T_ NEUTRAL
FOR A HORIZON FREE
OF TEXTILE WASTE

UNDRESSING THE PLANET.

EXPLORING A FEASIBLE GLOBAL RESPONSIBILITY MODEL FOR TEXTILE CIRCULARITY.

Case Study on the development of local circular ecosystems through textile credits as a global North-to-South EPR mechanism for the mitigation of the textile waste crisis.

2023/V1

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DISCLAIMER.

This document contains an extract of the analysis carried out to assess the sufficiency of an Extended Producer Responsibility system in the textile sector and the relevance of exploring complementary decentralized mechanisms.

After a comprehensive study of global textile flows, EPR regulations, and analogous solutions, such as the voluntary carbon and plastic credit markets, in T_NEUTRAL we developed the Textile Recovery Project Methodology. This methodology was piloted in 2022 and 2023 in collaboration with projects in Latin America and Africa. It was built on consensus frameworks and anchored in core principles of rigor, traceability, transparency, and impartiality. This methodology serves as the cornerstone of the global Textile Credits platform, which is currently in its final pilot phase and will be launched in 2024.

This paper is a theoretical reflection and solution proposal, accompanied by two case studies on the Kenyan and Chilean contexts. Both of them were developed after the piloting of the Textile Recovery Projects Methodology to determine the relevance and feasibility of developing a Textile Credit mechanism as a catalyst for textile circularity and textile waste elimination in the Global South.

ABOUT T_NEUTRAL.

T_NEUTRAL was established in 2021 with the purpose of developing practical solutions for textile circularity. In 2022, we introduced the concept of the Textile Footprint, a pioneering methodology designed for calculating and tracing textile flows within the operations of textile producers. This methodology serves as a foundation for action, enabling the industry to gauge, enhance, and actively contribute to the reduction of textile waste. Recognizing the significance of European Extended Producer Responsibility (EPR) regulations and the concerns expressed by organizations at the forefront of the waste crisis in the Global South, we identified the necessity for an innovative and disruptive model tailored to the challenges associated with the export of textile waste from the Global North to the Global South.

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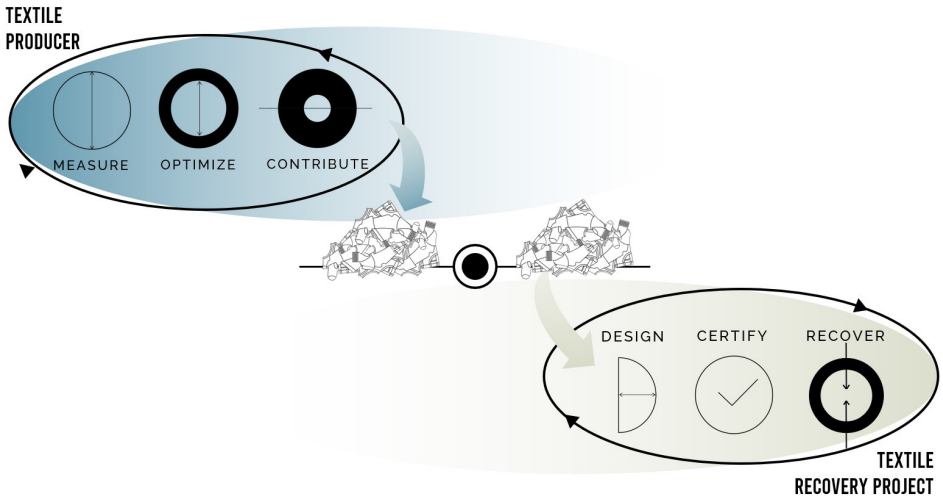
EXECUTIVE SUMMARY.

In recent years, the environmental challenges arising from textile waste have escalated to a point of global concern, sparking a crisis with clear and compelling evidence. To effectively tackle this issue, a fundamental shift in mindset is imperative — a shift that reinforces equitable North-to-South relationships, that reframes waste from burden to opportunity, one of circular transformation and prosperity.

While the implementation of the EPR (Extended Producer Responsibility) schemes across Europe is imminent, tangible results will take time to materialize. This transformation requires investment in infrastructure, intricate public-private coordination, and robust awareness campaigns to drive its success. The application of these regulations for textiles in many territories will, in fact, have an impact on the decrease of used textile exports over the long term, but not over the short or medium term. However, in order to tackle the current crisis and repair the damage already caused in the Global South in an agile and effective way, additional and complementary measures to the textile EPR laws will be necessary, especially in places where textile waste is already a social and environmental crisis.



Countries like Ghana, Kenya or Chile faces a significant financial burden in dealing with the aftermath of the hegemony of the fast fashion linear way of production/consumption, which is the main precursor of the current textile waste crisis. To address the imbalance of responsibilities in this global situation, we need to formulate comprehensive strategies aimed at reducing the prevalence of existing landfills while promoting the development, establishment, and legitimization of circular waste management systems at the local level. We need solutions that can harmoniously coexist with, complement, and even substitute the forthcoming EPR regulatory frameworks, while developing the local circular economy and ensuring traceability, all with an emancipatory approach.

To implement these solutions effectively, new financial flows are needed, not only from the public sector, but also from the private sector. The proposal of a voluntary textile credit mechanism, as the one T_NEUTRAL is developing, emerges as a viable alternative to develop and bolster local circular ecosystems, either in places lacking Extended Producer Responsibility regulations, or in coexistence with them. Establishing a transparent system through which textile producers assume responsibility for their Textile Footprint beyond existing regulations. This mechanism opens a scenario of enormous possibilities for the execution of projects of high socio-environmental impact in an agile way and through the commitment of the private sector, with the purpose of taking responsibility for the socio-environmental effect of their activity.

FINDINGS.

PROMOTING CIRCULARITY IN THE TEXTILE INDUSTRY: A GLOBAL RESPONSIBILITY APPROACH.

