

# Monitor Denim Deal

Results quantitative and qualitative monitoring 2022

June 12, 2023



# Content



## **3** Introduction

- 4 Goals Denim Deal
- 5 Definitions
- 6 Road to goals denim garments and jeans
- 7 Monitoring approach

## **8** Results quantitative monitoring

- 9 Results monitoring 2022 denim garments
- 10 Additional individual goals denim garments
- 11 Results monitoring 2022 jeans
- 12 More PCR-cotton in denim garments
- 13 Share of 20% PCR-cotton in jeans is growing
- 14 Summary per goal

## **15** Results qualitative monitoring

- 16 Challenges of the industrial scale up
- 18 Challenge 1: more demand for recycled fabrics from brands
- 20 Challenge 2: more supply of feedstock for recycling
- 22 Related challenge: design for easier recycling
- 24 Related challenge: knowledge sharing regarding material specification of PCR feedstock and innovation in recycling technology
- 27 Related challenge: more awareness among consumers
- 29 Willingness for international continuation of the Denim Deal

# Introduction

On October 29, 2020, 28 parties signed the Dutch C-233 Green Deal on Circular Denim ('Denim Deal'). Signatories in the value chain, from producers, brands, retailers to collectors, recyclers and public authorities, have jointly developed an approach to take major steps towards using recycled textile in all denim products marketed in the Netherlands. On January 1st, 2023 in total 49 signatories, including 8 brands and retailers, were committed to the Denim Deal.



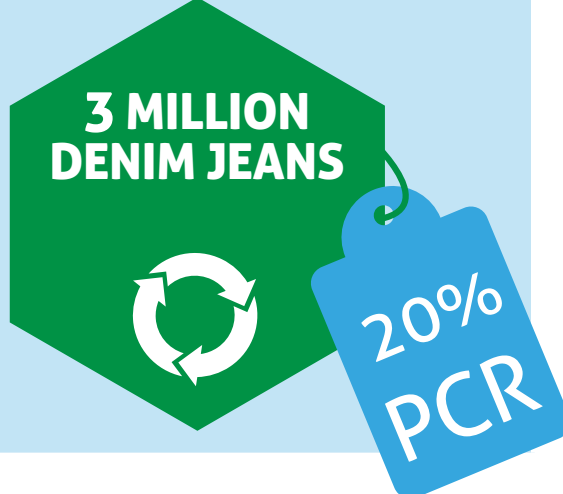
The signatories of the Denim Deal aim to close the denim loop by promoting the use of high-grade post-consumer recycled cotton fibres ('PCR-cotton') in new jeans and other denim garments. They committed themselves to the joint ambition of working as quickly as possible towards a new industry standard of 5% PCR-cotton used in the production of all denim garments and will raise the bar in the future based on the learnings of the Denim Deal. They will monitor annually the activities they have undertaken to this end, the results achieved, and their effect and challenges towards achieving the goals of the Denim Deal.

This annual report gives a general summary of the results and challenges during 2022 based on the outcome of the **quantitative monitoring** of all participating brands and retailers and the **qualitative monitoring** done by 65% response of all signatories of the Denim Deal. In this report they are referred to as 'participants' (of the monitoring).



# Goals Denim Deal

All signatories of the Denim Deal undertake activities to achieve the following specific goals before the end of the Denim Deal in December 2023.

1	Brands and retailers will achieve a minimum of 5% post-consumer recycled cotton (PCR-cotton) in their own denim collections during this period by working together closely with other signatories.	
2	Brands and retailers will achieve their own, individual and higher goals for PCR-cotton in denim garments, and will set out their ambitions and approach in individual roadmaps, based on the close collaboration with other signatories.	
3	Brands and retailers will commit to individual ambitions designed to achieve the specific, joint goal of using 20% PCR-cotton fibres in 3 million pairs of jeans produced by these parties until the end of 2023.	

# Definitions

The monitoring considers the following definitions:

**Denim** is a cotton twill fabric, traditionally made from 100% cotton, but recently alternative fibres are added such as hemp, linen and elastane. The product must contain at least 80% cotton. Denim is traditionally blue by using indigo dye to colour the yarn in one direction. In practice, denim can have different colours and does not necessarily have to be indigo blue.

**Denim garments** are outer clothing made of denim (e.g. pants, dresses, skirts, jackets, shorts, shirts), except accessories (caps, bags, etc.), which for the purposes of the Denim Deal does not include trimming.

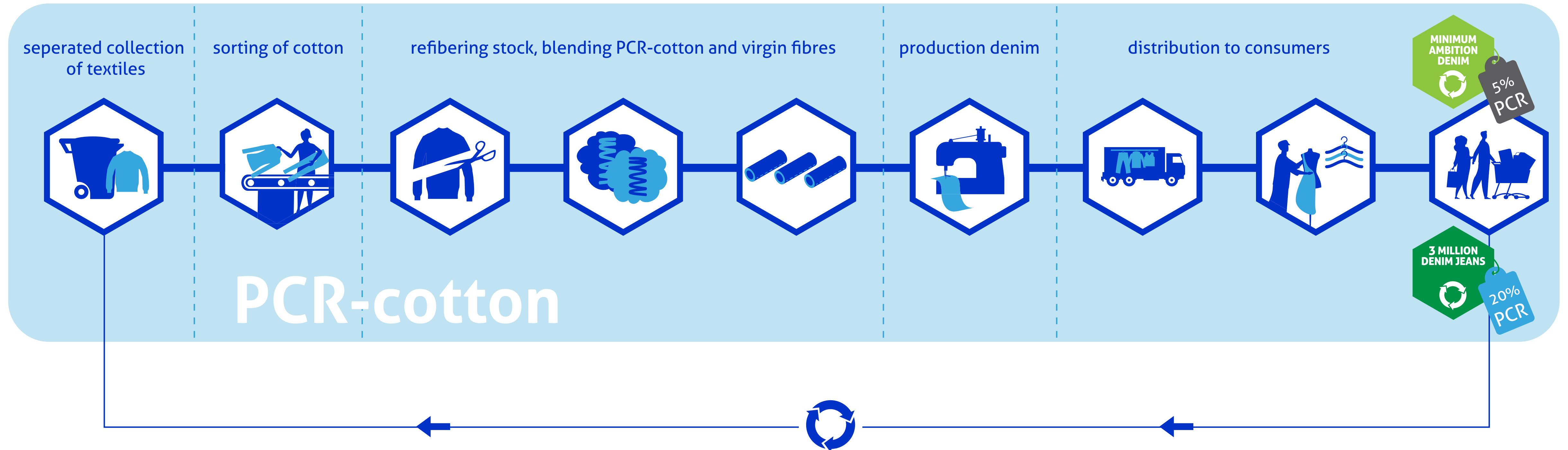
**Jeans** are hard-wearing trousers made of denim.

**Post-consumer recycled cotton (PCR-cotton)** is recycled cotton from textile products that have been used by the end user(s) for an indefinite period of time for the intended purpose and discarded and subsequently recycled, whereby the cotton fibres of at least 98% cotton are reused in new products.

The data is compiled by FFact. Annual monitoring reports are planned each year up to 2024. The information in the report is anonymized and aggregated. The monitor is based on a self-reporting methodology for a given reference date aimed to see possible trends in the reported data. The results presented thus reflect the current state of affairs on the reference date. Any later added changes or differences in the exact number can therefore occur.

# Road to goals denim garments and jeans

The figure below shows the supply chain of post-consumer recycled cotton (PCR-cotton).



# Monitor approach

The quantitative data in this report apply to the input of all 8 participating brands and retailers and not to the total market. In order to collect quantitative data for 2022, the participating brands received a standard monitoring form which needs to be completed.

