AUSTRALIAN FASHION COUNCIL

NATIONAL CLOTHING PRODUCT STEWARDSHIP SCHEME

MILESTONE 1.4 | CLOTHING DATA REPORT

Version 1 - 11/05/2022

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The National Product Stewardship Scheme is led by the Australian Fashion Council in consortium with Charitable Recycling Australia, Queensland University of Technology, Sustainable Resource Use and WRAP. This project received grant funding from the Australian Government.

We acknowledge Aboriginal and Torres Strait Islander peoples as the First Australians and Traditional Custodians of the lands where we live, learn and work.

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EXECUTIVE SUMMARY

In the development of a National Product Stewardship Scheme for Clothing, there is a need to develop a good understanding of the sector, its size and profile. This needs to cover all parts of the value chain and lifespan of our clothing.
Key data is important for each of these reasons:

- to understand the structure of the sector to ensure the scheme elements are efficient and fair to all,
- to provide a comprehensive understanding of the flow of clothing in order to frame the scheme actions for maximised effectiveness.
- to act as an important baseline by which we can measure changes and successes.

The following is a summary of key data on clothing production, sales, use and end of use outcomes. This report provides the background for this data as the Product Stewardship Scheme for Clothing is being developed. Some of this data is very precise, while other elements are well-based estimates or draw on global data sources from like countries. All data will fluctuate year on year and to avoid the impacts of the COVID pandemic, we have utilised 2018-19 data where possible in this report.

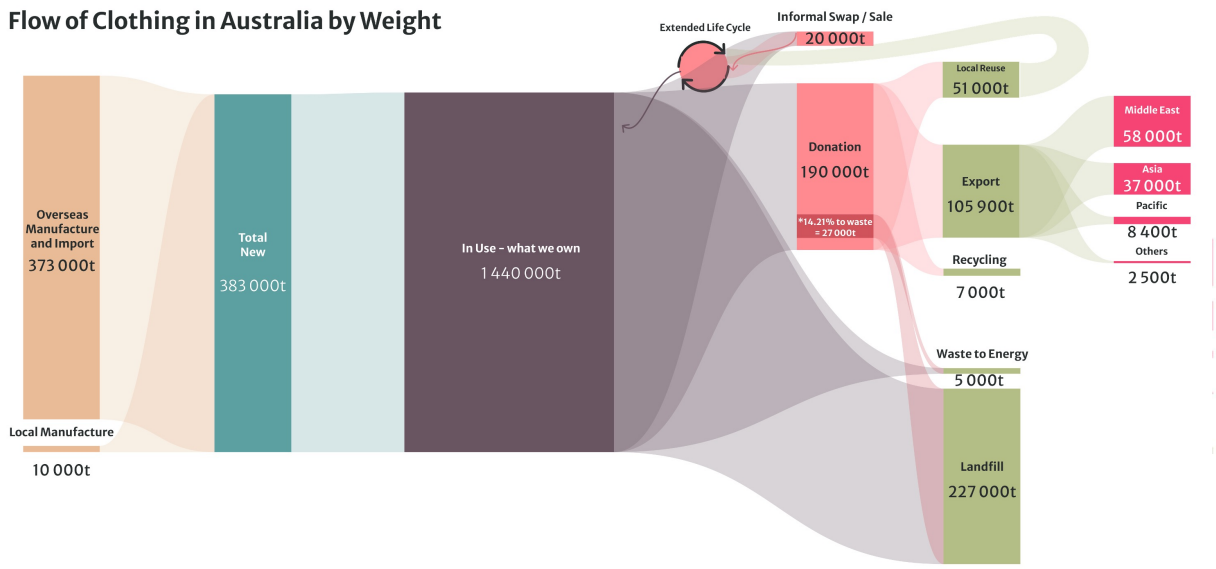
KEY DATA FINDINGS
Annual import of new clothing (2018-19) 1,420,000,000 units $9,200,000,000 value FOB 373,000 tonnes 3800 items/tonne or 260 grams/item Annual local production of clothing (2018-19) <38,000,000 units <10,000 tonnes Annual total consumption of new clothing (2018-19) 383,000 tonnes 56 items per person 14.8 kg per person. Total clothing fibre use: Polyester (PET) 52% Other synthetics 10% Cotton 24% Manmade cellulosic fibre 6.5% [not natural] Other natural fibre (plant, animal) 7%