The fashion industry has positioned itself as one of the most polluting industries worldwide, responsible for millions of tons of textile waste. According to data from the Ellen MacArthur Foundation[1], 73% of clothing worldwide ends up in the trash and less than 1% is recycled. This means that more than 92 million tons[2] end up landfilled every year.

In 2022, more than 150 billion new items of clothing were sold globally, twice as many as in 2000[3], a growing trend with a direct impact on the level of discarded textiles. Individually, each European citizen throws away 11 kilograms worth of clothing each year[4], while North Americans discard up to 50 kilograms[5]. The rampant consumption of fashion, especially the so-called *fast fashion*, has led to a significant reduction in the average number of times a garment is worn, down 65% in the last 20 years, and it is estimated that more than half of fashion purchases are discarded in less than 1 year[6].

This context of exponential growth in consumption and disposability places enormous pressure on segregated waste management streams. In the case of textiles, these are virtually non-existent at a global level, resulting in clothing ending up mixed with general waste, informally donated or dropped off at the few textile collectors currently operating on a private or semi-private capacity. This paints a picture where tons of discarded clothing cannot be properly managed locally, leading to an escalation in textile waste exports from over 550,000 tons in 2000 to nearly 1.7 million tons in 2019[7]. Once this textile waste reaches its destination, usually different ports in the Global South, the risk of it being dumped into the environment is far greater than its potential for reuse, as it lands in contexts that also lack a proper textile waste management system.

For years, countries such as Kenya, Ghana or Nigeria have been recipients of large quantities of used clothing. According to the Observatory of Economic Complexity, Ghana was the world's top importer of used clothing in 2021, receiving $214 million[8] worth of clothing, while Kenya ranked fifth, importing $169 million[9] worth of this product. Nigeria, meanwhile, imported $148 million[10], ranked in 10th place. The demand for pre-owned clothing from these countries is driven by the opportunity to access affordable clothing. It has become part of the economy, playing a key role in creating employment and opportunities throughout the supply chain.

An example can be found in Accra, home to the Kantamanto market, a key location for the second-hand trade in Ghana. It employs around 30,000 people who, six days a week, sell, repair, clean, and recycle more than 15 million pieces of "*Obroni Wawu*"[11] which translates into "*Dead Man's Clothes*", that arrive at the market. It is estimated that around 95% of the Ghanaians, regardless of their socio-economic background, buy secondhand clothes[12]. A thriving thrift culture has grown around this market, where people have easy access to fashion items, including young designers and stylists[13], underlining the socio-economic importance of this sector in the daily lives of the population.

1 Ellen MacArthur Foundation, A new textiles economy: Redesigning fashion's future (2017).
2 Global Fashon Agenda, Pulse of the Fashion Industry, 2020.
3 World Bank, "How much are our closets costing the environment", 2019.
4 CBI Ministry of Foreign Affairs, "How can Europe ReSet the Trend and recycle all apparel", 2023.
5 The Round Up, Textile waste statistics, 2023.
6 Ellen MacArthur Foundation, A new textiles economy: Redesigning fashion's future (2017).
7 European Environmental Agency, Exports of used textiles in Europe's circular economy, 2023.
8 Observatory of Economic Complexity, "Ranking of used clothing importers", 2021.
9 Observatorio de Complejidad Económica, "Ranking of used clothing importers", 2021.
10 Economic Complexity Observatory, "Imports and exports of used clothing in Nigeria", 2021.
11 Apparel Insider, Fast Fashion's Final Stop, 2021.
12 Vanessa O. A. Doe, Implications of fast fashion's second-hand clothing market on Seamstresses in the Ghanaian textile industry, Professional Project presented to the faculty of The Center for International Studies of Ohio University, 2022.
13 Dazed, The secondhand market at the heart of Ghana's fashion revolution, 2022.

However, despite the positive effects these imports have on the receiving countries, they also inflict a significant negative impact. When viewed through a socio-economic lens, the increasing influx of second-hand clothing has had tangible consequences on the domestic textile industry, undermining the ability of local business and creative talent to compete and grow. For example, in Nigeria, which once had a robust textile workforce of around 200,000 workers, the industry has practically disappeared[14]; similar to Ghana, where textile-related jobs fell by 80% between 1975 and 2000[15].

In terms of environmental impact, images of landfills, beaches, or rivers saturated with textile waste perfectly illustrate the crisis cities such as Accra or Nairobi[16] are currently facing. The large volume of imported second-hand clothing, mostly poor-quality *fast fashion*, has led to a significant increase in the generation of textile waste, as most of this clothing is not suitable for resale and ends up in landfills, contributing to pollution and ecosystem degradation.

In recent years, the environmental challenges arising from textile waste have escalated to a point of global concern, sparking a crisis with clear and compelling evidence. Mountains of textile waste can be found not only in the aforementioned African countries, but also in Latin America. A dramatic example is the discovery of an illegal textile landfill sprawling across the Atacama Desert, in Chile. Here, over 300 hectares of this once intact desertic landscape have been covered in textile trash[17], with new additions arriving daily, fueled by the relentless *fast fashion* consumption patterns prevalent in the Global North. This harsh image serves as a testament to the scale of the problem, which transcends borders and continents.

AFP via Getty Images

The uncontrolled disposal of clothing in the environment, such as that found in Atacama, has terrible environmental and social consequences. open-air decomposition has long-term effects on air and land contamination, mainly due to the fibers and chemicals they are made of, which are not suitable for this type of degradation. A considerable portion of these garments are constructed from synthetic materials like polyester, which undergoes a slow breakdown process, taking up to 200 years to disappear[18]. Natural fibers, on the other hand, such as cotton and wool, are also problematic, as once they start to biodegrade, they release methane, a gas with global warming potential effects significantly greater than carbon dioxide[19]. In addition to the harmful effects of landfilling on soil and air, another concerning practice is the open burning of textile waste, which produces toxic gases that also pose serious risks to human health[20]. In Cambodia, for instance, post-industrial textile waste is used as fuel in brick kilns, where workers burn a mixture of textile waste and wood[21], unaware of the severe impact it has on their health and the environment.

