

CENTRE FOR RESPONSIBLE BUSINESS

APPLICATION OF CIRCULAR ECONOMY

INDIAN APPAREL & TEXTILE SECTOR

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Table of Contents

1.Introduction	3
2. Exploring circular economy in indian textile industry	5
2.1 Sustainability Challenges in The Indian Textile Industry	7
3. Outcomes from Stakeholder dialogues	8
3.1 Insights from Scoping Exercise	9
<i>A)Brands and Suppliers</i>	9
<i>B)Government</i>	11
<i>C)Academia</i>	12
Challenges and Critical Concerns.....	12
4. Conclusions and Recommendations.....	13
Annexures	16
Annexure 1: Approaches to the aspects of Circular Economy in the Textile sector...	16

1. INTRODUCTION

The linear economy which follows the approach of “take, make, and dispose” has proved to be highly resource inefficient. The sustainability efforts within a linear economy are focused mainly on minimizing the ecological impact, after the production cycle is completed.¹ Waste generated in the current model translates into not just pollution but also lost revenues. To comprehend the gravity of the situation, a World Economic Forum (WEF) report suggests that 5% of plastic packaging material, worth \$80–120 billion annually, is lost to the economy after a short first use.² This number signifies the amount of resources wasted which could have been easily be used to generate profits in some other manner.

Circular Economy (CE) can help address the challenges of a linear economy—mitigate resource depletion and pollution, explore avenues for cost reductions, enhance revenues, and provide better risk management.³ Circular economy holds considerable potential to contain waste in the economy and prevent reduce its passage onto the environment. The concept has gained a lot of momentum presently, given its application where availability of resources is limited. The concept is presently promoted by several big businesses and developed countries, such as Finland, Sweden, and Netherlands. The growing popularity of circular economy can be attributed to the business opportunity it offers which is estimated currently at \$1000 billion annually (McKinsey, 2014).⁴

According to a report published by the Ellen MacArthur Foundation (EMF) in 2013, circular economy emphasizes on product, component and material reuse, refurbishment, remanufacturing, repair and upgrading to alternative energy sources throughout the value chain⁵. EMF defines circular economy as looking beyond the conventional take-make-dispose extractive and linear industrial model, “a circular economy aims to redefine growth and entails gradually decoupling economic activity from the consumption of finite resources and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural and social capital.” The concept of circular economy can be best illustrated in figure 1.

¹ Refer: <https://kenniskaarten.hetgroenebrein.nl/en/knowledge-map-circular-economy/how-is-a-circular-economy-different-from-a-linear-economy/>

² Refer: <https://events.sustainablebrands.com/sb17cph/updates/value-for-business-in-the-circular-economy-generating-roi-by-eliminating-the-concept-of-waste>

³ Refer: https://link.springer.com/chapter/10.1007/978-3-319-91971-3_8

⁴ Refer: <https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/the-circular-economy-moving-from-theory-to-practice>

⁵ Refer: [Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf](#)

Figure 1: Concept of Circular Economy



Source: European Union

(<https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits>)

According to the EMF, which has been pioneering CE practice globally, concept of CE is based on three principles:⁶

- i. Design out waste and pollution: Waste and pollution can be minimized at the design stage, which determines 80% of environmental impact. Using alternative and new material and updated technology can help in designing better.
- ii. Keep products and materials in use: This principle ensures that products do not end up in landfill but are kept in use. The products should be designed in a way that they can be reused, repaired, or remanufactured.
- iii. Regenerate natural systems: A circular economy promotes doing good for the environment, which means going beyond 'not doing any harm'. The principle promotes enhancing natural resources by being mindful about consumption and production.

⁶ Refer: EMF <https://www.ellenmacarthurfoundation.org/>

The ramification of these principles is huge. Integration of these principles into business practices represents a paradigm shift in approach that builds long term resilience and creates unprecedented business opportunities with positive societal and environmental benefits. A transition from a linear economy to a circular economy would reduce the negative impacts of the former. Hence the financials will be favourably impacted if the businesses are able to leverage upon these opportunities.