Recycled content in clothing
Recycled clothing fibre<2%
Total recycled fibre -all sources <10%

Total clothing in use
5,325,000.000 units
1,440,000 tonnes

70% have been worn in the past year
Annual clothing donations and other reuse:
2676 charitable reuse outlets
210,000 tonnes
796 million units of clothing

FIGURE A: THE FLOW OF CLOTHING IN AUSTRALIA BY WEIGHT THROUGH SALES, USE AND END OF USE.



1. GLOBAL CONSENSUS FOR ACTION

Globally, the USD 1.3 trillion clothing industry employs more than 300 million people along the value chain.[1] Clothing represents more than 60% of the total textiles used and is expected to remain the largest application.[2] In the last 15 years, clothing production has approximately doubled at a global level.[3]

According to the Ellen Macarthur Foundation, more than USD 500 billion of value is lost every year due to clothing underutilisation and the lack of recycling.[4] 'Furthermore, this take-make dispose model has numerous negative environmental and societal impacts. For instance, total greenhouse gas emissions from textiles production, at 1.2 billion tonnes annually, are more than those of all international flights and maritime shipping combined'.[5]

The economic value of these negative externalities is difficult to quantify, although the Pulse of the Fashion Industry report estimated that the overall benefit to the world economy could be about EUR 160 billion (USD 192 billion) in 2030 if the fashion industry were to address the environment impacts of the sector.[6]

Worldwide, clothing utilisation – the average number of times a garment is worn before it ceases to be used – has decreased by 36% compared to 15 years ago. While many low-income countries have a relatively high rate of clothing utilisation, elsewhere rates are much lower. In the US, for example, clothes are only worn for around a quarter of the global average. The same pattern is emerging in China, where clothing utilisation has decreased by 70% over the last 15 years.[7]

Globally, customers miss out on USD 460 billion of value each year by throwing away clothes that they could continue to wear, and some garments are estimated to be discarded after just seven to ten wears.[8] Clothing users are acknowledging this as a problem, with, for example, 60% of German and Chinese citizens admitting to owning more clothes than they need.[9]
Less than 1% of material used to produce clothing is recycled into new clothing, representing a loss of more than USD 100 billion worth of materials each year.[10]

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[1] Ellen MacArthur Foundation. (2017). *A new textiles economy: redesigning fashion's future*. https://ellenmacarthurfoundation.org/a-new-textiles-economy
[2] Ibid.
[3] Ibid.
[4] Ibid.
[5] Ibid.
[6] Global Fashion Agenda. (2017). *Pulse of the Fashion Industry*. https://www.globalfashionagenda.com/publications-and-policy/pulse-of-the-industry/
[7] Ellen MacArthur Foundation. (2017). *A new textiles economy: redesigning fashion's future*. https://ellenmacarthurfoundation.org/a-new-textiles-economy
[8] Ibid.
[9] Greenpeace Germany. (2017). *After the Binge, the Hangover: International Fashion Consumption Survey*. G. Germany. https://www.greenpeace.org/static/planet4-international-stateless/2017/05/2da03645-after-the-binge-the-hangover.pdf;
[10] Ellen MacArthur Foundation. (2017). *A new textiles economy: redesigning fashion's future*. https://ellenmacarthurfoundation.org/a-new-textiles-economy

The textiles industry relies mostly on non-renewable resources – 98 million tonnes in total per year – including oil to produce synthetic fibres, fertilisers to grow cotton, and chemicals to produce, dye, and finish fibres and textiles. Textile production (including cotton farming) also uses around 93 billion cubic metres of water annually.[11]

Across the industry, globally only 13% of the total material input is in some way recycled after clothing use. Most of this recycling consists of cascading to other industries and use in lower-value applications, for example, insulation material, wiping cloths, and mattress stuffing – all of which are currently difficult to recapture and therefore likely constitute the final use.[12]

