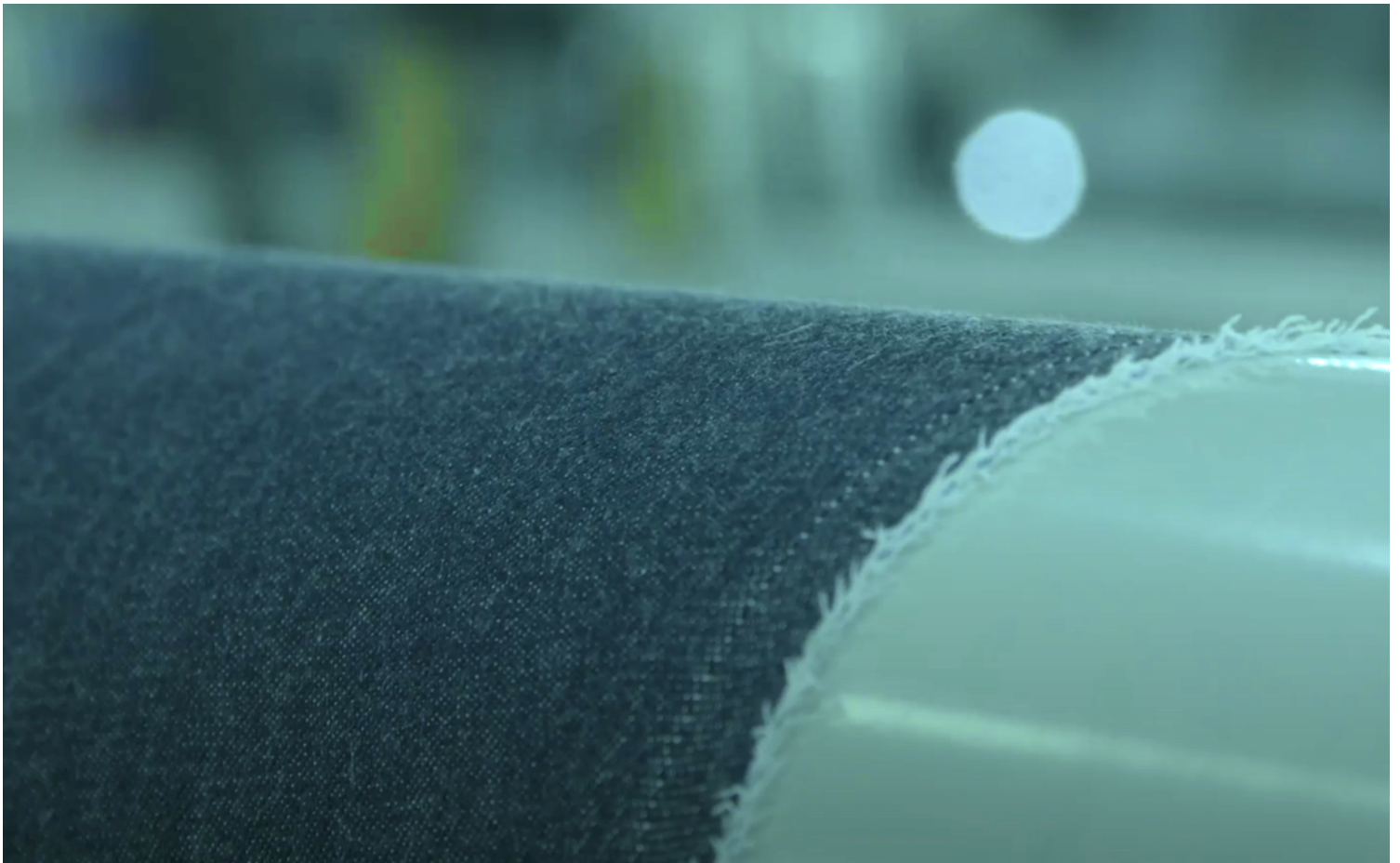
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On behalf of:



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

www.switchmed.eu



Background

The SwitchMed Programme

Launched by the European Union in 2014, the SwitchMed Programme has demonstrated the potential on how to unfold business models, policies and ways of production that can stimulate circular and sustainable societies. Through policy development, demonstration activities and networking opportunities the SwitchMed Programme supports policy makers, eco-innovative small and medium sized enterprises, industries, start-ups and entrepreneurs in Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine, and Tunisia.