2. EXPLORING CIRCULAR ECONOMY IN INDIAN TEXTILE INDUSTRY

The Indian textiles sector is one of the largest contributors to India’s exports (15 percent, 2018-19), contributing 2 percent to the country’s GDP (2018-19).⁷ With over 45 million people, the industry is one of the largest sources of employment generation in the country as well. The size of India’s textile market in 2016 was around US\$ 137 billion and is expected to touch US\$ 226 billion by 2023, growing at a CAGR of 8.7 percent. On the other hand, the textile sector is also one of the most polluting sectors. Textile is the third biggest source of waste in most states of India. Approximately 60 percent of Indian textiles are dependent on cotton, which consumes 25 percent of the world’s pesticides. The wet processing of textiles generates an enormous quantity of waste sludge and chemically polluted waters.⁸

Most of the large international brands, including those who have made commitments for promoting the principles of circular economy in their supply chain, source textiles and apparels manufactured by Indian suppliers. Upon interaction with experts, it was revealed that some of the brands have already started discussions with their suppliers on **circular economy** and have initiated action for promoting the principles of circular economy in the production of the textiles and apparel sourced from India.

As an organisation actively engaged on sustainability issues in the Indian apparel and textile sector, and interest in circular economy, CRB was keen to examine the understanding of the concept in the industry and its application. With support from Novozymes, CRB undertook a quick review by interacting with a number of key actors in apparel and textile sector. The findings are provided here below and will form basis for CRB’s future interventions.

⁷ Refer: <https://www.ibef.org/industry/textiles.aspx>

⁸ Refer: <http://www.forbesindia.com/blog/the-innovation-edge/is-the-indian-textile-and-apparel-industry-reinventing-itself/>

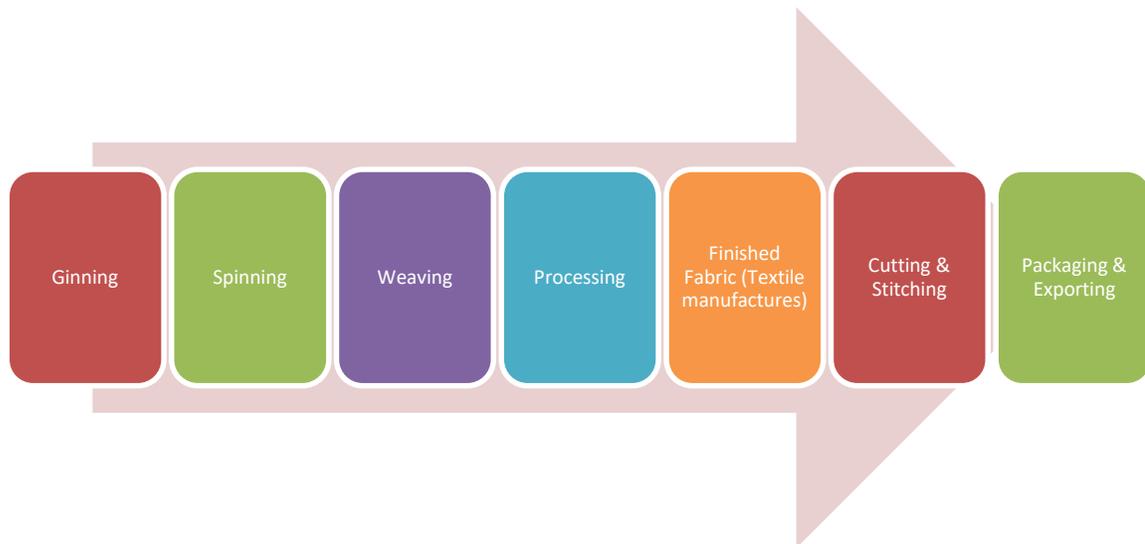
Using a mixed sampling methodology, suppliers and brands were identified. The sample size for key stakeholders is comprised of 32 relevant stakeholders.