Demand for new clothing is continuing to grow quickly, driven particularly by emerging markets, such as Asia and Africa. Should growth continue as expected, total clothing sales would reach 160 million tonnes in 2050 – more than three times today's amount.[13]

The global demand for man-made fibre is expected to grow at a rate of 3.66 %. The demand for cellulosic fibre is expected to grow more slowly than for synthetic fibres. If the industry continues its current path, it is estimated that by 2050, it could use more than 26% of the carbon budget associated with a 2°C pathway.[14] The COVID-19 pandemic erased billions of industry revenue worldwide in 2020 and 2021. The apparel and footwear industry has been among the worst hit by the COVID-19 pandemic. Global retail value sales declined by 19% in 2020, with a return to the pre-COVID-19 level of sales not expected until post-2025. The continued restrictions, and growing fears of contagion in retail spaces and shopping malls among consumers, are creating further challenges for retailers around the globe. A shift to more online shopping is apparent.[15]

[11] Ibid.
[12] Ibid.
[13] Ibid.
[14] Ibid.
[15] Euromonitor International. (2021). *World market for Apparel and Footwear July 2021.* https://www.euromonitor.com/world-market-for-apparel-and-footwear/report

2. DEVELOPING A NATIONAL PRODUCT STEWARDSHIP SCHEME

The Australian Fashion Council (AFC) will lead a consortium of industry disruptors, brands, manufacturers, retailers, reuse charities, fibre producers, academics and waste management companies to create Australia's first National Product Stewardship Scheme for clothing textiles.

This world class initiative aims to improve the design, recovery, reuse and recycling of textiles, providing a roadmap to 2030 for clothing circularity in Australia in line with National Waste Policy Action Plan targets.

A $1 million grant was awarded through the National Product Stewardship Fund, which was launched following the first ever Industry Roundtable on Clothing Textile Waste hosted at Parliament in May 2021.

In consortium with Charitable Recycling Australia, Queensland University of Technology, Sustainable Resource Use and WRAP, the AFC will identify, educate, empower and activate all stakeholders to better manage and improve environmental and human impacts of their product and materials.

The outcome-oriented and measurable action plan towards a circular system will address four action points on the Minister's Priority List 21-22, requiring coordinated action from industry and community.

3. THE NEED FOR QUALITY DATA AND MATERIAL FLOWS

In the development of a National Product Stewardship Scheme for Clothing, there is a need to develop a good understanding of the sector, its size and profile. This needs to cover all parts of the value chain and lifespan of our clothing. The key question in gathering data is why do we need this information for scheme design or implementation?

As has been the case with all previously addressed products with stewardship schemes, we need to understand the structure of the sector to ensure the scheme elements are efficient and fair to all, large and small, covering all parts of the value chain, including consumers.

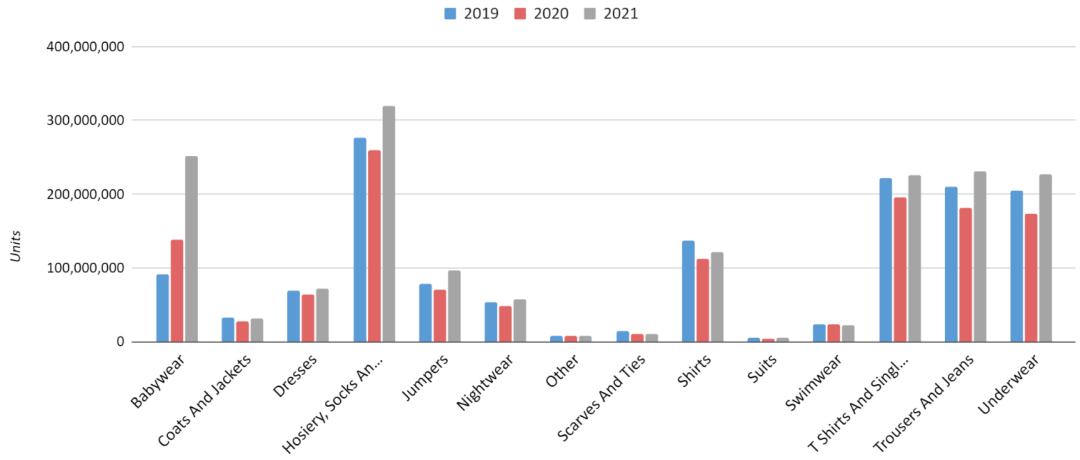
Further, we need a comprehensive understanding of the flow of clothing in order to frame the scheme for maximised effectiveness. And finally, our data acts as an important baseline by which we can measure changes and successes.