In a world with limited natural resources, it is necessary to find ways that can make human development and environmental protection compatible in order not to overshoot planetary boundaries. At the same time, global demand for cotton and polyester, two of the most relevant fibers for the textile and clothing industry, is expected to grow with 40% by 2023. A growth rate that calls for alternatives to virgin materials.

Cutting scraps, defective pieces, unsold collections, and second quality graded products from the fashion supply chain make out a significant amount of waste, but also represent an untapped resource that could fulfil the demands of a growing market for recycled fibers. Building local infrastructure, technical expertise and know-how are pivotal for the development of circular value chains that can enable the valorization of the textile waste into value added products and ensure that the recycling processes also correspond to mitigated environmental impacts.

In 2019, the United Nations Industrial Development Organization (UNIDO) launched actions withing the [SwitchMed Programme](#) to focus on the textile supply chains in Egypt, Morocco and Tunisia. Together with international brands and key expert organizations, UNIDO engages national stakeholders in the development of greener and circular value chains. Until 2023, the SwitchMed/MED TES III project in Tunisia endeavors to achieve two main objectives:

- i) to lay down the foundation for a local recycling value chain as well as to prepare the fashion industry to deliver more circular products that meet consumer preferences and requirements;
- ii) to accelerate the textile finishing industries' shift towards adopting safer chemical protocols.

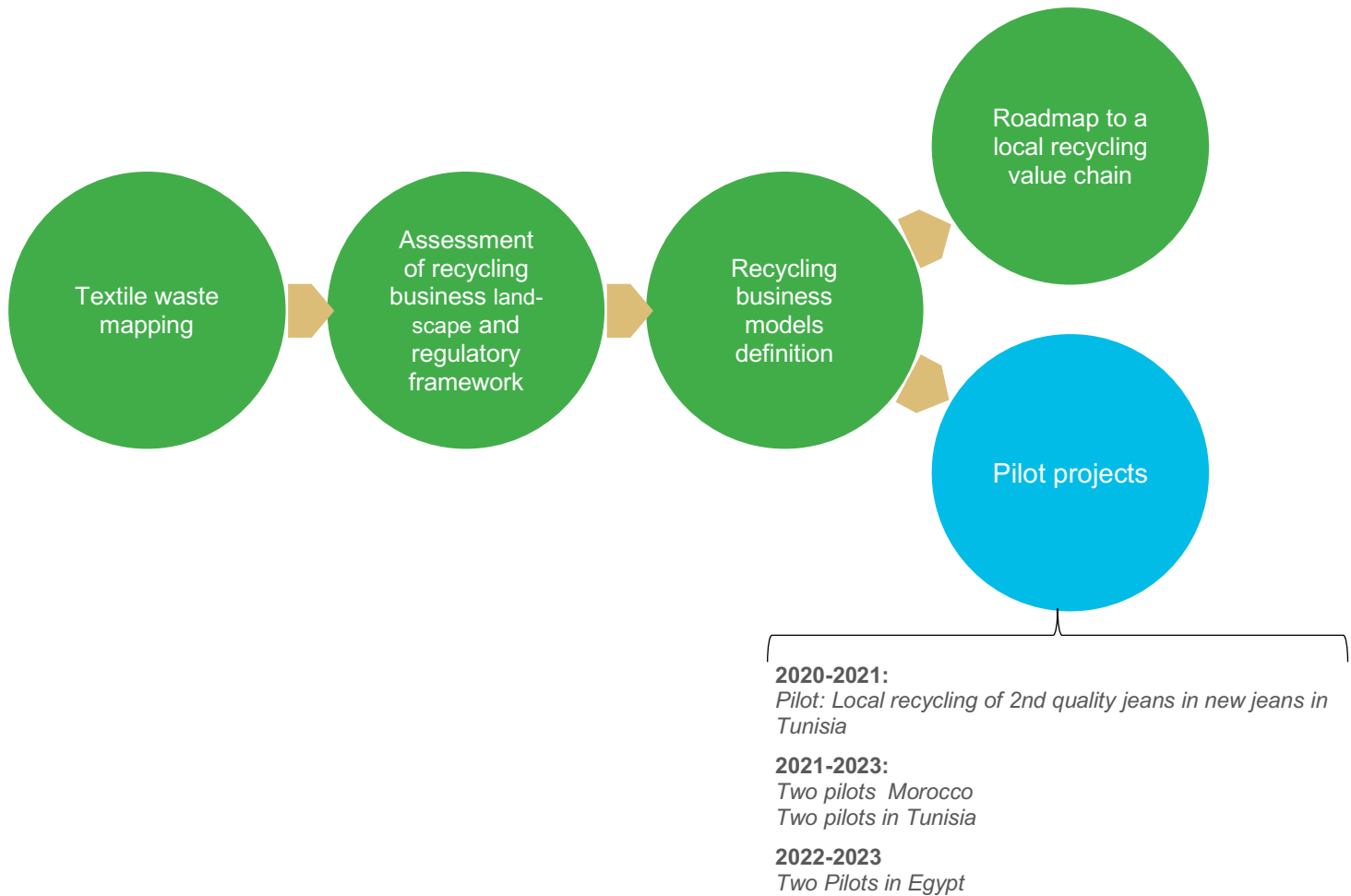
The pilot, disclosed in this report, is part of the SwitchMed/MED TEST III project, implemented in Tunisia under the lead of UNIDO.