Table 1: Number of Stakeholders

STAKEHOLDERS	NUMBER
Scrap Dealers	15
Suppliers	12
Academicians	3
Brands	2
Total	32

Several steps involved in the textile manufacturing process starting from fabric creation till it is ready for shipment include spinning, weaving, processing (dyeing, colouring, bleaching, waxing), cutting & stitching, and packaging as illustrated below in Figure 2.

Figure 2: Sequence of Processes in Textile Manufacturing



Ginning: Ginning is the process of separating the seeds from the cotton fibers. It is the first mechanical process.

Spinning: In this process, the drawn-out strands of fibre are twisted to form yarn which is then used further to create fabric. This is one of the most important processes in the textile industry.

Weaving: This is a process where different kinds of yarns or threads are weaved together to form a piece of fabric or cloth.

Processing: This includes dyeing, colouring, bleaching, and waxing of the produced fabric.

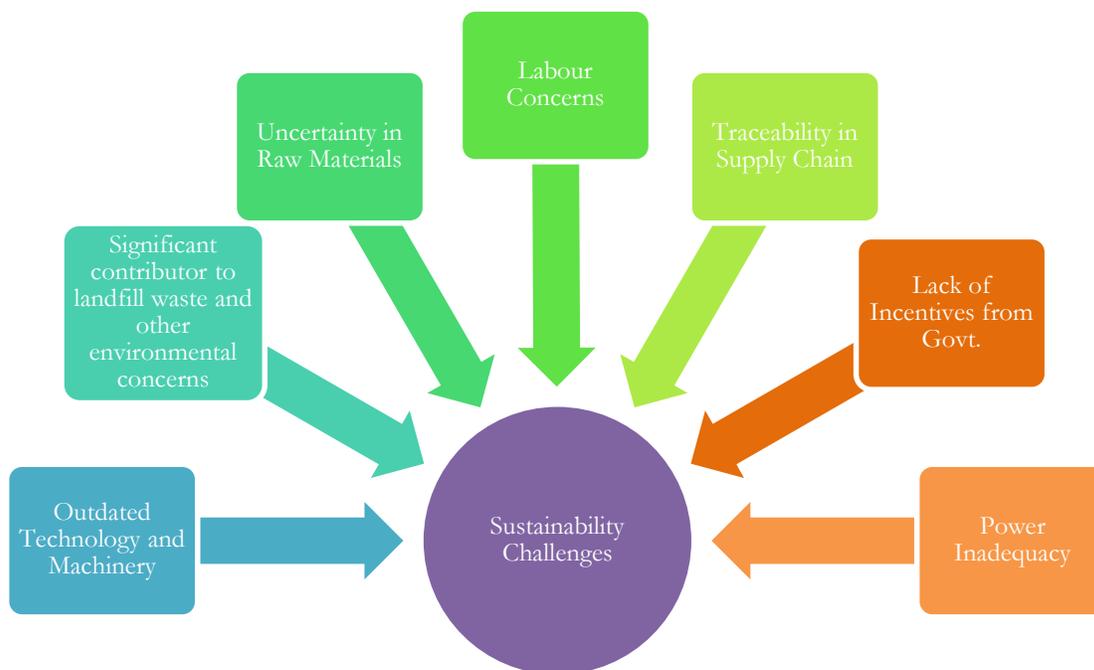
Cutting and Stitching: In this process, the finished fabric is used by manufacturers to design different types of clothing as required by the client.

Packaging: This is the art of packing the products for distribution, storage, selling, and use.

2.1 SUSTAINABILITY CHALLENGES IN THE INDIAN TEXTILE INDUSTRY

The Indian Textile industry plays a significant role in contributing to employment generation, export earnings, and industrial output. However, at present, the sector is hugely overshadowed with several sustainability challenges and circular economy presents one of the key strategies or practice to combat the challenges. Some of the key issues faced by the textile sector are illustrated in figure 3.