4. IMPORT OF CLOTHING

Clothing imported into Australia forms the overwhelming majority of what we buy and wear. This has not always been the case. Local clothing manufacture was once extensive, but most high-volume production has moved offshore to lower wage jurisdictions.

The quantity in units, weight and value of clothing imports varies each year. The last two pandemic affected years have been particularly unusual, so in this section we present data from 2018-19 as the latest year not Covid affected.

Figure 1 Clothing import by category and number of units 2018-19, 2019-20 and 2020-21

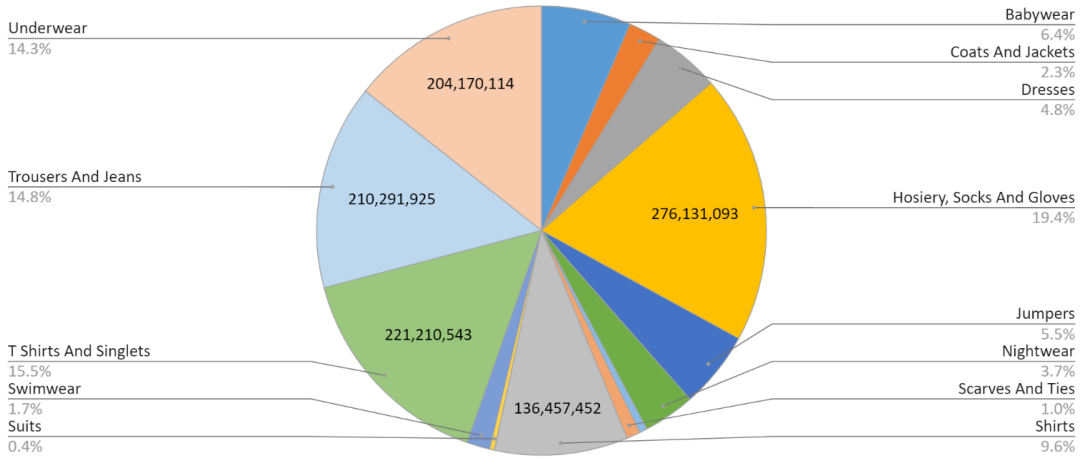


We also show the fluctuation in clothing import over the past three years where Covid impacts on production shipping and store access has been apparent. Data on clothing imports comes from the official recording of clothing imports undertaken by Australian Customs.[16] It shows that in 2018/19 we imported 1.42 billion items of clothing at a value of $9.2B.

The profile of different clothing types is also identified in Customs records. It is presented here by the number of units of each clothing type. As can be seen from the chart below (Figure 4.2), the major categories of clothing items imported are trousers and jeans 14.8%, underwear 14.3%, and hosiery/socks 19.4%.[17]

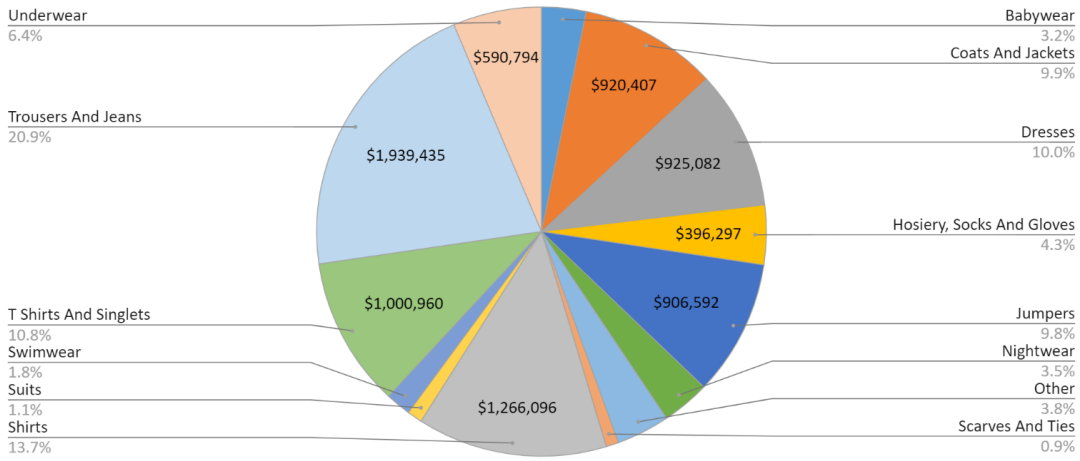
[16] Australian Bureau of Statistics. (2021). Customs imports 2018-19 chapters 61-62 clothing
[17] Ibid.