One of the 8 brands was unable to provide data this year due to circumstances. In this monitor it has been assumed that the 2022 data of this company was equal to 2021.

The aim of the qualitative monitoring is allowing the signatories of the Denim Deal to share experiences, to see which activities and efforts contribute to the Denim Deal, and which challenges they experience while working on achieving the goals.

The qualitative data is collected by questioning all signatories about the progress of efforts including the Metropolitan Region Amsterdam (MRA)/local authorities, brand owners and retailers, Ministry of Infrastructure and Water Management, textile waste collectors, sorters, cutters, cleaners, fiberizers (mechanical treatment or shredding), spinners, weavers, and all other participants like Modint and NEN. The response was approximately 65%. The response is well distributed across the supply chain.

All participants received the standard monitoring form to be completed annually. The form contains questions about their efforts and results to achieve the goals of the Denim Deal in 2022, with a focus on opportunities and challenges. A separate form has been developed for each target group.

This report gives an overview of the answers given by the participants. Initiatives of specific organizations that provide additional insight into the overall progress are mentioned specifically.



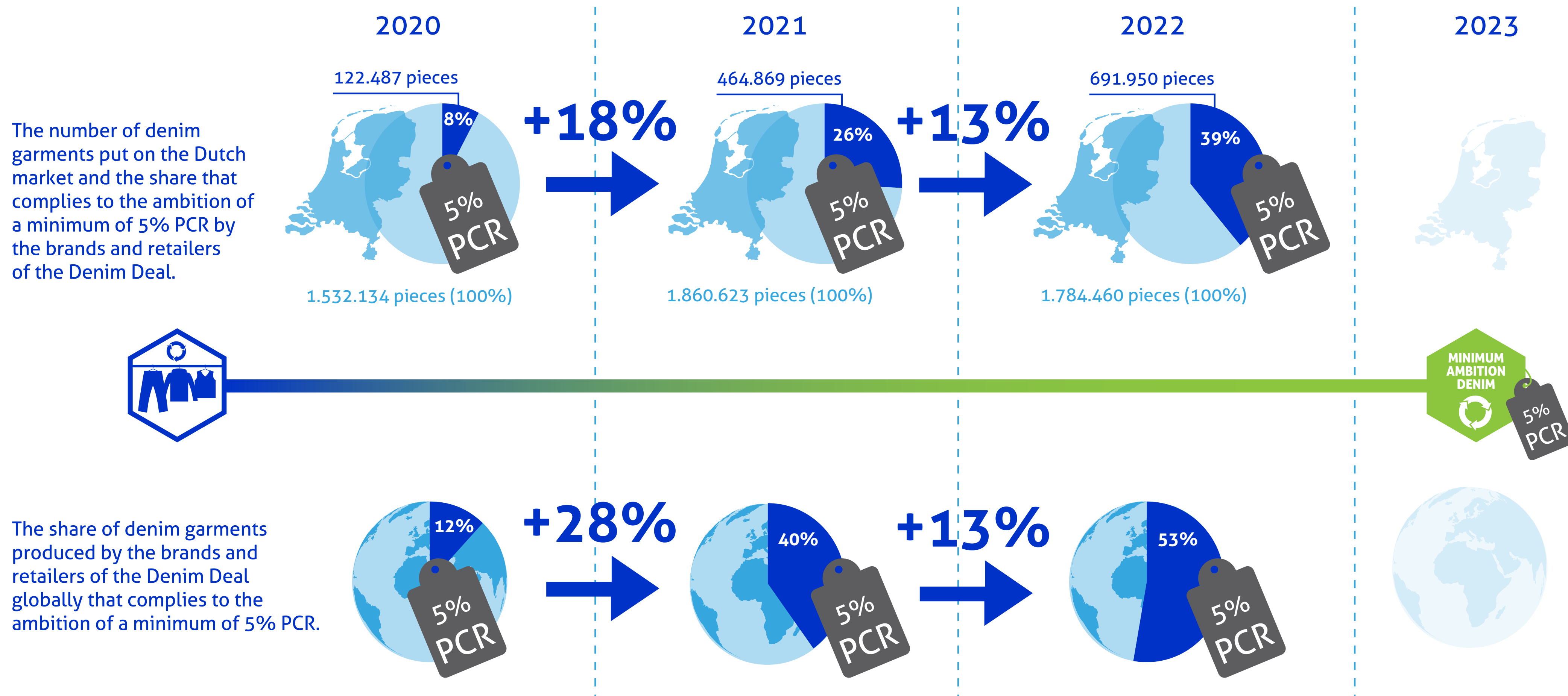


**Results quantitative  
monitoring**



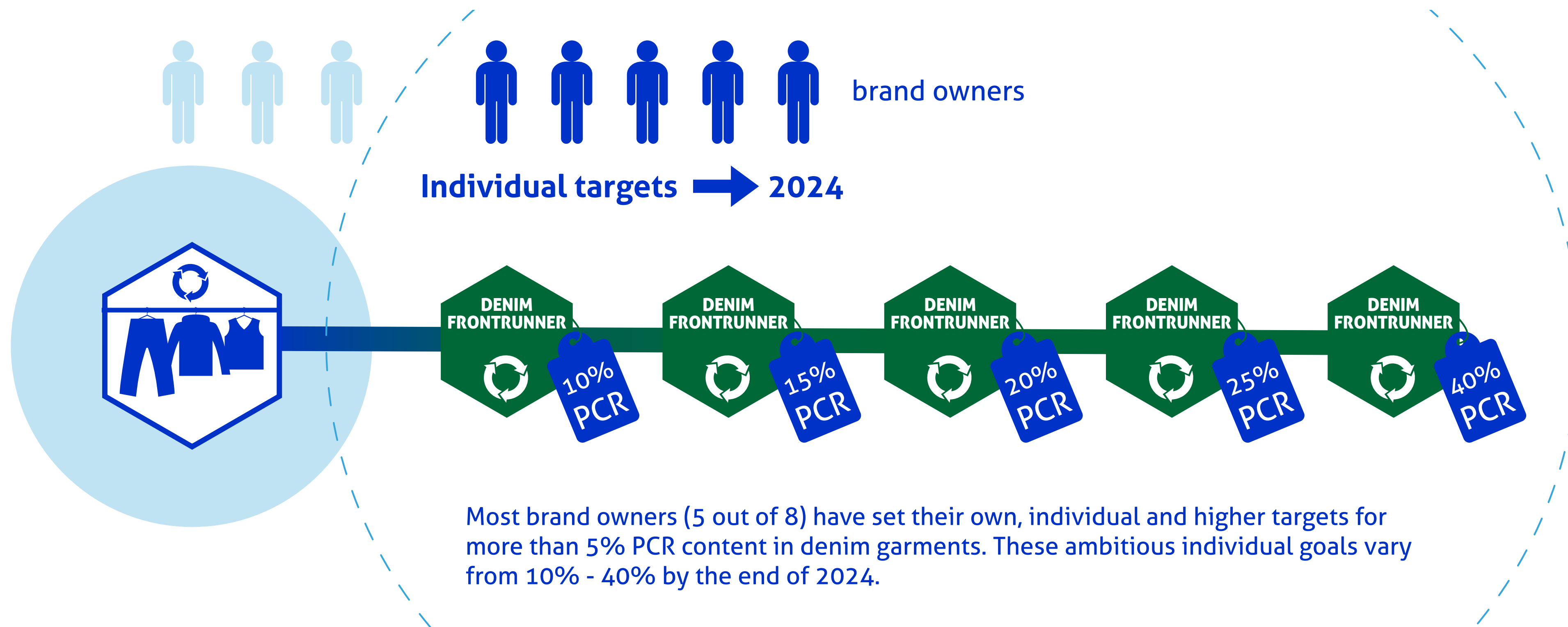
# Results monitoring 2022 denim garments

The numbers below refer to the questions in the 2020, 2021 and 2022 monitoring forms. The figures refer to the share of denim garments including jeans with post-consumer recycled cotton (PCR-cotton). The figures for 2023 will be included in this figure next year.