Figure 3: Sustainability Challenges in Indian Textile Sector



Outdated technology and machinery: The spinning and weaving mills face the problem of obsolete machinery, thereby increasing the waiting time for orders to be delivered. Lack of research & development and inadequate investment makes the products uncompetitive compared to imports from Europe.

Environmental degradation and disposal of wastes in landfill: The environmental footprint from the textile manufacturing activities is huge in the form of air and water pollution through the disposal of waste in the landfills. According to Saravanan (2011)⁹, the total amount of willow waste generated in India is about 80,000 to 85,000 tons per annum, and this needs proper treatment apart from disposal as landfill.

Labour concerns: The textile sector in India is long bothered with labour issues pertaining to health and safety concerns. The sector is also bogged down by child labour issues, making it internationally less competitive.

Uncertainty in procuring raw materials: Fluctuating prices and uncertainty relating to the procurement of raw materials such as cotton and silk is a cause of concern (Assocham, 2015)¹⁰.

Power Inadequacy: The textile clusters in India face frequent power shortage and load shedding, resulting in a loss of substantial working hours.

Lack of incentives from the government: The fiscal incentives in terms of reduced customs duties and tax exemption is required for revamping the textile sector which at present is over burdened with varied fiscal duties.

3. OUTCOMES FROM STAKEHOLDER DIALOGUES

CRB organized a workshop inviting key stakeholders from brands, suppliers, government, UN agencies, academic, CSO and experts. The outcome from the discussions is enumerated below:

- i. There is a need for an action agenda on circular economy for the Indian apparel and textiles sector, with support and cooperation of international brands/businesses that have been champions on Circular Economy in the world.
- ii. Some of the elements of such an agenda could include:

⁹ Refer: <http://www.indiantextilejournal.com/articles/FAdetails.asp?id=3941>

¹⁰ Refer: <http://tari.co.in/wp-content/uploads/2015/10/Textile-and-Apparels-Study-Final.pdf>

- Creating awareness across various clusters/supply chain actors in the Apparel &Textile (A&T) sector
 - Capacity building of managers in A&T suppliers and industry experts about techniques to compute cost savings from adopting CE practices
 - Developing action points for zero-waste-to-landfill
 - Promoting responsible handling and management of chemicals
 - Policy analysis and engagement with policymakers
- iii. Adequate research on technology and innovation needs to be carried out to promote CE practices in the apparel and textile sector.
- iv. A platform comprising multiple-stakeholder could be considered to focus on some of the actions that have been highlighted earlier to raise awareness and build the capacity of key stakeholders within the apparel and textiles sector.

3.1 INSIGHTS FROM SCOPING EXERCISE

CRB conducted one to one discussions with a number of different key stakeholders. Outcome of these discussions is summarised below:

A) BRANDS AND SUPPLIERS

The overall perception related to the context of circular economy is not yet fully developed. This is also because the international clients with whom the Tier-1 suppliers deal with have not actively engaged with them on the broader aspects of circular economy, its implications for the textile sector and its overall impact on the sustainable development of the economy. However, the basic perception steers from the fact that the select Indian suppliers surveyed comprehend the situation from an ethical point of view, which means that they perceive it as something which is ‘good to do’ and hence doing it provides them with a sense of satisfaction.

For most of the respondents, the concept of circular economy is one-dimensional which implies that mostly the aspect of ‘recycling’ is attached to circularity. The elements of ‘redesigning’, ‘reusing’ etc. are yet to gain popularity among the manufacturers. The perception of circularity or circular economy is still not clearly understood by the respondents’ and is used synonymously with the general sustainability measures. A couple of suppliers surveyed recognise the importance and implication of circular economy. However, they are also sceptical as the cost implications are high with long pay-off periods and governmental support being abysmally low. Hence, complying with circularity practices poses a substantial cost burden, they felt.