14 BBC Mundo," El negocio global de la ropa de segunda mano", 2015.
15 BBC Mundo," El negocio global de la ropa de segunda mano", 2015.
16 Greenpeace, "Poisoned Gifts From donations to the dumpsite: textile waste disguised as second-hand clothes exported to East Africa", 2021.
17 BBC News Mundo, "We have transformed our city into the world's garbage dump": the immense cemetery of used clothing in the Atacama Desert in Chile, 2022.
18 Close The Loop, "A Guide Towards a Circular Fashion industry".
19 Greenpeace, "Poisoned Gifts From donations to the dumpsite: textile waste disguised as second-hand clothes exported to East Africa", 2021.
20 Unhearted, Revealed: Garment waste from Nike, Clarks and other leading brands burned to fuel toxic kilns in Cambodia", 2022.
21 Unhearted, Revealed: Garment waste from Nike, Clarks and other leading brands burned to fuel toxic kilns in Cambodia", 2022.

Lastly, regarding water contamination, it is important to highlight the complexity of cleaning up hazardous chemicals after their release, including the high cost of carrying out rehabilitation programs, in addition to the inability of total decontamination[22].

The environmental impact of the massive import of used clothing is so damaging to the receiving countries that in recent years many of them have come up with ways to restrict it. In 2019, Kenya, Uganda, Tanzania, Rwanda, and Burundi planned to gradually limit imports of second-hand textiles from industrialized nations, although only Rwanda has implemented its plan so far[23]. Similarly, countries such as Bolivia, Mexico, or Zimbabwe, have outright banned imports in recent years[24], although this has not prevented the continued entry of smuggled goods, also damaging to local communities.

Many areas of the Global South are facing a challenging situation caused by the massive influx of low-quality used clothing into their markets over the last decade. To tackle this problem effectively, a fundamental shift in thinking is needed - a shift that puts these countries at the centre, that strengthens equitable North-South relations, that transforms waste from a burden into an opportunity, a circular transformation and a source of prosperity.

ADMINISTRATIVE MECHANISMS TO CONTROL NORTH-SOUTH EXPORTS OF SECOND-HAND GOODS.

With the birth of "the polluter pays" mantra came the concept of Extended Producer Responsibility (EPR). This regulatory framework aims to reassign the financial cost of managing a product at the end of its life cycle back to the producer. This approach rests on the principle that it is the producer who introduces the product into the market and, in doing so, must assume the environmental risk associated with its uncontrolled leakage. Consequently, through the extension of their responsibility from the production phase onto the post-consumer one, producers are mandated to create and fund a system capable of effectively handling their products when they reach the end of their life cycle. It is an effective strategy for creating a local waste management ecosystem specific to a given material.

EPR systems have been in use for decades now, applied to various consumer products[25] with specific end-of-life management requirements, such as plastic, glass, electronics or paper, and their operation has become essential in advancing circularity. Surprisingly, textile products have remained exempt from these regulations until very recently and today, we only find textile EPR systems in a handful of countries, all of which are European. This development stems from the European Directive on Waste Management that has, for the first time, mandated member states to establish a separate textile collection system by 2025[26].

An early example of the implementation of this management system for discarded textile is France, the only country in the world with a textile EPR system in place since 2020. An estimated 600,000 tons of textiles are discarded in France[27], and since the textile EPR law came into effect in 2017[28], they have successfully collected 38% of discarded textiles[29]. Over these years, the French EPR system has effectively doubled the collection and sorting rates for textile waste. This achievement involved substantial investments in urban infrastructure, separation facilities, preparation for reuse, the scaling up of recycling technologies, and public awareness campaigns[30].

22 Greenpeace International (2011), Hidden Consequences, the costs of industrial water pollution on people, planet and profit, May 2011.
23 Womens Wear Daily, "New Report Highlights Europe's Textile Waste", 2023.
24 United Explanations, "The secondhand clothing business and its impact on Africa," 2019.
25 MMSK, History of EPR. 2023
26 European Parliament and Council, Directive (EU) 2018/851 of 30 May 2018 Amending Directive 2008/98/EC on Waste. 2018.
27 Refashion, Annual Report, 2019.
28 République Française, Article L541-9-5 - Code de l'environnement- Légifrance.
29 Refashion, Annual Report, 2019.
30 Refashion, Annual Report, 2019.

As of today, France has established 44,000 collection points for clothing[31], roughly one for every 1,440 inhabitants. Over the last decade, producers have contributed a total of 150 million euros[32] towards the management of this waste. France's pioneering approach aligns and sets the standard for other EU members already working on complying with textile EPR regulations, designed to bolster textile circularity domestically and subsequently reduce exports. Furthermore, countries such as the United States are also working own state-level frameworks[33].

While the implementation of the EPR scheme across Europe is imminent, tangible results will take time to materialize. This transformation requires investment in infrastructure, intricate public-private coordination, and robust awareness campaigns to drive its success. The application of EPR regulations for textiles in many territories of the Global North will, in fact, have an impact on the decrease of used textile exports over the long term, but not over the short or medium term. This can be observed within the broader context of textile waste flows, in which France stands as a major "exporter" - a classification shared by nearly every Global North country. To provide some perspective, in 2019, France exported a substantial 54.9%[34] of the collected used clothing, making it the primary source of used clothing imports for African countries such as Madagascar and Central African Republic. In 2021, 80% of the amount collected was exported. While exports for reuse remained stable, 49% was exported for recycling[35]. Given this precedent, it is evident that even with a fully operational EPR system, the Global North will continue to export used clothing it is unable to process domestically.