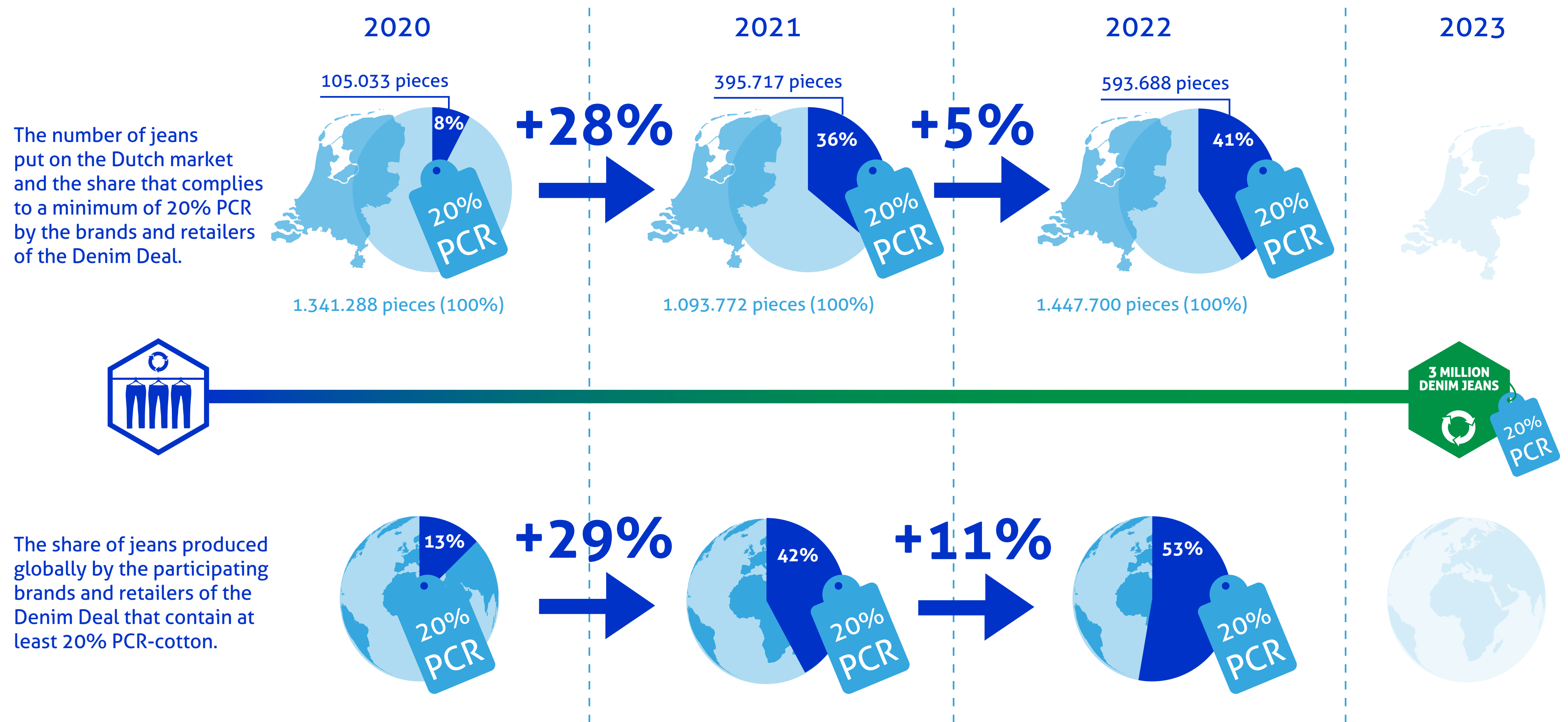
# Additional individual goals denim garments

To look ahead to the coming years, the brands were asked about their individual goals for 2024. Therefore, brands and retailers have reported their own, individual targets for post-consumer recycled cotton (PCR-cotton) in denim garments including jeans. The individual targets given this year are more realistic than in the previous monitoring. Brands (5) indicated that the transition takes time. Most brands have adjusted their targets. Last year targets of 35% to 100% PCR-cotton were indicated. Now, the highest values are 25% and 40%. Most brands indicated that targets like 20% and 25% PCR-cotton are already an ambitious challenge.

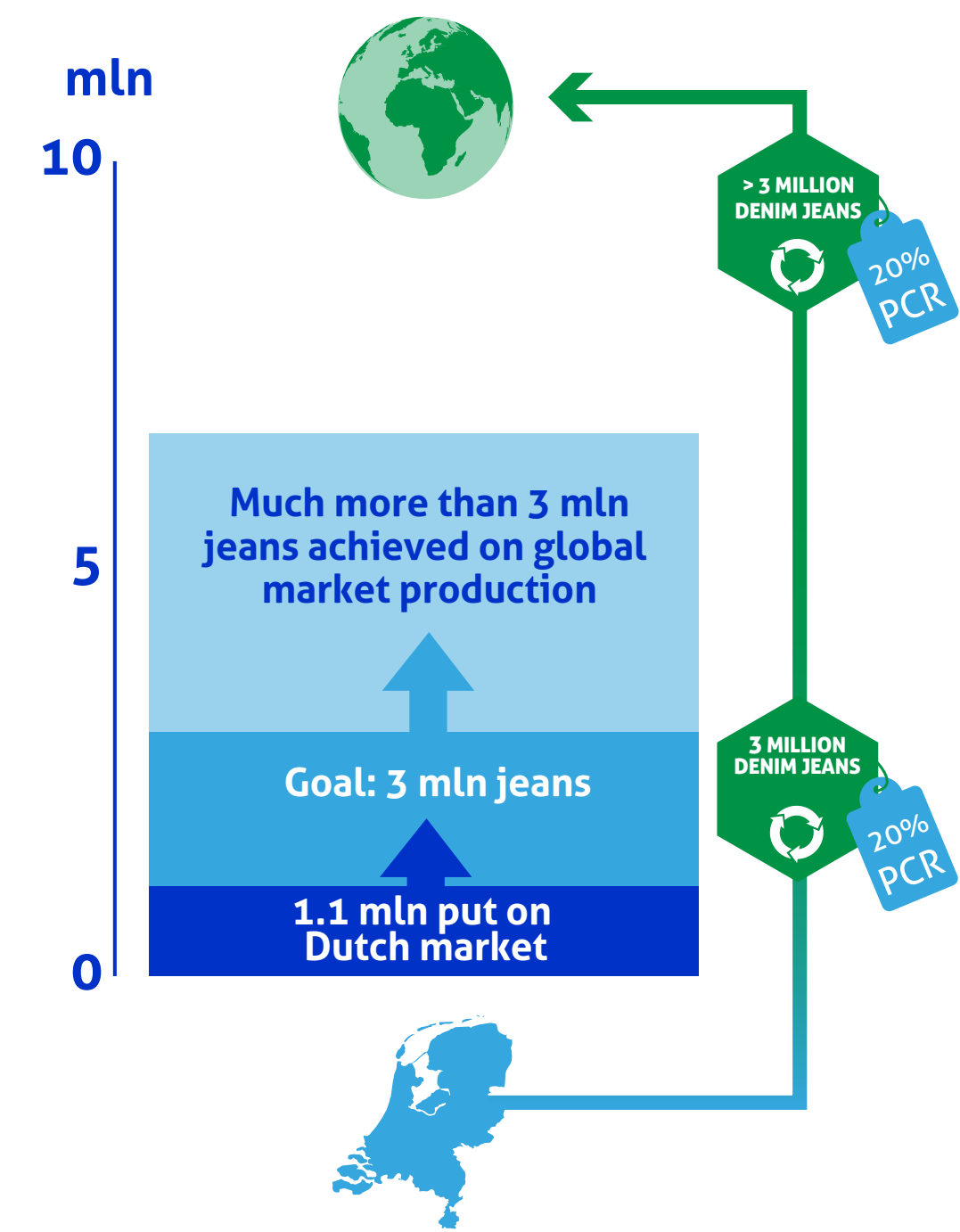


# Results monitoring 2022 jeans

The numbers below refer to the questions in the 2020, 2021 and 2022 monitoring forms. The figures refer to the share of jeans with post-consumer recycled cotton (PCR-cotton). The figures for 2023 will be included in this figure next year.