The collaboration with the Swedish denim brand Nudie Jeans, to develop more circular value chains for valorizing textile waste, aimed to:

- Demonstrate that investing in a resource efficient and cleaner production is not only good for the environment but also for the businesses;
- Promote circular value chains for a greener and more competitive textile industry in Egypt, Morocco, and Tunisia.

The project implementation logic

For the SwitchMed/MED TEST III project in Tunisia, UNIDO is collaborating with international brands, local suppliers, business associations and policymakers to include actors that can support an infrastructure and facilitate a valorization of pre-consumer textile waste.

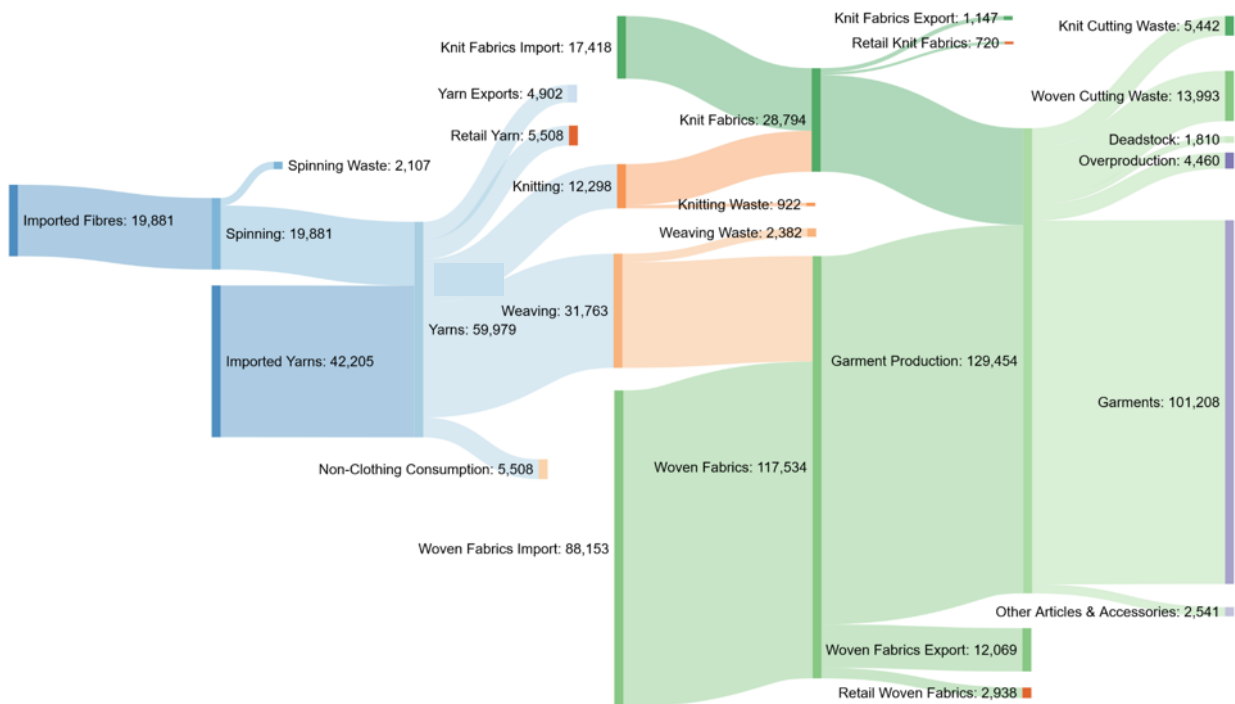


Overview: Post-industrial textile waste in Tunisia.

According to the SwitchMed/MED TEST III waste mapping report of the textile waste in Morocco and Tunisia that was published in 2021:

Over 31,000 tons of textile waste are annually generated in Tunisia

- 19,400 tons of cutting waste
- 6,300 tons of garment overproduction (incl 2nd quality) and deadstock fabrics
- 5,300 tons of spinning and weaving waste
- 90% of the textile waste is in the Center-Eastern and North-Eastern regions
- Over half of the textile waste is 100% cotton, or cotton rich waste



Source: Blumine & Reverse Resources estimates

For more information, see:

[SwitchMed/MED TEST III - Textile waste mapping in Morocco and Tunisia](#)

Objectives

The objectives of the collaborative pilot project in Tunisia, included:

- Testing the business case for **high-value recycling** of 2nd quality jeans manufactured by the Nudie Jeans supplier in Tunisia Denim Authority