It is important to note that the introduction of legislation to regulate EPR for materials such as textiles, although not sufficient, is indeed fundamental to the path to circularity. Such measures aim to establish separate urban waste management systems and serve as the primary barrier to address issues arising from the growing volume of urban textile waste, and also provide key elements such as traceability and data on the reverse streams of textiles, promoting transparency in exports. All of them are crucial steps in building a global circular ecosystem for textiles.

However, in order to tackle the current crisis and repair the damage already caused in the Global South in an agile and effective way, additional and complementary measures to the textile EPR laws will be necessary, especially in places where textile waste is already a social and environmental crisis (Kenya, Ghana[36], Chile[37],etc).

ESTABLISHING A VOLUNTARY TEXTILE CREDIT MECHANISM.

The Global South faces a significant financial burden in dealing with the aftermath of the hegemony of the fast fashion linear way of production/consumption, which is the main precursor of the current textile waste crisis. Conscious of the complexity of such systemic problem, to address the disparity of responsibilities in this global situation we need to formulate multifaceted comprehensive strategies aimed at reducing the prevalence of existing landfills, while promoting the development, establishment, and legitimization of circular waste management systems at a local level. In this light, we position ourselves far from stand-alone approaches, and propose a logical and problem-specific solution to operate in combination with other needed strategies on prevention, reduction, circularity, and domestic management of textile waste. A solution to harmoniously coexist with, complement, and even serve as a proxy for upcoming regulatory EPR frameworks, while developing the local circular economy, ensuring traceability and with an emancipatory approach[38].

31 Refashion, Annual Report, 2019.
32 Refashion, Annual Report, 2019.
33 California State Senate, Legislation Introduced to Create First-Of-Its-Kind EPR Textile Recycling and Repair Program In CA, 2023.
34 Refashion, Annual Report, 2019.
35 Refashion, Annual Report, 2021.
36 Observatory of Economic Complexity (OEC), Used Clothing and Other Used Textile Articles, 2021.
37 BBC, The Global Second-hand Clothing Business, 2015.
38 The OR Foundation, Stop Waste Colonialism! Leveraging EPR to Catalyze a Justice-led Circular Textiles Economy, 2022.

To implement these solutions effectively, new financial flows are needed, not only from the public sector, but also from the private sector. Year after year, the equitable distribution of this financial responsibility has been a focal point of discussion at the United Nations Assembly[39] meetings, with the aim of reaching agreements between countries. The objective is to transfer technology and resources to developing countries, thereby addressing the effect of activities in the North in a fair manner within the South. Beyond the effect of pollution caused by the export of solid waste, whether textiles, plastics[40], or electronic devices[41], the glaring disparities in the direct impact of global warming on the countries in the Global South are equally striking. Massive floods, prolonged droughts, and unpredictable weather- all these indicators of climate change- are primarily originated by greenhouse gas emissions from the most developed countries[42].

The Paris Agreement, specifically Article 6[43], laid the foundation for establishing new mechanisms to facilitate private sector involvement in funding projects aimed at mitigating environmental impact. The second paragraph of this article emphasizes that transactions involving credits "should promote sustainable development, ensure environmental integrity, transparency and robust accounting to avoid what is known as double counting". This led to the rise of the voluntary carbon credit market[44], which operates based on consensus frameworks and offers an alternative financing stream for decarbonization.

Applying a similar rationale, various environmental credit mechanisms are already in place, covering areas such as plastic or water. These financing mechanisms effectively relieve the pressure from the local public sector, as they are supported by the responsibility assumed by the private sector on a global scale. Therefore, they serve as a means of redistributing resources and complementing the sustainable development policies of individual nations. The existence of established consensus frameworks confirms the relevance and pertinence of this type of mechanism in addressing issues such as textile waste, making it possible to adapt its design to respond to the specific reality of textiles under globally validated criteria of transparency, traceability, and impartiality.

Leveraging the principles underlying voluntary carbon offset mechanisms in combination with the structured frameworks of regulated EPR systems, presents an innovative approach. This approach allows to establish a fundamental and universally accepted unit of measurement in transactions: one textile credit equivalent to one tonne of recovered textile. It is a transferrable token certified by independent certification bodies to represent a textile output reduction that can then be bought or sold. Certified Textile Waste Reduction Projects are issued Textile Credits based on the amount of textile traceably recovered. Producers wishing to contribute for the equivalent to all or some of their textile output can purchase Textile Credits from the selected projects. Textile Credits are issued based on the verified impact of such projects, are unique and get registered along with all transactions in a public registry and tokenized for maximum traceability. Once transferred, they are permanently removed from circulation to prevent them being purchased again.

By adopting this system, we establish a direct connection between companies outputting tonnes of textile products into the system and textile waste recovery initiatives, all operating with a common unit of measurement and transaction. Through the acquisition of textile credits, producers can more effectively assume global responsibility for the end-of-life of their products, beyond regulated countries. This responsibility translates into financing collection, sorting, and recycling in regions most impacted by the waste generated directly from their activities. The outcome goes beyond mere financial transactions; it encompasses the transfer of resources and knowledge. It also empowers local communities, fostering their autonomy and resilience by propelling the development of local circular ecosystems.