## Results 2020 + 2021 + 2022



# Still more PCR-cotton in denim garments

In 2023 seven of eight brands and retailers participated in the 2022 quantitative measurement. There is a **clear positive development** in the increase in application of PCR-cotton in denim garments and jeans. In general most participating brands and retailers are aiming for higher targets than the 5%-PCR-content in the coming years.

The results of measurement show for 2022 that 41% of the volume of denim put on the Dutch market by participants contains at least 5% PCR-cotton. In comparison with 2020 (8%), this is a substantial growth. And the volume of denim garments produced by the participants worldwide containing at least 5% PCR-cotton has increased from 42% in 2021 to 53% in 2022.

Most participating brands and retailers **expect to achieve 5% PCR** in their own denim garments in 2023, by working closely with other signatories.

Most brands and retailers (5 of 8) have set their own, **more ambitious goals** for PCR content in denim garments than the aimed new industry standard of 5%. Their individual goals vary up from 10% up to 40% by the end of 2024. However, the individual targets given this year are much lower and more realistic than in the previous monitoring.



# Share of 20% PCR-cotton in jeans is growing




The participating brands and retailers have put in total 1.5 million jeans on the Dutch market in 2022. From the volume put on the Dutch market by participants 593,688 jeans (41%) contained at least 20% PCR-cotton. This is a relatively small part of the amount of jeans put on the Dutch market annually. However, the volume of **jeans put on the Dutch market with 20% PCR increased** from 8% in 2020 to 41% in 2022.

The results of the measurement show for 2022 that 53% of the volume of jeans produced worldwide by participants contains at least 20% PCR-cotton. This is a substantial growth compared to 2020. In 2020 13% of the volume produced by participants contained 20% PCR.

On the global market the number of 3 million 20% PCR jeans was already reached in 2021 and had now more than doubled this amount. However, it will be still a challenge to reach 3 million 20% PCR jeans on the Dutch market only. To achieve such amount during 2021 - 2023 would imply that nearly all jeans of the participating brands should contain 20% PCR-cotton.



# Summary per goal

1	<p>Brands and retailers will achieve a minimum of 5% post-consumer recycled cotton (PCR-cotton) in their own denim collections by working together closely with other signatories.</p> <p><b>In 2022 39% of all denim garments put on the Dutch market of the participating brands and retailers contained at least 5% PCR and 53% of denim garments produced globally contained 5% PCR.</b></p> <p><b>Most expect to achieve 5% PCR in denim garments in 2023.</b></p>	
2	<p>Brands and retailers will achieve their own, individual and higher goals for PCR content in denim garments, and will set out their ambitions and approach in individual roadmaps, based on the close collaboration with other signatories.</p> <p><b>Most (5 of 8) brands and retailers even aim for a higher percentage of PCR in denim garments.</b></p> <p><b>The individual targets given this year are much lower but more realistic than in the previous monitoring.</b></p> <p><b>Brands indicated that the transition takes time.</b></p>	
3	<p>Brands and retailers will commit to individual ambitions designed to achieve the specific, joint goal of using 20% PCR-cotton fibres in 3 million pairs of jeans produced by these parties until the end of 2023.</p> <p><b>On the global market the target of 3 million 20% PCR jeans was already achieved in 2021 and has already surpassed this figure by far. However, it will be a challenge to reach 3 million 20% PCR jeans on the Dutch market only with the brands that signed the Denim Deal.</b></p>	



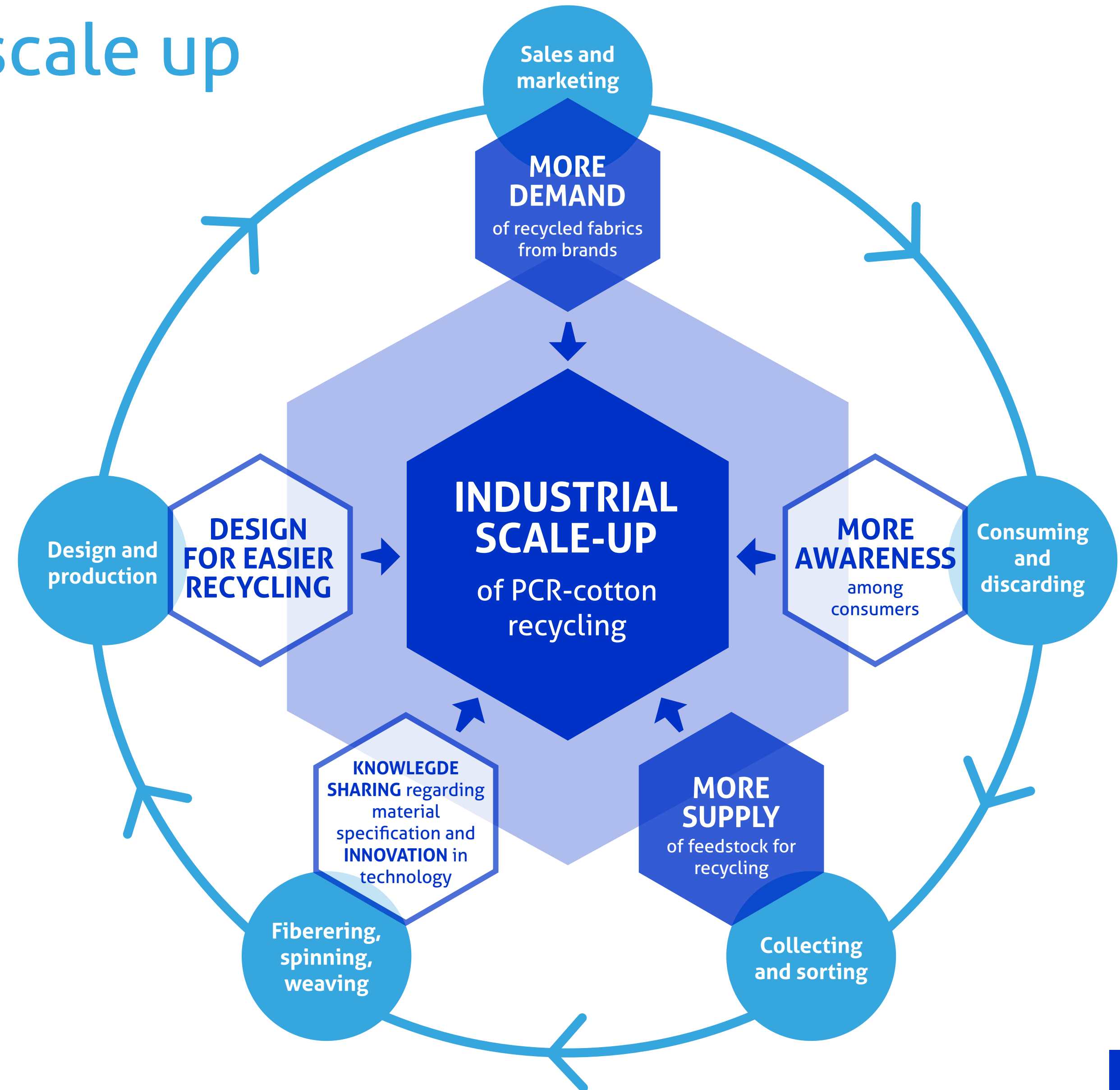
## Results qualitative monitoring

Developments and challenges,  
a qualitative picture  
behind the figures

# Challenges of the industrial scale up

The qualitative monitoring questions the participants on their activities within the Denim Deal, results and challenges to improve the use of post-consumer recycled cotton (PCR-cotton) in new denim garments.