The international brands and suppliers in the study have already started to acknowledge the contributions of a circular economy approach in the textile sector through integrating the EMF principles in their manufacturing process. However, the practices followed by most of the Tier-I suppliers are on an ad-hoc basis with the focus mostly on waste management practices, as listed in Annexure 1. On the contrary, the brands having an international perspective through integration with the global textile market, undertake efforts to redesign, reuse, recycle, and regenerate the natural ecosystems. They also undertake several measures in the form of collaborative efforts with other entities to promote circularity as is not the case with suppliers. One probable reason behind this trend could be the lack of understanding of circular economy models, principles, and approaches.

Motivation

Motivations to promote circularity approaches in the textile sector vary across brands and suppliers. For brands, one of the critical motivations includes managing reputational risks and gaining recognition. Brands believe in the business case of circularity approaches and are gearing up to leverage upon the opportunities. According to few suppliers, there is no direct economic benefit accrued from recycling; however, their internal demand for water has reduced; they were earlier buying water from the village, which has now reduced. A move towards ethical practice leads to positive outcomes, such as a reduction in demand for water has an indirect impact on the balance sheets. However, the suppliers are unsure about whether it is getting actually reflected in their balance sheets due to problem of quantification.

Challenges

It was evident that a number of challenges impede the acceptance and application of circular business models. Some difficulties faced by the Tier-I suppliers include tight profit margins, increased prices of the raw materials, and reduced client margins thereby making the contribution factor too low. According to them, utmost care needs to be taken to reduce the waste to a minimum level. Some of the impediments faced by textile brands in promoting circular economy approaches are:

- Lack of collaboration: Collaborations with multiple stakeholders would help achieve the goals and would also further the development of new technology and innovation. However, building and nurturing meaningful relations remains a challenge.
- Technological gaps: Finding innovations to fill the technological gaps across the supply chain and bringing these innovations to market poses a challenge due to variable market perception and acceptability.

- Lack of recycling options: Some of the raw materials still do not have any recycling option. For example, in acrylic, there is no recycling option which can be used. There is a need to find sustainable source material or change the material.

Industry associations play a crucial role in furthering the approach of circular economy in the textile sector as is listed below. According to several suppliers, OGTC has been very supportive and offers the latest trends and updates in terms of waste management and water reutilization. They also work with local organisations to collect the waste paper and cardboard and make sure that the waste is directed to the right channel for disposal.¹¹ However, the suppliers surveyed felt that the fabric yarn and accessories chain is partially organised and hence there is a scope of more intervention by OGTC in this segment.

B) GOVERNMENT

Integration of circular economy approach is not possible without the active involvement of local and national government. Many suppliers foresee the role of the government in terms of infrastructure development, for example, their factory still does not have any sewage connectivity and hence they are dumping the waste in the '*local naala*' which is both illegal and unethical. However, these suppliers have tried to reach out to the local government body but no action has been undertaken for the past two years. The brands and suppliers discussed some of the critical government interventions being undertaken or that could be planned.

- i. According to the suppliers, the state government offers 30% rebate on installing ETP plants and there is a benefit accrued on solar panels as well. In addition to this, if any supplier wants to shift towards more environmentally friendly machines, there are rebates provided on these machines as well.
- ii. In terms of other infrastructural development, there is a need for an evaporation tank which can preserve the evaporated water from systems. The government can either provide subsidies or other economic incentives to rationalise the process. Government can also help small suppliers to build effluent and sewage treatment plants within the facility.
- iii. Active support is required to incentivise waste management practices which also include subsidising the collection of waste. Efforts also need to be undertaken to create more awareness about waste management practices.
- iv. Awareness creation of circular products is one of the necessary requisite for creating a market. A move to product labels and adhering to process-oriented standards will generate consciousness in the end-users. However,

¹¹ OGTC website, available at <http://www.ogtc.in/mission.html>

the whole process is time-consuming and costly. Coordinated efforts by the government are required to pursue these efforts.

- v. For submission of the GST bills, the process followed is cumbersome and requires submission of hard copies of the bills. This increases the environmental footprint of the company by significant levels. Assisted efforts of the government against this practice and upgrading the system through online submission of bills are required.