A robust textile credit mechanism, built upon methodologies aligned with consensus frameworks, enables

39 London School of Economics, Grantham Research Institute on climate change and the Environment, COP27 Report Calls for International Investments of $1 Trillion Annually by 2030 in Climate Action in Developing Countries, 2022.
40 Nature, Scientific Report, Evidence that the Great Pacific Garbage Patch is Rapidly Accumulating Plastic, 2018.
41 United Nations Environmental Programme, How Disposable Tech is Feeding an E-waste Crisis, 2022.
42 Fair Planet, How Does Climate Colonialism Affect the Global South, 2022.
43 UNFCCC, Paris Agreement, Paris, November 2015.
44 MITECO of Spain, Carbon markets in the UNFCCC, Carbon Markets in the Paris Agreement: Voluntary Cooperative Approaches.

the formalization of local ecosystems of projects that benefit from contributions. This mechanism offers valuable data, material traceability, transparency in impact assessment, and seamless transaction tracking. It's particularly tailored to informal or less financially attractive projects with immediate, substantial environmental and social impacts. Consequently, this approach not only creates alternative channels to divert clothing from landfills but also generates employment opportunities across various skill levels, from textile collectors and sorters to experts in recycling and new product manufacturing. Moreover, it attracts investment in textile recycling and reuse innovation, fostering the development of advanced technologies and processes. This transformation turns environmentally and socially challenged contexts into hubs of prosperity and circular leadership. Investment in innovation also ripples into related sectors like construction, insulation material manufacturing, and even renewable energy production, all closely linked to the different streams derived from textile waste management. Furthermore, diverting each kilogram of clothing from incineration or landfills reduces CO2 emissions by an estimated 6.1 kg of CO2[45],contributing significantly to the global fight against climate change and the pursuit of Net Zero objectives.

CASE STUDY #1 AFRICA COLLECT TEXTILES (ACT).

BOLSTERING LOCAL CIRCULAR TEXTILE ECOSYSTEMS IN AFRICA.

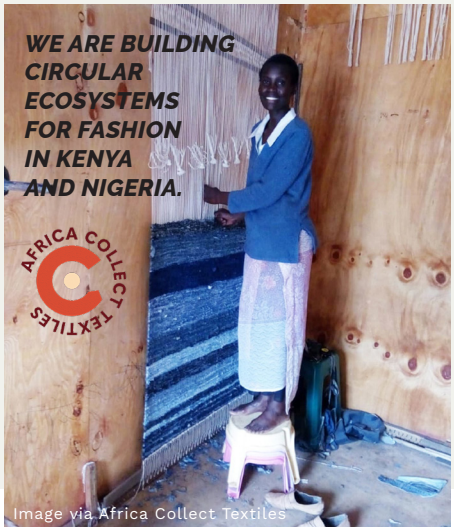


Image via Africa Collect Textiles

ACT is part one of the participants in the pioneering pilot project led by T_NEUTRAL to develop the Verification Methodology for Textile Recovery Projects eligible for issuing Textile Credits. This in-depth examination aimed to determine the cost of the environmental service and value added from managing textile waste, establishing the baseline, additionality, and financial translation into €/textile Credits. This methodology also aims at providing a triple-impact perspective, also evaluating environmental impact and potential for local development through measurable Sustainable Development Goals (SDGs). Within this paradigm, Africa Collect Textiles is an example of efforts to foster circular textile ecosystems at the local level.

Africa Collect Textiles (ACT) is a pioneer organization based in Nairobi that is committed to tackling the challenge of textile waste while fostering local prosperity. Their mission revolves around building an all-encompassing circular textile waste ecosystem. This initiative involves the collection, sorting, reuse, and recycling of discarded textiles, making a significant contribution to the local community.

With a forward-looking vision, since 2013 they've been building a network for collecting used textiles, involving citizens, businesses, and various partners. This network ensures a reliable sustainable path for this sort of urban waste, which is then sorted into different value streams. But the management of textile waste is a multifaceted challenge, and Africa Collect Textiles tackles these complexities through a holistic strategy. Given the diverse range of discarded textiles they handle, which differ in quality, composition, and potential for reuse, the organization recognizes the necessity for developing distinct pathways for these materials.

The first step involved the strategic implementation of a comprehensive infrastructure. ACT has deployed the installation of 35 drop-off points across Nairobi and has conducted several awareness campaigns to encourage both citizens and informal vendors to actively participate in the recycling process by using their bin network to deposit their discarded textiles. Thanks to these collection bins, 20 tons of textile waste have been successfully diverted away from landfills annually, providing a second life to them through their various management streams.

45 People to People, Humana Federation, For every kg of used clothing well managed, 6.1 kg of CO2 emissions are avoided, 2023.

Based on the waste hierarchy[46], the collected items are categorized with a primary focus on identifying high-quality garments for reuse. ACT actively donates part of the reusable clothing to Mathew 25, a children's orphanage with which they have a collaborative partnership. The rest of these garments are distributed domestically amongst women resellers in the outskirts of Nairobi, including areas like Kahawa West, and neighboring villages like Meru. This approach serves the dual purpose of supporting local communities and mitigating the need for unnecessary import of second-hand clothing from the Global North.

To address other inputs, such as off-cuts from the textile manufacturing industry and used uniforms, ACT has forged strategic partnerships with various suppliers and local businesses. These types of discarded textiles are well-suited for upcycling, with used uniforms being washed and repurposed as new raw materials for manufacturing, alongside the manufacturing of the majority of the off cuts. These efforts result in the annual creation of 27,400 new upcycled products, ranging from backpacks to woven rags and baskets.

All processes are carried out by a team of skilled staff within the organization, supplemented by local artisan groups in Nairobi and surrounding villages. Currently, ACT has a core staff of 16 and an additional 50 occasional collaborators, including women's groups in Kitui known for their exceptional basket weaving skills. These collaborative partnerships serve as a conduit for ACT to harness the expertise and artistic skills of these communities, transforming recycled materials into innovative new products as well as preserving the heritage of traditional crafts in these regions.

But what happens to textile waste not suitable for reuse or upcycling?

ACT is taking steps to expand its ecosystem by incorporating mechanical recycling to manage adequately the non-reusable stream of recovered textile waste, otherwise left without a proper way of handling other than formal landfilling. The plan is centered around the creation of a recycling infrastructure that has the capacity to efficiently process and repurpose textiles that are considered unusable. This will require significant investment in appropriate machinery and equipment capable of handling these specific materials effectively. The recycled textiles will be used for a variety of purposes, such as cleaning rags or shoddy (filling material).