The previous qualitative monitoring (2021) showed that an industrial scale up of post-consumer recycling for new denim garments is necessary. For the year 2022 participants were asked what it takes to create an industrial scale up. The five most important challenges mentioned by the participants are included in the following diagram.





# Challenges of the industrial scale up

We have identified five interdepending challenges regarding the transition towards an industrial scale up of the post-consumer cotton recycling industry. The qualitative monitoring shows two main challenges:

1. More demand for recycled fabrics by brands;
2. More supply of feedstock to recyclers to produce post-consumer recycled-cotton (PCR-cotton).

Besides these two main challenges, participants indicate that there are three other related challenges:

1. Design for easier recycling;
2. Knowledge sharing regarding material specification of PCR feedstock and innovation in recycling technology;
3. More awareness among consumers.

All of the challenges of the industrial scale up are, according to the participants, strongly interdependent. More awareness among consumers will have a pull on demand from brands for PCR-

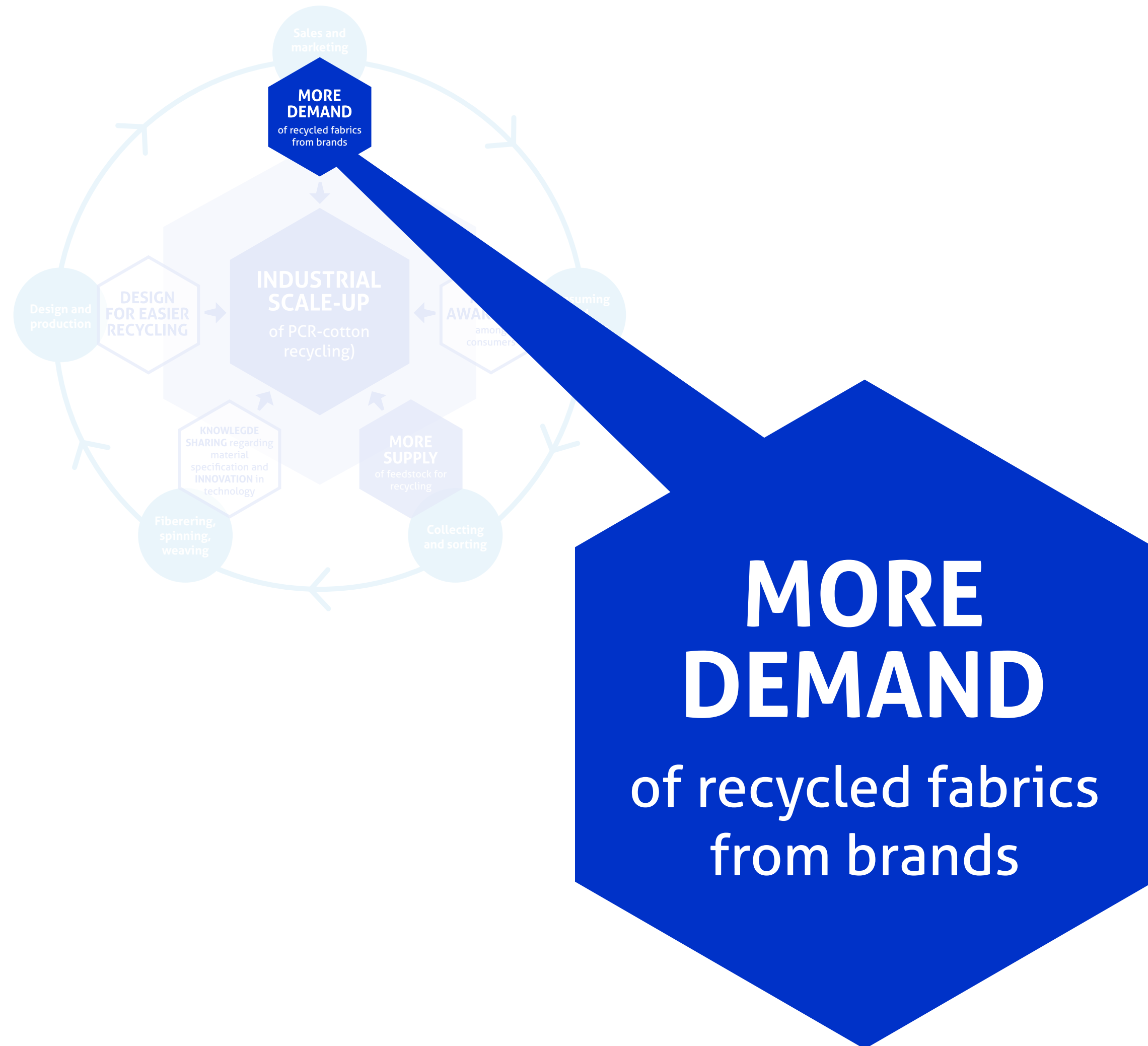
cotton; this will accelerate investments in innovation for recycling technologies and capacity; feedstock from sorting will become more valuable and the business case for sorted material will improve.

These main challenges and their interdependence were also described in the MIS-analysis by the Utrecht University (Hekkert et al, 2021): 'Transition to Circular Textiles in the Netherlands'. It is an innovation systems analysis of textile recycling and refers to the above mentioned challenges as a 'waiting game' or 'chicken-and-egg' problem. This implies that the industry is reluctant to design clothes with recycled fibers and that the industry will produce garments with recycled cotton on scale only if volume, quality and price are favourable. At the same time not enough PCR feedstock is available. The qualitative monitoring indicates a similar situation.

The hypothesis is that a breakthrough is possible by:

- 1) creating more demand for recycled fabrics and 2) creating more supply of PCR-cotton feedstock.

# Challenge 1: More demand for recycled fabrics by brands



Most participants indicate that there is a need for more demand for recycled fabrics from brands. Right now textiles made of raw (virgin) materials are still dominating the market. And in the case of using recycled materials, brands currently focus on pre-consumer recycled materials (also mentioned post-industrial) instead of post-consumer recycled materials. The monitoring shows that the Denim Deal activated the industry and that large brands that do not participate in the Denim Deal also buy fabrics with recycled content from fabric suppliers participating in the Denim Deal.

The brands are able to increase the demand for PCR-textiles by increasing marketing efforts regarding fashion with recycled content. As a result brands will give fabrics with PCR-cotton a more positive image. While doing so, according to some participants, the brands could be more transparent about the origin and composition of their products. However, completely accurate traceability of the origins of the materials is not guaranteed yet. To achieve this, more transparency between supply chain partners regarding fabric quality data and fabric origins (chain of custody) is needed.