C) ACADEMIA

The perception and awareness related to circular economy approach require inputs and interventions from the academic experts in the textile sector. Some of the key points which came up through the interactions are mentioned as under:

- i. Efforts are undertaken by educational institutions to integrate courses on sustainability practices at the undergraduate and postgraduate levels to make students aware of the circularity.
- ii. The academic institutions are also promoting research on alternative material and are actively experimenting with different sustainable options.
- iii. There is a need to transfer the research from the laboratory to the field.
- iv. More investment and favourable policies needed to promote research on circular economy.

CHALLENGES AND CRITICAL CONCERNS

The pilot survey of brands and suppliers in the textile sector highlighted some serious concerns:

- i. **Huge fabric waste:** As revealed by several suppliers, a large quantity of fabric waste, approximately 1 ton, goes to landfill every month. This poses a considerable risk to the environment.
- ii. **Lack of regulation:** According to some suppliers, as of now there are no environmental audits; however there are solar audits done by the government since they get a benefit on the total solar power generating capacity.
- iii. **Water waste:** Approximately 80,000 litres of water is utilised for daily purposes, out of which a considerable amount of wastewater treated from the ETP plants goes to the local drain and there is no way of further reusing the water. This again poses significant environmental threat to society.

iv. **Sludge waste in landfills:** Sludge waste which is generated in the tune of 200-300 kg per year comprises of washing powder, dye colour, fabric chemicals etc., which is disposed off in landfills.

v. **Lack of alternate and affordable options:** Polythene is the material used for packaging purposes. This material poses a significant risk to the environment. However, replacing this with some environmental friendly material is costly and hence inconvenient to be borne by small suppliers.

vi. **Lack of awareness:** Other concerns include a lack of awareness about circular economy and circularity principles among suppliers.

vii. **Poor designs and innovation:** Lack of interventions at the design level by manufacturers and brands is also one of the lost opportunities to create product differentiation.

viii. **Unorganised scrap dealers:** The market for textile scrap dealers is highly unorganised, and they are mostly unaware of their buyers. Temporary tents are set up by the shop owners, where the scrap from the factories is collected.

4. CONCLUSIONS AND RECOMMENDATIONS

Circular economy is a relatively new concept, and its implications for the Indian textile sector are vast. One cannot ignore the emanating opportunities posed by such an approach. The preceding sections highlight several disparities in approach by suppliers in adhering to such practices and limited applicability of circularity in the Indian textile sector. However, time is ripe to introduce interventions through various stakeholder efforts and accelerating the understanding of circular economy benefits. India is a significant source of sustainable materials and this provides the necessary impetus for furthering the approach.

Some of the action points highlighted by the study are:

- Promote responsible handling and management of chemicals
- Industry associations can provide extensive support and options for cost effective alternatives
- Implement effective recycling options and upgrade the technology
- Government should actively take part in infrastructure development. Provision of subsidies for small scale suppliers to build different facilities such as evaporation tank or sewage treatment plant can further the cause of CE
- Need for increased and focused investment on research and innovation
- Need to build capacity of stakeholders involved

- Promote awareness campaigns and encourage active multi stakeholder collaboration

According to the brands surveyed, the Indian government is taking adequate steps to address water scarcity through enhanced water efficiency. Collaborative efforts have been undertaken with the World Resources Institute (WRI) to craft innovative methods to address water risks, scarcity, and to reduce the consumption of water. Sustainability commitments are also applicable to suppliers and third party suppliers in terms of ownership and responsibility. The international textile brands are undertaking several measures to comply with the sustainability commitments of the government. The brands have to shoulder the responsibility to drive efforts towards circular economy approaches. The stakeholders in the textile sector have to bear the divided responsibility to promote circularity in several ways. To streamline the efforts, there is a need for developing a multi-stakeholder platform for facilitating and addressing the sustainability issues in the textile sector through a circular economy approach.