For the pilot phase of the Textile Recovery Methodology for the issuing of Textile Credits, we applied such framework to evaluate the eligibility of the project, its baseline and additionality in order to then calculate both, the cost of the environmental service provided by such an ambitious expansion of their collection and recycling capacity, and, subsequently, the Textile Credits amount and price needed to finance it.

By financing their capacity expansion through Textile Credits, ACT will be able to divert and recover a total accumulated 1,300 tons of textile waste by 2026. The cost of providing this environmental service is significant, accounting for 73% of the organization’s operating costs, totaling €150,000. This cost underlines the commitment to creating a comprehensive circular ecosystem that includes a collection network, a sorting facility, upcycling initiatives and mechanical recycling activities.

By providing a traceable multi-stream end-of-life solution for discarded garments, ACT is effectively shouldering costs that, according to the EPR logic, should be the responsibility of textile producers, and for which the Textile Credits provide a *proxy* voluntary financial mechanism for those committed to mitigating their textile footprint beyond mandatory regulations. ACT strives to redefine circularity in a way that is context-specific, that is, relevant to each country, while safeguarding scalability to other neighboring nations.

46 European Comission -

Supporting the development of local circular ecosystems not only provides a solution for the second-hand influxes from the Global-North, but also generates local waste management infrastructures to remain in place for the long term to also be used for domestic waste in a future low-import context. This represents an emancipatory approach that is not dependent on the prevalece of second-hand imports. Access to precise and detailed data on investment costs, infrastructure development and maintenance, as well as social impact and circularity metrics based on measurable results, opens the door to innovative financing mechanisms such as Textile Credits, providing essential support for projects like ACTs to fulfil their mission in a transparent manner.

CASE STUDY #2 CHILEAN TEXTILE WASTE CONTEXT.

ANALYSIS OF THE PERTINENCE AND LIMITATIONS OF A TEXTILE E.P.R. SYSTEM AND THE POTENTIAL FOR COMPLEMENTARY DECENTRALIZED MECHANISMS.

This case study examines the specific context of textile flows in Chile at a macro level, with a particular focus on used clothing and the set of measures needed to curb the escalation of textile waste and address the already existing problem of uncontrolled landfilling in areas such as the Atacama dessert.

The textile landscape in Chile reflects a compelling and evolving narrative, characterized by a significant reliance on textile imports, both new and used. In 2021, 736,1 thousand tons of new clothing and 156,7 thousand tons of used clothing were introduced into the country[47]. According to the OEC, Chile is the largest importer of used clothing in Latin America, accounting for 81.7% of total imports[48]. The main sources of these clothes are Europe, the United States, South Korea and Japan[49], with the port of entry located in the northern part of the country, in the Iquique Free Trade Zone. Its strategic location allows it to serve as a gateway for trade between Mercosur, Asia and the Americas.

What is striking, however, is that the import figures for used clothing have increased exponentially in recent years, with an inflow of 69 thousand tons in 2018, rising to 150 thousand tons in 2021[50]. On a cumulative basis, Chile has imported more than 400 thousand tons of used clothing since 2017[51]. Changing habits in the countries of origin, characterized by rampant consumption of cheap clothing, short use before disposal, and a non-existent local textile waste management system, have led to this surge in used goods entering the country. Furthermore, this situation is exacerbated by the emerging trend of the second-hand fashion industry, which is not limited to Chile but has a global presence[52]. Several factors, including the need for affordable clothing in disadvantaged communities and the desire to access fashion trends from other places[53], have contributed to the increased demand for used clothing.

47 Biblioteca del Congreso Nacional de Chile, Asesoría Técnica Parlamentaria, Ropa usada: mercado nacional y regulación en Chile y extranjero, agosto 2022.
48 Observatory of Economic Complexity (OEC), Used Clothes And Other Used Textile Goods, 2021.
49 United Nations Environmental Programme, How Disposable Tech is Feeding an E-waste Crisis, 2022.
50, 51 Biblioteca del Congreso Nacional de Chile, Asesoría Técnica Parlamentaria, Ropa usada: mercado nacional y regulación en Chile y extranjero, agosto 2022.
52 Future Market Insights, Secondhand apparel market outlook, 2022-2023.
53 Quartz, The secondhand clothing market is exploding, 2023.

However, the underlying problem with these imports is not just the volume, but the low quality of the goods. Over 70% of imported used clothing is not of sufficient quality to be reused[54]. This is not only an economic problem for traders, but also leads them to dispose of unsaleable clothing in illegal dumps scattered across Chilean territory. Cities in the northern region, such as Alto Hospicio and Tarapacá, are witnessing the downside of textile pollution. So much so that just a few kilometers away, in the middle of the Atacama Desert, there is one of the world's largest textile dumps. Covering more than 300 hectares[55], it accumulates textile waste fed daily by the "fast fashion" consumption of the Global North. In 2021, approximately 39,000 tons of textile waste reached this landfill[56], contaminating soil, water and air through the decomposition or incineration of toxic materials used in clothing production. The environmental impact of this waste is difficult to quantify and there is still a lack of specific data. However, the impact on local ecosystems and people living near the landfill is clear, including rat infestations, fires and soil contamination that can seep underground and pollute the region's scarce fresh water sources[57].

At present, the lack of an appropriate legal framework is an obstacle to the effective management of textile waste and limits the solutions available. The situation relies primarily on local initiatives, often operating independently with limited resources, attempting to provide stand-alone solutions. As a result, the problem of textile waste continues to escalate, increasing its impact on local communities and the environment.