# Challenge 1: More demand of recycled fabrics by brands

However, some other participants have a different opinion. They think that brands may choose to apply PCR-cotton in textiles as a regular feedstock without specific separate communication about the origin and composition to consumers.

To increase the quality of PCR-cotton, brands should aim to buy recycled fabrics from mills with the same quality as raw material. However, according to the participants the current quality of PCR-cotton is far from competing with raw virgin cotton and still has a long way to go. The current lack of availability of textiles with high quality PCR-cotton to produce fabrics for consumers requires more innovation in the recycling of PCR-cotton.

Another challenge mentioned is that brands need to develop credible labels regarding PCR-cotton, to ensure that the quality of PCR-cotton is being held to a certain standard and to prevent greenwashing. Some participants of the monitoring indicate that it will help if brands accept the additional costs of recycled cotton.



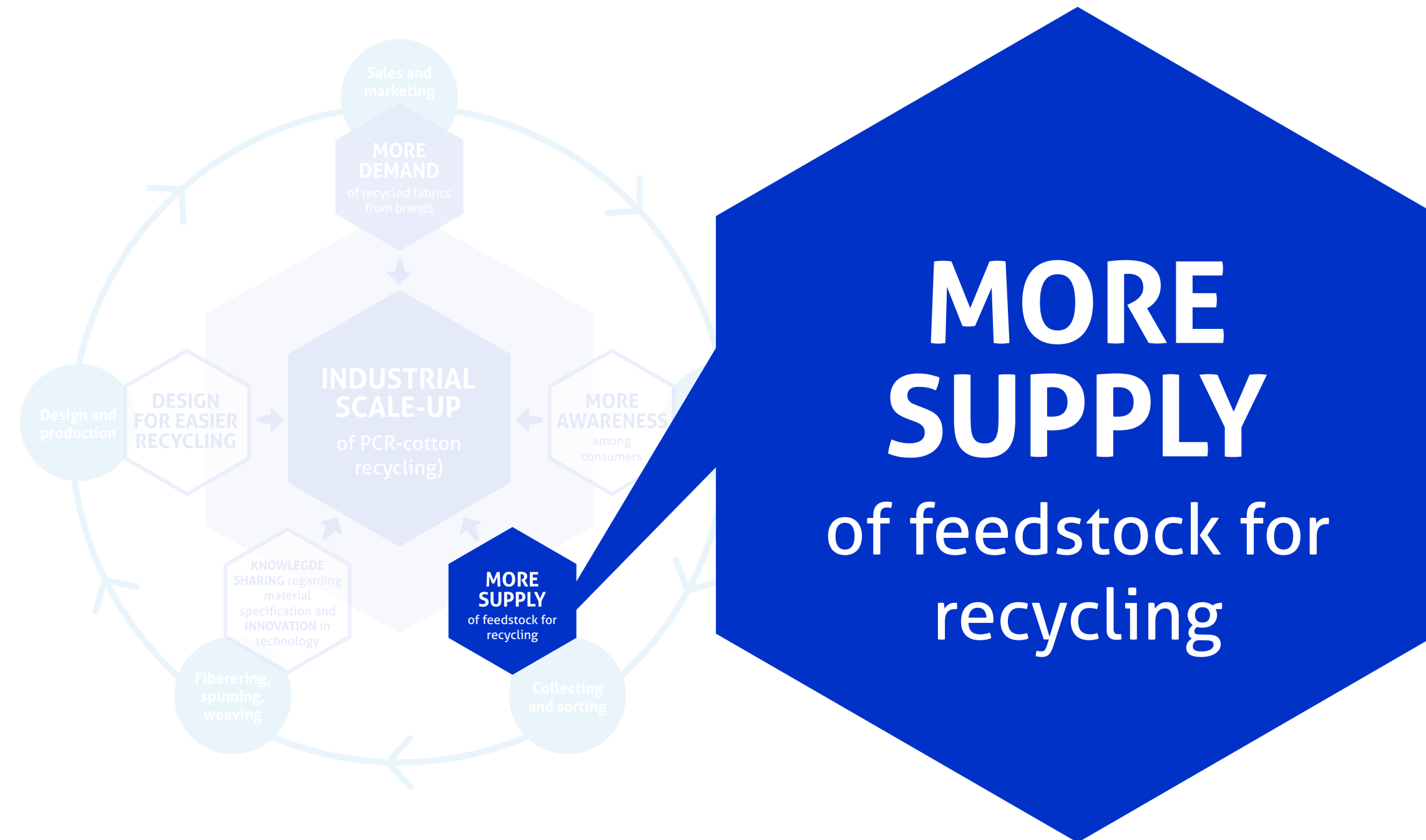
# Challenge 2: More supply of feedstock for recycling

More supply of feedstock for recycling is required. According to participants, this is related to current collecting and sorting systems, the market and export barriers.

## Collection

Participants indicated that the current collecting system in the Netherlands can be improved by creating more awareness with

municipalities about dry and clean textiles collecting. Especially collecting through above-ground-containers in combination with a manual unloading system is preferable, so the discarded textiles can be reused and recycled. If municipalities collect in underground waste containers these should stay dry by appropriate maintenance of the bins. Another important issue is the prevention of dumping residual waste in textile bins, especially in Dutch municipalities where citizens need to pay for discarding their residual waste.



## Sorting for 100% post consumer cotton

According to the participants the sorting for recycling should be stimulated, especially sorting for 100% post consumer cotton. Therefore, more innovation in automated sorting is necessary. In order to keep the sorting process affordable it is important to increase the speed and accuracy of mechanical sorting by the development with scan possibilities. Another related issue is that some participants indicated that fiberizers pay too little for sorted material and should pay the cost prize of sorting according.

# Challenge 2: More supply of feedstock for recycling

## Market place

The sales of feedstock by sorters are based on sales relations between individual sorters and recyclers. There is no mature marketplace. This causes an unstructured system without a stable supply chain. Improvements of the sales of feedstock can be made by implementing material specifications and a proper guideline for sorting.

## Trade barriers

Also trade barriers for exporting sorted textile waste across borders to production countries outside of the EU are an issue. These cause high costs for import and high freight charges. The Dutch Ministry of Infrastructure and Water management is exploring solutions for these trade barriers (primarily focusing on Turkey).

Some participants mentioned that current European policy does not make a choice regarding where European discarded textiles should ultimately be recycled. This means that the barriers to the export of textiles for recycling may not be resolved. Brands and producers of recycled fabrics want import barriers to be removed so that the global market for textile recycling in Turkey, Pakistan, India, China and Egypt receives sufficient feedstock, also from Europe.



# Related challenge: Design for easier recycling



In order to stimulate the use of PCR-cotton in fabrics and generate more supply for recycling, design is often mentioned by participants. Participants mentioned challenges on both sides: 1) understanding using PCR-cotton and 2) making designs more suitable for recycling.

## Understanding using PCR-cotton

According to participants, there is still a lack of understanding among designers about using PCR-cotton. Designers need to know more about how to design new clothing that contains PCR-cotton. Therefore, more cooperation and knowledge sharing regarding design and quality requirements between manufacturers of textiles and brands is required. In this field, the following things are especially mentioned: the diversity of terms, names and abbreviations for PCR-cotton; limited data on fabric quality and limited availability of testing reports on PCR-cotton; no data available for fabric performance and knowledge building in design process.

# Related challenge: Design for easier recycling

The monitoring shows that there are challenges in designing fabrics with PCR-cotton, especially with the look and feel of the product, as well as requirements for certain styles. To implement and phase out styles without PCR-cotton takes a considerable period of time.

## Making designs more suitable for recycling

Another issue is that there is still a lack of understanding among designers about the way they can make their designs more suitable for recycling. This means that designers must be made aware that their choices regarding the design have consequences for how easily garments can be recycled after they have been discarded.