Centre for Responsible Business (CRB) was established in 2011 as a think-tank to pursue its vision, ‘businesses integrate sustainability into their core business practices’. Given that sustainability is a multi-dimensional problem, especially in the context of India and other emerging economies, CRB has adopted a model of engaging multiple stakeholders to develop action plans for promoting sustainable/responsible business, across various sectors in India. CRB’s activities are organized across four verticals: Action & Policy Research, Training & Capacity Building, Sustainability & CSR Advisory, and Multi-stakeholder Knowledge For a. CRB is committed to creating an ecosystem for uptake on sustainable business practices. Over the years, CRB has pioneered multi-stakeholder engagement on sustainable business-related issues in India, using the framework of voluntary sustainability standards.

ANNEXURES

ANNEXURE 1: APPROACHES TO THE ASPECTS OF CIRCULAR ECONOMY IN THE TEXTILE SECTOR

	Brands	Suppliers
Reduce/Redesign	One of the brands surveyed adhere to “component first” design approach, meaning that the designs are initially based on material choice	have installed an automatic cutting machine to reduce the cutting waste
	Some brands are building circularity into the design process by accounting for longevity, durability and the recycling capabilities of the products.	
	Using the Ellen MacArther Foundation tool which improves how the company communicates with its suppliers and raises awareness of the need for circularity in their products and processes.	
Reuse	Zero liquid discharge is followed in the plants located at Tamil Nadu, Karnataka	zero discharge for water
	Old clothes are collected, repaired, processed and reused	Drawing groundwater 1.5 lakh litres every day out of this 50,000 L is recycled and used in horticulture, washroom etc
		recycled water is reused only in the boilers
Recycle	One of the brands surveyed used the equivalent of over 100 million plastic PET bottles in recycled polyester.	Installation of ETP and STP plants for recycling of the waste
		Installation of multiple RO plant for purification of water and using the treated water for washroom purposes
Regenerate	Water harvesting initiatives undertaken	Water harvesting initiatives have been undertaken recently
Initiatives/Partnerships undertaken to promote circularity	One of the international brands is collaborating with the Cradle to Cradle Products Innovation Institute on an initiative called Fashion+. This initiative brings brands, designers and suppliers together; it seeks to identify, optimise and innovate sustainable materials while making them widely available.	All the surveyed plants have solar panels, and the bills have reduced by about 40% and the factories are all run by LEDs

	<p>One of the surveyed brands has also partnered with Swedish innovation company renew cell, whose unique technology recycles used cotton, viscose and other cellulosic fibres into a new, more sustainable dissolving pulp that can be turned into new textile fibres.</p>	<p>Waste is collected by Bharat Oil, GAPIL quarterly upon payment of registration fees to the collector</p>
	<p>One of the surveyed international brands has joined DEMETO, a new research project focusing on recycling polyester textiles into new fibres without compromising quality.</p>	<p>Adhere to the restricted substances list (RSL) provided by ICA (Indian Chemical Association) and the company is not allowed to use any chemical or other substance which is in the list</p>
	<p>One of the surveyed international brands has collaborated with Danone AQUA on a project called Bottle2Fashion in Indonesia. Through this collaboration, Danone collects and recycles plastic waste which is then sent to respondents' suppliers where it is turned into recycled polyester, made into products and sold in the respondents' stores.</p>	<p>Provide internal training to the teams to keep them updated about the industry best practices and the trends in the industry concerning the RSL etc.</p>
	<p>Initiative has been taken to conduct annual audits on supplier reports using the HIGG's index.</p>	
<p>Other sustainability measure undertaken</p>	<p>Due diligence of water, energy and chemicals Interaction with suppliers on promoting circularity measures Members of sustainability initiatives such as Sustainable Apparel Coalition (SAC)</p>	<p>For water-saving, they have replaced all the taps with push taps, have a special nozzle for a small outflow of water and they have brought down the requirement to about 1.5 from 2 L every day The social and environmental compliances are audited once every year as per the client requirement Run the boiler on PNG which is environmentally friendly and cost-effective</p>