Figure 2 Clothing import by category and units 2018-19



The data on clothing import is also available by the value of the imported goods. Figure 4.3 shows the key categories by value. Some smaller and cheaper clothing types such as underwear and hosiery are less dominant when assessed by value, and clothing categories such as dresses and coats and jackets make up a greater share by value.

Figure 3 Clothing import by category and value 2018-19 (A$m)

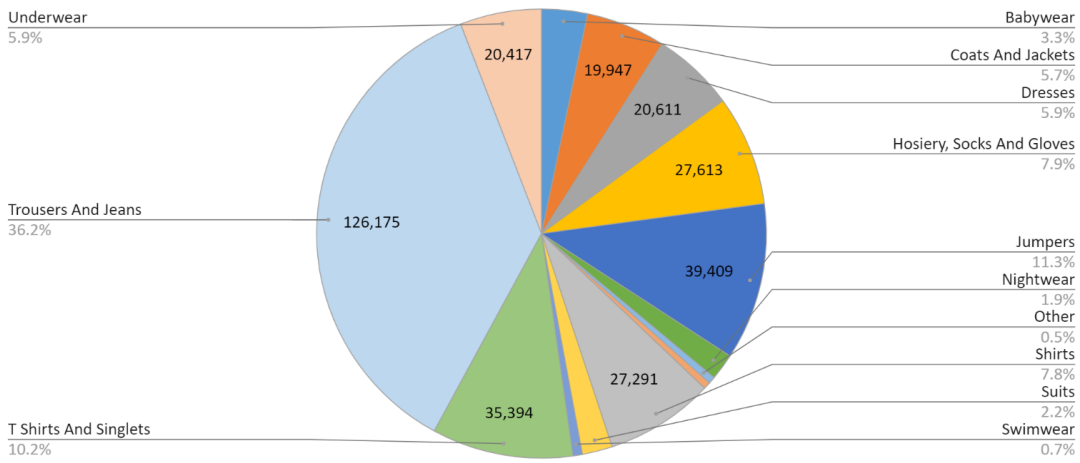


Having clothing imports reported in this way is highly valuable to scheme design and operation. It is a legal requirement for all imported clothing to be reported in this manner and we can therefore have strong confidence in the integrity of the data. It is also divided into categories that remain the same year on year enabling rigorous tracking of imports over each subsequent year in great detail.

The weight of imported clothing is not recorded, and this is therefore something that we have needed to calculate. This has been done by identifying recorded weights for each clothing type (dresses, socks, jackets, trousers, etc.), and applying these to the number of units for each clothing type. The data used was drawn from international postal shipping weight estimates.[18] It was then calibrated against local clothing by weighing of items to verify the data is suitable for application in Australia. These weights per item were then sent to major retailers who also verified their accuracy.

This enables us to estimate the weight of clothing being imported into Australia. Figure 4.4 below shows total import by weight and by clothing type.[19]

Figure 4 Clothing import by weight (tonnes) 2018-19



The clothing that we import and buy is very diverse, from swimwear to jackets, t-shirts to hosiery. All have different fibre makeup and weights and values. Based on different garment weights, we estimate that there are over 350,000 tonnes of clothing imported annually. The estimate for 2018-19 was 373,000 tonnes.