To address these challenges, the Chilean Ministry of the Environment, in collaboration with various relevant bodies, has embarked on an ambitious roadmap[58] to address the country's circularity needs, with a specific focus on textiles. The challenge is to overcome the current fragmentation of efforts and move towards a comprehensive strategy involving all relevant sectors, from the textile industry and recycling technologies to government agencies and civil society. As part of this plan, textiles have been identified as a material requiring an Extended Producer Responsibility (EPR) law. While this is an important step in the fight against textile waste, following the logic of these regulations, the application of a textile EPR law to producers or importers of new textiles would result in the establishment of a separate urban textile waste management system dimensioned for this type of products. However, in this context of new textile import, sale and disposal, the second-hand stream, would remain unresolved, with 70% of imports being discarded without proper control[59]. In the context of an "importing" country such as Chile, as opposed to the "exporting" context that we assigned to the French model based on the macro flows of textile waste, a textile EPR regulation, while vital, seems insufficient to quickly tackle the existing problem, making it essential to rely on other types of mechanisms that complement conventional EPR regulations by addressing the clean-up of the local ecosystem, as well as the development of appropriate systems that help to achieve integrated management of urban and industrial textile waste.

The current context provides Chile with an unprecedented opportunity to take the lead in transparent and innovative mechanisms (such as textile credits) to capitalize on the challenges posed by fast fashion imports and to forge an ecosystem of entrepreneurship focused on the circular economy. The combination of regulatory and voluntary approaches would effectively address the challenges related to textile waste flooding the country's landfills, and facilitate its transition towards circularity while creating economic and employment opportunities in emerging sectors. Embracing this situation and fully committing to a circular approach within the textile industry will position Chile as a leader in innovation, purpose-driven technologies, and social responsibility.

As an example of the potential impact, contributing for just 5% of the annual Textile Footprint of the Chilean textile sector could result in the circular recovery and management of over 42,000 tonnes, an injection of more than $10 million towards local textile recovery projects, and the creation of over 4,000 jobs.

54 Quintatrends, El lado B de la ropa usada en el norte de Chile: una debacle ambiental y social "sin responsables, 2021.
55 BBC News Mundo, "Hemos transformado nuestra ciudad en el basurero del mundo": el inmenso cementerio de ropa usada en el desierto de Atacama en Chile, 2022.
56 Quintatrends, El lado B de la ropa usada en el norte de Chile: una debacle ambiental y social "sin responsables", 2021.
57 WIRED, Colores sucios: la industria de la moda genera 20% de las aguas residuales, 2023.
58 Ministerio del Medio Ambiente, Propuesta Hoja de Ruta Nacional a la Economía Circular para un Chile sin basura 2020-2040., Chile, 2021.
59 El Confidencial, El desierto de Atacama, el mayor vertedero de ropa del mundo, 2022.

CONCLUSIONS.

The global used clothing market is on the rise, reflecting the growing consumption of fast fashion in the Global North. According to the United Nations, over 4.5 million tons of used clothing, or approximately 23.6 billion items[60], circulate around the globe each year - the equivalent of 25,000 football fields of used clothing. It is estimated that between 45% and 60%[61] of discarded second-hand clothing is exported to East Africa for consumption, or directly to be sent to landfills.

The solution proposed in developed countries to manage textile waste domestically is the implementation of an Extended Producer Responsibility (EPR) system, which makes producers financially responsible for the end-of-life management of the products they put on the market. Evidence from the implementation of these systems shows that, although their existence is essential to ensure proper domestic waste management, they take time to produce results[62] at the macro level, effectively reflecting on textile waste export rates.

Faced with this pressing situation, it is crucial to set a common goal and implement targeted and practical solutions based on the principles of circularity, responsibility, and traceability. Following extensive research into the issue of textile waste, the first step will be the adoption and implementation of a 'Zero Textile Waste to Landfill' commitment across the textile industry. Subsequently, a global textile credit mechanism emerges as a relevant and actionable model to (i) repair the damage already done and (ii) accelerate the creation of an appropriate circular textile ecosystem at the local level. This model can serve as a bridge between regions, promote transparency and equity, and accelerate the adoption of circular practices within the textile industry. It is also a powerful tool to alleviate the burden on local governments and communities in the Global South who are struggling with the environmental and social consequences of the textile waste crisis.

The Textile Credits, versatile in their applications, serve various purposes (see Application Diagrams on page 16 for more details)—from responsible producers strengthening their commitments voluntarily to EPR systems expanding their fund allocations through a traceable and transparent mechanism. Aligned with Sustainable Development Goals this mechanism propels goals 9.3, 9.a, 12.1 & 12.5[63], contributing to global prosperity through the exercise of voluntary accountability. The Voluntary Textile Credits Mechanism, essentially acts as a catalyst for change. It promotes responsible and accountable practices among producers to mitigate the environmental and social impacts of their textile footprint. By emphasizing transparency and equitable participation, it transcends geographical boundaries and encourages collaboration between the Global North and South. This collaborative effort not only helps reduce textile waste but also accelerates the circular transformation of the textile industry.

The creation of an intelligent textile ecosystem stands as a pivotal element for transformative change, requiring the connection of data at local and global levels to address textile flows and promote circularity. These efforts will not only contribute to an accurate understanding of the challenges and opportunities but will also provide concrete and actionable data to support circular transformation plans in both the private and public sectors. By developing this textile-specific data ecosystem, leveraging digital tools such as AI to collect and process accurate data or tokenization for traceability, and equipping industry stakeholders with the necessary tools to measure and effectively optimize the textile footprint, we are paving the way for the circular transformation of the textile industry.

The current global context presents an unprecedented opportunity to build an entrepreneurial ecosystem around a circular economy. Taking advantage of this situation and betting on a circular approach in the textile industry would position any country as a benchmark in terms of innovation, sustainability, and social responsibility.

60, 62 STOP WASTE COLONIALISM, "Leveraging Extended Producer Responsibility to Catalyze a Justice-led Circular Textiles Economy," 2023.
61 Greenpeace, "Poisoned Gifts From Donations to the Dumpsite: Textiles Waste Disguised as Second-hand Clothes Exported to East Africa", 2021.
63 UN, "The 2030 Agenda for Sustainable Development", 2015.