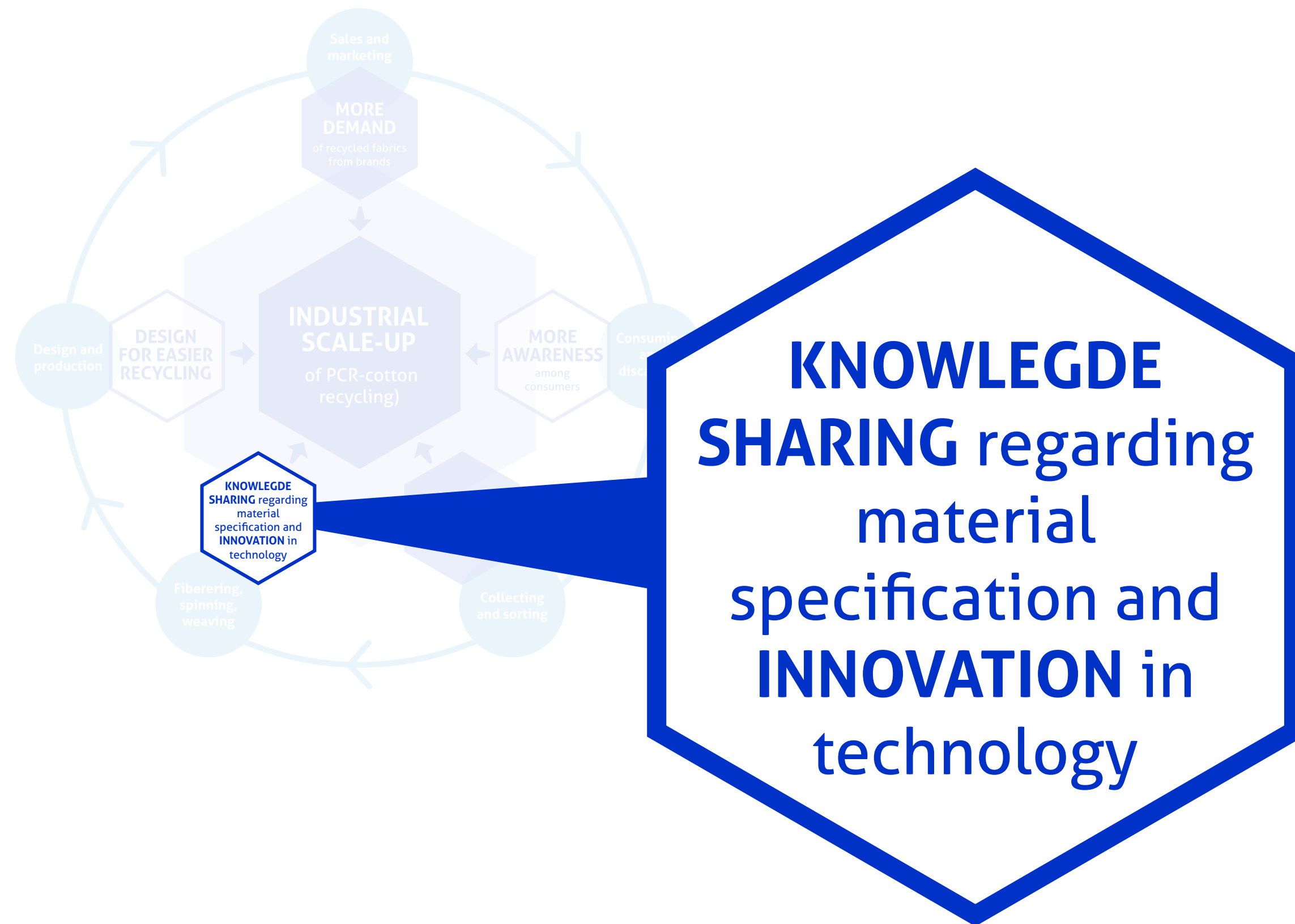
The participants expressed the following remarks on requirements to make a design more suitable for recycling:

- The PCR feedstock should consist of less mixed materials and more mono materials.
- Polyester should be avoided in fibres, as it is too difficult to recycle with the current mechanical recycling systems. For this material we need innovations in chemical recycling.
- Garments that will be recycled should contain less buttons, zippers and seams.



# Related challenge:

## Knowledge sharing regarding material specification of PCR feedstock and innovation in recycling technology



According to the fiberizers, spinners and weavers producing textiles with post-consumer cotton (PCR-cotton) is still in the early stages of development. At this time recycled materials are a mix of mostly pre-consumer material and post-consumer material (varying from a minimum of 2% to a maximum of 20% of post-consumer material). Pre-consumer is regularly incorporated in the production of recycled fabric whereas post-consumer is linked with the specific customer order requirement.

The objectives of the Denim Deal focus on the increase of the use of post-consumer recycled cotton. In 2021 - 2022 brands and manufacturers carried out more pilots with fabrics containing PCR-cotton to build up more experience with post-consumer material. Efforts of switching current denim qualities to PCR-cotton versions have been a massive undertaking.



# Related challenge:

## Knowledge sharing regarding material specification of PCR feedstock and innovation in recycling technology

Currently, there is a lack of high quality and payable feedstock being delivered by the sorters to recyclers (fiberizers, spinners and weavers), which makes the recycling process a lot harder. The question is how the quality and volume of feedstock of mono material of discarded textiles can be improved. According to participants, sorters cannot solve the problem alone. Innovations of the dyeing and spinning processes are also an important step. And if polyester was used in a blend, recycling of that material will be more difficult than using mono materials. Participants indicate that it is important to include this aspect in the design.

Despite that, according to some participants, textile fiber companies are already working with upstream industrial textile waste collection and sorting companies for many years, there is still a need for more cooperation to improve the recycling process. Especially, more knowledge sharing is necessary between sorters and fiberizers, spinners and recyclers about material specification of feedstock for



# Related challenge:

## Knowledge sharing regarding material specification of PCR feedstock and innovation in recycling technology

recycling. Participants indicated that developing guidelines for sorters could help in the knowledge sharing process. To improve the recycling process, it is mentioned that it is important to share material-related data and not so much any confidential process-related data.

The first set of guidelines for the sorters are expected to be delivered by the end of this year (2023), in which sorters get clear material specifications to the criteria set by the recyclers.

Further innovations and investments in recycling technology will also help to improve the application of PCR-material in fabrics.

The previous monitoring (2021) concludes that there is a need for a higher quality of PCR-cotton in denim. Brands and recyclers mentioned that five quality requirements are important:

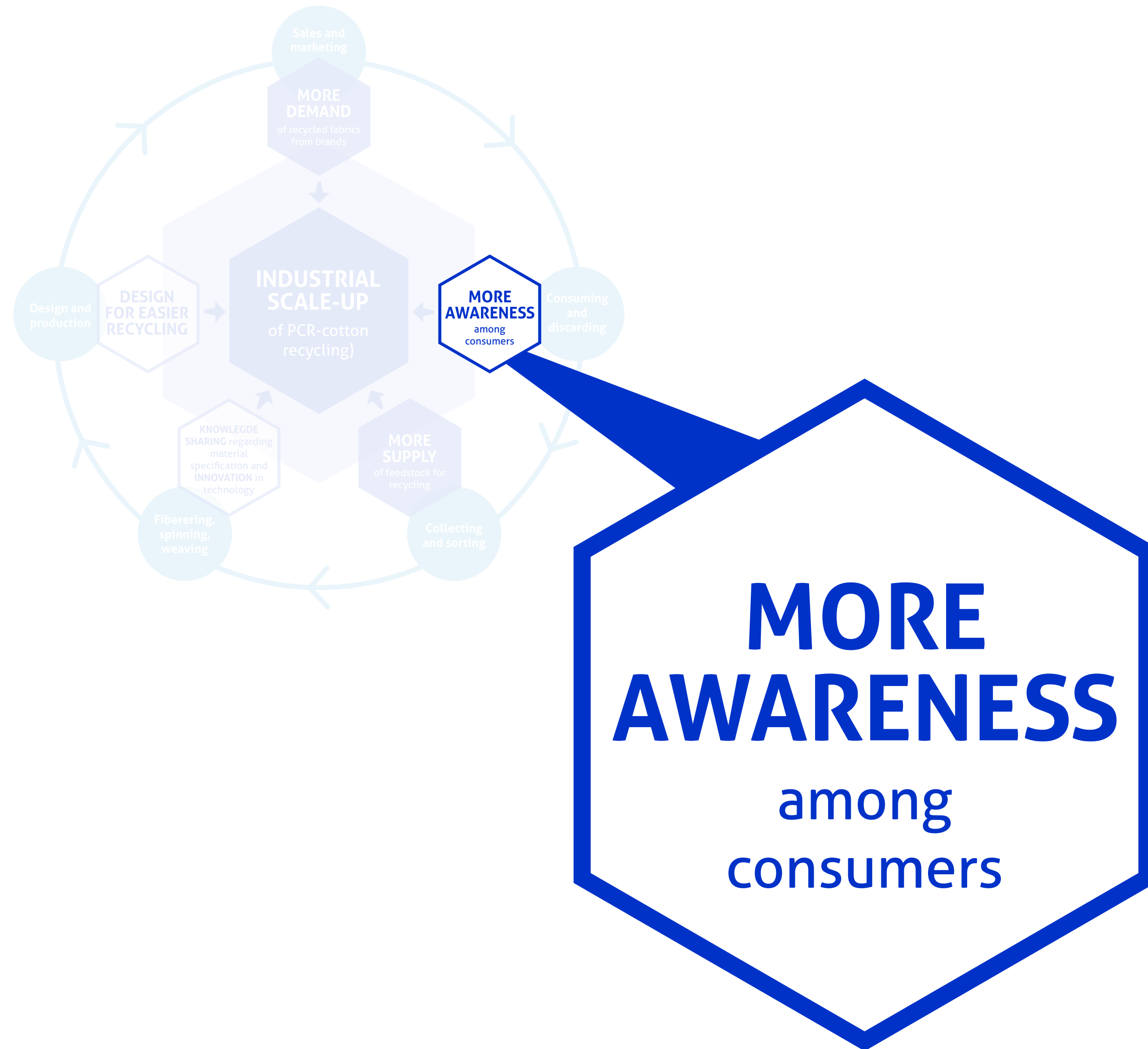
- Quality/long stable fiber length (needed for spinning quality yarn)
- Appearance/aesthetic of the garment

- Texture of the fabric (feel and touch)
- User quality
- Longevity garment

Ideally, we should be able to make textiles with the same quality as textiles made of raw virgin materials. Innovations should focus on improving manufacturing processes because a higher recycled content than 20% PCR-cotton currently generate a weaker strength and then it is more difficult to run in denim processing as dyeing, weaving and finishing.

Another challenge is to achieve a higher quality by removing all synthetic fibers. During the weaving of the denim it is sometimes not yet visible, but when the cloth is dyed or treated, these irregularities become visible. However, by then the canvas is almost ready.

# Related challenge: More awareness among customers



The increase of marketing of fashion with recycled content from the brands will help to increase customer awareness; brands should promote sustainable clothing with recycled post-consumer textiles as a fashion trend. Consumers should become more aware of the environmental benefit of PCR-cotton and increase the demand for brands with PCR. Culture spreading regarding wearing recycled fabrics is important, so consumers will become more aware of the benefits of recycling and the equality to virgin fabrics.

Brands currently give priority to high quality fabrics with PCR-cotton comparable to the quality of virgin cotton fabrics. However, other stakeholders suggest that communications about the environmental benefits of PCR-cotton should get priority. According to participants, the marketing efforts of brands should focus on increasing willingness to buy sustainable fabrics.

# Related challenge: More awareness among customers

Furthermore, consumers should get access to credible information about the origin of PCR in labels, so they can verify the reliability of recycled fabrics. The Ecodesign for Sustainable Products Regulation (ESPR) is an EU initiative to make sustainable products the norm in the EU. Part of the proposal is to develop a passport for products, including for textiles, which will increase traceability for parties in the supply chain and will enable that consumers could get insight into environmental effects. This also makes it more difficult to come up with sustainability claims without substantiating them.

With the increase of awareness among consumers they should also learn to properly drop discarded textiles in textile bins<sup>1</sup>. If consumers dispose of their textile waste properly, the supply of feedstock for recycling will increase and the recycling process will become considerably easier.

1) Consumers discard about 55% (FFact 2018) of their old textile products in ordinary residual waste.



# Willingness for international follow-up of the Denim Deal

The Denim Deal has connected stakeholders in the supply chain and has exposed the difficulties in the use of post-consumer recycled cotton (PCR-cotton) in new denim across the complete value chain (from production to recycling and back again). According to participants, the Denim Deal is an important platform to share knowledge and gain latest developments in circular denim and increase culture and information about the benefits of recycling. The monitoring shows that collaboration between all participants is required to unlock the current waiting game between the parties in the supply chain.

The Dutch Denim Deal has made an important step to demonstrate that it is possible to work with PCR-cotton. In order to make a true impact this initiative needs to expand and create change across multiple regions and at a global scale.

Above mentioned reasons are given by almost all participants and indicate that the Denim Deal should be continued. However, the Denim Deal is a Dutch initiative and there is a need for further international follow-up of the Denim Deal to encourage a worldwide change of thinking. It is important to generate more demand for recycled PCR fabrics and more supply of feedstock. In addition, this will support more investments in new sorting and recycling technologies.

Brands and producers of recycled fabrics want import barriers to be removed so that the global market for recycling in countries like Turkey, Pakistan, India, China and Egypt receive sufficient feedstock from Europe. However, the current European policy does not strictly define where European discarded textiles ultimately should be recycled: in Europe or in the production countries.

The monitoring shows it is important that more brands participate in any follow-up of the Denim Deal, especially the demand for PCR-cotton should come from the brands. Furthermore it is mentioned that in the future, other easy-to-recycle product groups besides denim should be added, such as bath and bed linen. If participants choose for any follow-up of the Denim Deal, it can be investigated in consultation with the Steering Committee of the Denim Deal and Stichting UPV Textiel (Dutch EPR-organisation) whether from 2025 the Denim Deal coalition can introduce innovation projects - to be further defined - in the EPR systems in the Netherlands and France, as first adopters of an EPR strategy for textiles. Cooperation can also be sought with initiatives such as the Ellen MacArthur foundation Jeans Redesign initiative and frontrunners such as HNST jeans in Antwerp.

# Together we make sustainability visible

Photographs in this report are  
courtesy of Mudjeans, PVH,  
Kings of Indigo, Agi Denim,  
Garcia and Wolkat.

[www.ffact.nl](http://www.ffact.nl)  
[info@ffact.nl](mailto:info@ffact.nl)

+31 15 257 6384  
+31 6 5383 2456

FFact Mcs B.V.  
Het Slot 9  
2622 KH Delft

KvK Haaglanden:  
18052228

Rijkswaterstaat commissioned this report on behalf of  
the Ministry of Infrastructure and Water Management.

**FFact**

**Steering Committee  
Denim Deal**