The key categories outlined in the charts above show the dominance of some types of clothing either in units, value, or weight. The understanding of the profile of garment types is crucial to how we plan circular systems.

For example, it is noted that underwear and hosiery are significant categories in number of units but have little reuse prospect and will require fibre recycling pathways for diversion from landfill.

The import of clothing fluctuates each year. This has been particularly the case during the COVID pandemic when disruptions to shipping and retail store access has

[18] RocketMF. (2021). https://rocketmf.com/en/weight
[19] Australian Bureau of Statistics. (2021) Customs imports 2018-19 chapters 61-62 clothing

been impacted. As retail has reopened there has been an element of 'catch up' with the downturn in clothing sales being reversed as clothing stocks are restored.

For this reason, the data presented here on clothing import is for the financial year 2018-19, the last year not impacted by the pandemic.[20] Data for the subsequent two years has been assessed and is presented in Figure 4.1 showing year on year trends.[21]

4.1. PRE CONSUMER WASTE

Beyond oversupply and unsold or heavily discounted garments, there is also a waste that arises from the fabric and clothing production sector. It has been estimated that this production waste could be as high as 25% of total material use.[22] As the waste is concentrated at the point of production in countries such as Bangladesh, India and China, minimising or capturing this waste in these jurisdictions for recycling is the primary focus.

As the fibre profile of pre consumer fabric is more generally known, this makes it easier to sort and recycle. The Circular Fashion Partnership has found that in 2019, Bangladesh produced approximately 577,000 tonnes of waste just from the Ready Made Garments (RMG) and fabrics mills, of which almost half (250 thousand tonnes) was 100% pure cotton waste. It has been estimated that factories in Bangladesh could sell this 100% cotton waste to the recycling market for up to 100 million USD.[23]

KEY DATA FINDINGS
Annual import of clothing (2018-19) 1,420,000,000 units S9.200.000.000 value 373,000 tonnes 3800 items/tonne or 260 grams/item Estimated material lost in production between 15-25%.

[20] Australian Bureau of Statistics. (2021). Customs imports 2018-19 chapters 61-62 clothing
[21] Australian Bureau of Statistics. (2021). Customs imports 2019-20 chapters 61-62 clothing; Australian Bureau of Statistics. (2021). Customs imports 2020-21 chapters 61-62 clothing
[22] Reverse Resources. (2017). White Paper: Digitally Enhanced Circular Economy Within Global Fashion Supply Chains.
[23] Global Fashion Agenda. (2021). *Recycling 100% cotton waste could save Bangladesh half a billion USD on cotton imports*. https://www.globalfashionagenda.com/recycling-100-cotton-waste-could-save-bangladesh-half-a-billion-usd-on-cotton-imports/

5. LOCAL CLOTHING PRODUCTION

Local clothing production is also very important but is harder to quantify precisely. An initial estimate, based on a trade report, was that local garments could account for 15% of total new clothing market share.[24] However, key brands have suggested the figure is dramatically below this (possibly <3%).

We know that there is very little clothing fabric production in Australia, and therefore the quantity of imported fabric can give us a strong estimate of local clothing manufacture. These fabric imports total just 11,000 tonnes.[25] After subtracting for other non-clothing uses such curtain, furnishing and home sewing manufacture, we can have an assurance that local manufacture does not exceed 10,000 tonnes or 3% of total new clothes sold, possibly much less. Even at this low market share local manufacture is still likely to be over 38 million units.

The export of new clothing from Australia is also small and is substantially made up of re-export of imported garments, mostly to New Zealand. Export of new clothing is less than 1% of the import of new clothing.[26]

[24] Ibis World (2021). *Women's and Girls' Wear Manufacturing in Australia*, AU Industry ANSIC Report C1351b June 2021
[25] Australian Bureau of Statistics. (2021). *Customs imports 2018-19 chapter 60 fabrics*
[26] Australian Bureau of Statistics. (2021). Customs imports 2018-19 chapters 61-62 clothing

If we combine the current estimated annual totals of locally produced and imported clothing, it amounts to 383,000 tonnes in 2018-19 or 14.8 kg per person. This is defined as total local consumption. This is subject to annual fluctuations, particularly during the pandemic upheaval of shipping and retail sales. For this reason, it is more useful to measure consumption trends over several years. When we compare this figure to consumption (clothing purchase) in other countries it does show we are among the highest per capita clothing purchasers globally.