APPLICATION DIAGRAM.

The following diagram provides a broad overview of 3 examples of use cases of the Textile Credit mechanism for 3 different contexts, all of which have been presented earlier in the paper. It aims to illustrate the flexibility and potential of a traceable, performance-based mechanism for global accountability of textile waste.

CASE #1	CASE #2	CASE #3
VOLUNTARY CONTRIBUTIONS BY PRIVATE PARTIES	INTEGRATION WITH EPR REGULATIONS IN PREDOMINANTLY EXPORTING COUNTRIES[63]	PROXY-EPR SYSTEM FOR PREDOMINANTLY IMPORTING COUNTRIES[64] WITH OR WITHOUT EPR REGULATIONS
Textile Producers, retailers or any other actor who voluntarily, want to take responsibility for their impact and/or strengthen their CSR/impact commitments through traceable performance-based allocation of funds.	Countries with EPR regulations for textiles that also export second-hand textiles or textile waste to the Global South. They rely on EPR to increase domestic handling and eventually reduce exports, but also want to take responsibility for current and past exports.	Second-hand importing countries with EPR regulations that need a specific solution to tackle waste beyond the new product placed on the market. Also, countries without EPR regulations but affected by uncontrolled dumping of textile waste. They both can benefit from a flexible, traceable performance-based system to meet their local textile recovery goals.
Set a Contribution Pledge based on a previous Textile Footprint Assessment.	Measure the exported textile waste and set up a contribution system (e.g. collect a fee through EPR schemes into a fund).	Asses their context and textile waste recovery goals, as well as a contribution system logic (individual or collective).
Select the Textile Recovery Project/s that match their social & environmental commitments.	Project selection based on export flows & textile recovery goals (e.g., clean up tasks, local ecosystem development).	Determine the types of projects needed for each context. Promote their development, verification and credit issuance based on performance.

Textile Credit Purchase & Transaction Certificate

Tokenized Textile Credit Platform & Central Registry
1 Tonne of Recovered Textile = 1 Textile Credit

Textile Credit Transaction & Certification

Textile Credit Issuance

Eligibility, Verification & Monitoring of Activity

64 The phrase "Predominantly Exporting Country" refers to the same term used throughout the document as a way of informally defining those countries or contexts with high rates of exports of used textiles.

65 The phrase "Predominantly Importing Country" refers to the same term used throughout the document as a way of informally defining those countries or contexts with high rates of imports of used textiles.

DEFINITIONS.

Textile Producer: In line with Spanish Law 7/2022 on Waste and Contaminated Soil[66], a textile producer is defined as any independent organisation or person who manufactures, transforms, handles or markets textile goods in a professional capacity. Throughout this document, textile producer and producer will be used interchangeably.

Textile Goods: following Spanish law 928/1987 of 5 June 1987 concerning the labelling of the composition of textile products[67], textile goods are considered to be those which in their raw, processed, semi-manufactured, manufactured, or made-up state, are either composed exclusively of textile fibres or those whose weight is made up of at least 80% of textile fibres and textile products incorporated into other products, where the composition of the latter is specified. Throughout this document, textile good, textile product and textile material will be used interchangeably.

Textile Output: the amount of textile resulting from the activity of a textile producer measured in metric tonnes, including usable textile (in suitable condition for continuing the forward value chain. For example, a final marketed garment) and discarded textile (in unsuitable conditions for the forward value chain. e.g. workshop scraps, defective product, prototypes...).

Pre-Consumer Textile Outputs: textile outputs incurred during the manufacturing process before the end product is sold to the end consumer.

Post-Consumer Textile Outputs: consumer goods marketed to the end consumer.

Gross Textile Footprint: the sum total tonnes of textile from all textile output sources applicable to a producer. The total amount of textile outputted within an assessment period regardless of its final destination.

Net Textile Footprint: the result of incorporating mitigation practices that can be deducted from the Gross Textile Footprint, these being: textile outputs stored, recovered, or contributed for through mandatory or voluntary EPR mechanisms. For these purposes, the Net Textile Footprint is the tonnes of textile over which control has been lost at the end of a given assessment period.

Textile Footprint Mitigation Practices: initiatives undertaken by the producer aimed at preventing textile outputs along the value chain, counteracting unavoidable emissions already incurred, as well as improving circularity.

EPR: Extended Producer Responsibility. The principle whereby the cost of managing the waste generated by the products placed on the market is passed on to the producer. It is a term coined in the context of the European Union and can be summarised as “the polluter pays”.

Textile Waste Recovery Project: Any initiative that proposes a reduction of leaked textile that involves additionality and is measurable and traceable.

Textile Credit: unit of exchange equivalent to one tonne of recovered textile. It is a transferrable token certified by independent certification bodies to represent a textile output reduction that can then be bought or sold. Certified Textile Waste Reduction Projects are issued Textile Credits based on the amount of textile traceably recovere. Producers wishing to contribute for the equivalent to all or some of their Textile Footprint can purchase Textile Credits from the selected projects. Textile Credits are issued based on the verified impact of such project, are unique and get registered along with all transactions in a public registry and tokenized for maximum traceability. Once transfered, they are permanently removed from circulation to prevent them being purchased again.

Textile Footprint Voluntary Contributions: Voluntary monetary contribution made by the producer to take responsaibility of its Textile Footprint completely or partially. This contribution is made by purchasing Textile Credits from certified Textile Waste Recovery Projects.

66 Head of State. Law 7/2022 on Waste and Contaminated Soils for a Circular Economy. Official State Gazette no. 85, with reference BOE-A-2022-5809. 09/04/22.

67 Ministry of Relations with the Courts and the Secretariat of the Government of Spain, Royal Decree 928/1987, of June 5, regarding the Labeling of Composition of Textile Products. BOE num. 170, Reference BOE-A-1987-16727, Spain, 17/07/1987.