- Understanding the viability of a local closed loop recycling in Tunisia
- Producing a collection of recycled jeans delivered to stores in the AW 2021/22 season

Note

What is high-value recycling, or fashion to fashion recycling?

The high-value recycling concept imply the recycling of used or pre-consumer unsold garments and other textile waste into new garment products instead of downcycling in lower value products. This concept can cut the environmental impact of producing jeans, especially in terms of water and carbon footprint and in use of hazardous chemicals in agriculture by substituting virgin with recycled cotton.

The pilot project in numbers

6,530 pairs

of 2nd quality jeans
recycled

16,000 pairs

of new jeans manufactured with recycled cotton

3,200 kg

of reclaimed denim fabric recycled

20%

the composition of recycled cotton in the new jeans produced

2,5 pairs

of jeans from 20% recycled cotton for each pair of 2nd quality jeans

100%

the share of organic cotton in the new jeans

Pilot participants and roles

The 2nd quality jeans were stored in the warehouses of Denim Authority in Ras Jebel, Bizerte region, on the northern Tunisian coastline. The pilot aimed at recycling a selection of the 2nd quality jeans of homogeneous color (indigo) stored by Denim Authority. The jeans were prepared at Demin Authority site for their further processing into fibers: this phase consisted in cutting the garments into smaller parts, removing zips, buttons and other non-recyclable elements. The material was then sent to Swift/Sitex site for being shredded into recycled fiber, then spun into yarns mixed with virgin fiber 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).