Global data does show a strong correlation between household incomes and clothing purchase. We can also see that clothing affordability has changed dramatically over the past twenty years. This led to a very large growth in annual clothing purchase.[27] In some countries this has seen a doubling of consumption per person over the twenty year period. This growth is now moderating in some developed countries with annual growth in some European countries now static.[28]

KEY DATA FINDINGS
Annual local production of clothing (2018-19) <38,000,000 units <10.000 tonnes Annual total consumption of new clothing (2018-19) 384,000 tonnes 14.8 kg per person.

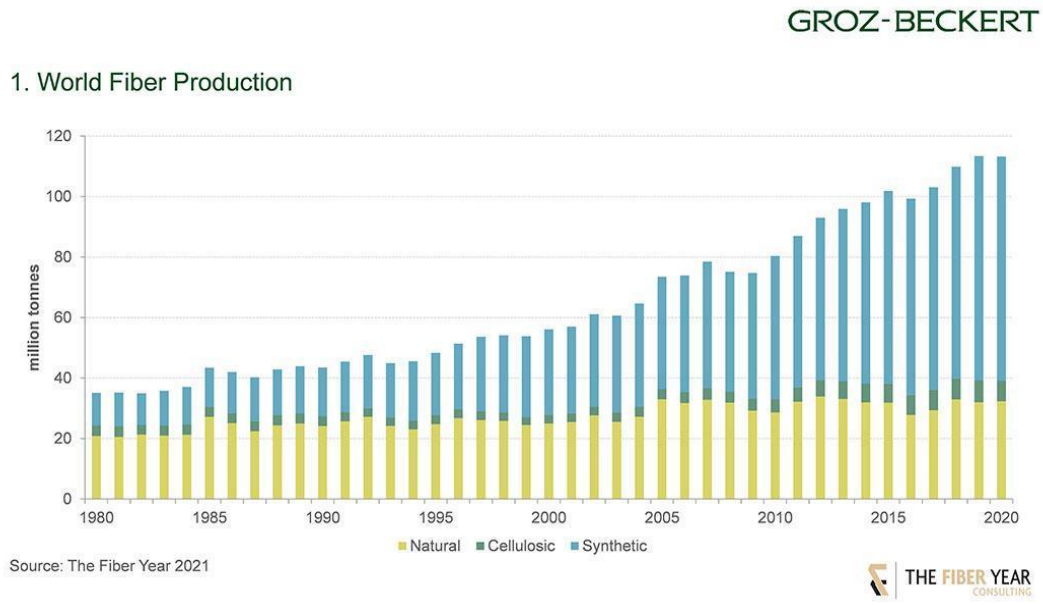
[27] Ellen MacArthur Foundation. (2017). *A new textiles economy: redesigning fashion's future*. https://ellenmacarthurfoundation.org/a-new-textiles-economy

[28] Maldini, I., Duncker, L., Bregman, L., Piltz, G., Duscha, L., Cunningham, G., Vooges, M., Grevinga, T. H., Tap, R., & Balgooi, v. F. (2017). *Measuring the Dutch clothing mountain*. https://www.hva.nl/kc-fdmci/gedeelde-content/projecten/projecten-fashion/measuring-the-dutch-clothing-mountain.html

6. CLOTHING FIBRE PROFILE

The fibre profile of clothing is also changing from year to year. If we group synthetic materials, particularly polyester and nylon, we estimate synthetic fibres account for around 62% market share. Cellulosic fibre sources, primarily cotton, account for around 38%. This ratio has swung around from 20 years ago when cellulose fibre was dominant, accounting for two thirds of clothing fibre content.