Actor	Role	Activities
Nudie Jeans	<ul style="list-style-type: none"> <input type="checkbox"/> Pilot initiator and goals setting <input type="checkbox"/> General management, <input type="checkbox"/> Final owner and retailer of the recycled jeans 	<ul style="list-style-type: none"> <input type="checkbox"/> Initiation & coordination of the project. <input type="checkbox"/> Purchase of the 2nd quality jeans as raw material.
Denim Authority	<ul style="list-style-type: none"> <input type="checkbox"/> Jeans manufacturer <input type="checkbox"/> 2nd quality jeans storage and preparation for recycling 	<ul style="list-style-type: none"> <input type="checkbox"/> Preparation for recycling (cutting) of the 2nd quality jeans. <input type="checkbox"/> Manufacturing of new jeans with recycled material <input type="checkbox"/> Quality control
Swift / Sitex	<ul style="list-style-type: none"> <input type="checkbox"/> Recycler, spinner and fabric supplier 	<ul style="list-style-type: none"> <input type="checkbox"/> Transportation <input type="checkbox"/> Shredding and opening <input type="checkbox"/> Spinning & weaving with recycled content <input type="checkbox"/> Quality control

Reducing transportation costs and carbon footprint

Fashion brands projects of closed-loop recycling in the denim jeans business are generally based on a globalized recycling value chain. Waste generation and collection points are in countries and continents different from those where the recycling processes are implemented.

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 sent 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.

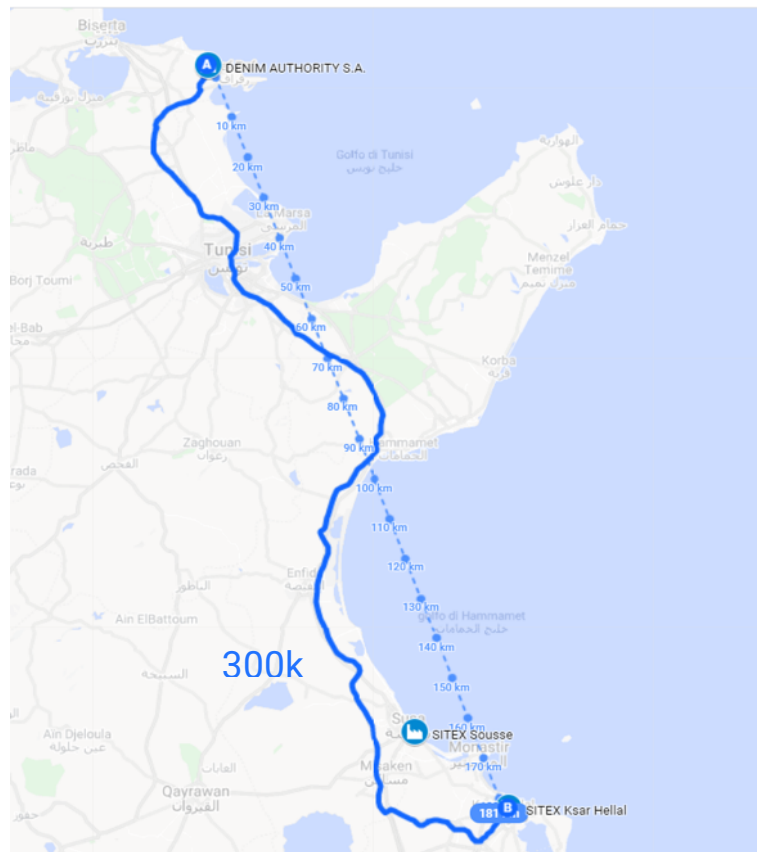
The Nudie Jeans pilot in Tunisia demonstrates the advantages of a “**local recycling value chain concept**” and the feasibility of the relevant practices in Tunisia.

A local recycling value chain

The Nudie Jeans pilot project “local recycling concept”.

The 2nd quality jeans selected for recycling come from the warehouse of Nudie Jeans supplier Denim Authority in Tunisia, where they were originally manufactured.

All the recycling and remanufacturing processes are implemented in Tunisia, within a radius of 180km, 300 km by route. Costs and CO₂ emissions from transportation are therefore minimized.



Conclusions

The collaborative pilot project with Nudie Jeans demonstrated that high quality jeans can be manufactured:

- Using 100% organic cotton, 20% of which from recycled fibres from 2nd quality jeans
- implementing all the recycling processes locally in Tunisia
- saving on costs and CO₂ emissions compared to jeans made with virgin cotton or with recycled content in global value chains

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