Figure 5 Global apparel fibre trend by weight for 1992-2016



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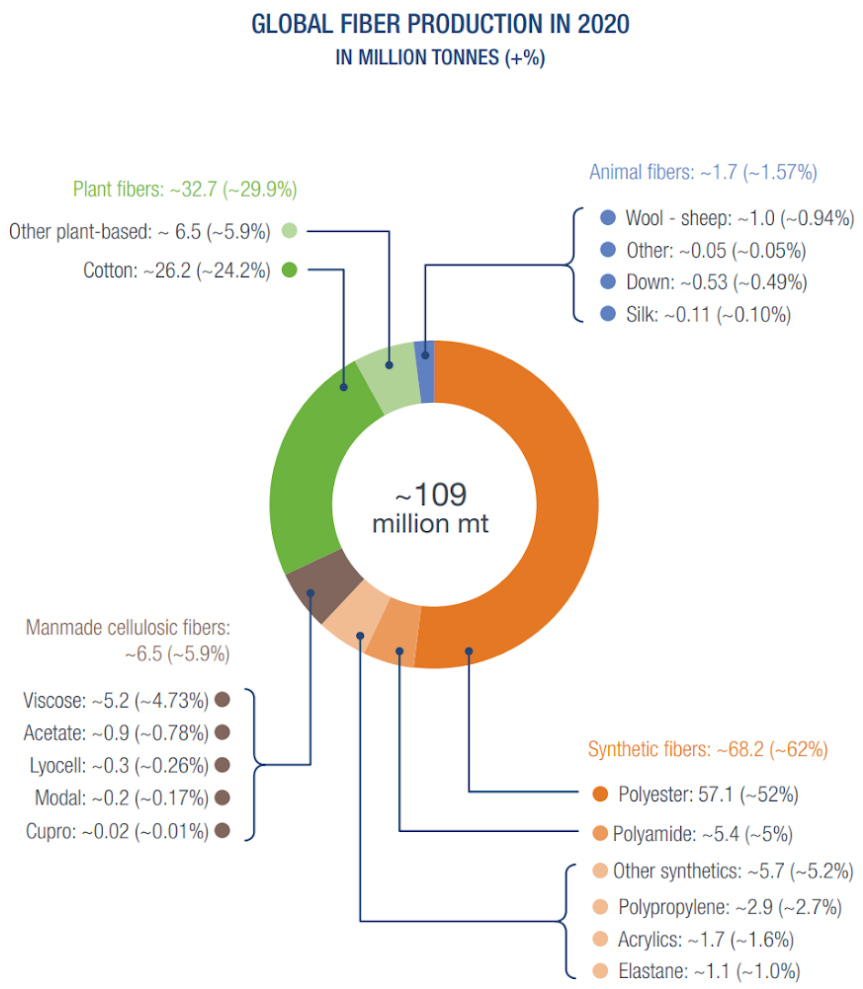
The increased purchase of active wear and outdoor gear has contributed to this increased use of synthetic fibre in clothing, together with more sophisticated use of synthetics.

While we don't have accurate estimates of fibre types used in Australian garments, the chart below (Figure 6) shows the global fibre production for 2020.[30]

[29] Groz-Beckert and The Fibre Year GMBH. (2021). *The Fabric Year* cited in Engelhardt, A. W. (2021). The Fabric Year 2021: Holistic approach from fibers to fabrics. *International Fiber Journal*. https://fiberjournal.com/the-fiber-year-2021-holistic-approach-from-fibers-to-fabrics/

[30] Textile Exchange. (2021). *Preferred Fiber and Materials Report 2021*. https://textileexchange.org/textile-exchange-preferred-fiber-and-materials-market-report-2021/

Figure 6 Global fibre production in tonnes for 2020.



Many garments are a combination of fibre types with blending of fibres done for strong performance reasons. It does present the sector with a further end of use challenge. Multi-material garments have the additional hurdle of fibre material separation. While polyester dominates the synthetic fibre usage, there are also significant amounts of nylon (polyamide), elastane, polypropylene, and other polymers. In the natural fibre content category cotton is the most significant, with smaller amounts of viscose and wool. The following is a list of the ten most used fibres/materials for clothing:[31]

[31] Common Objective. (2021). *What are our Clothes Made From?* commonobjective.co/article/what-are-our-clothes-made-from

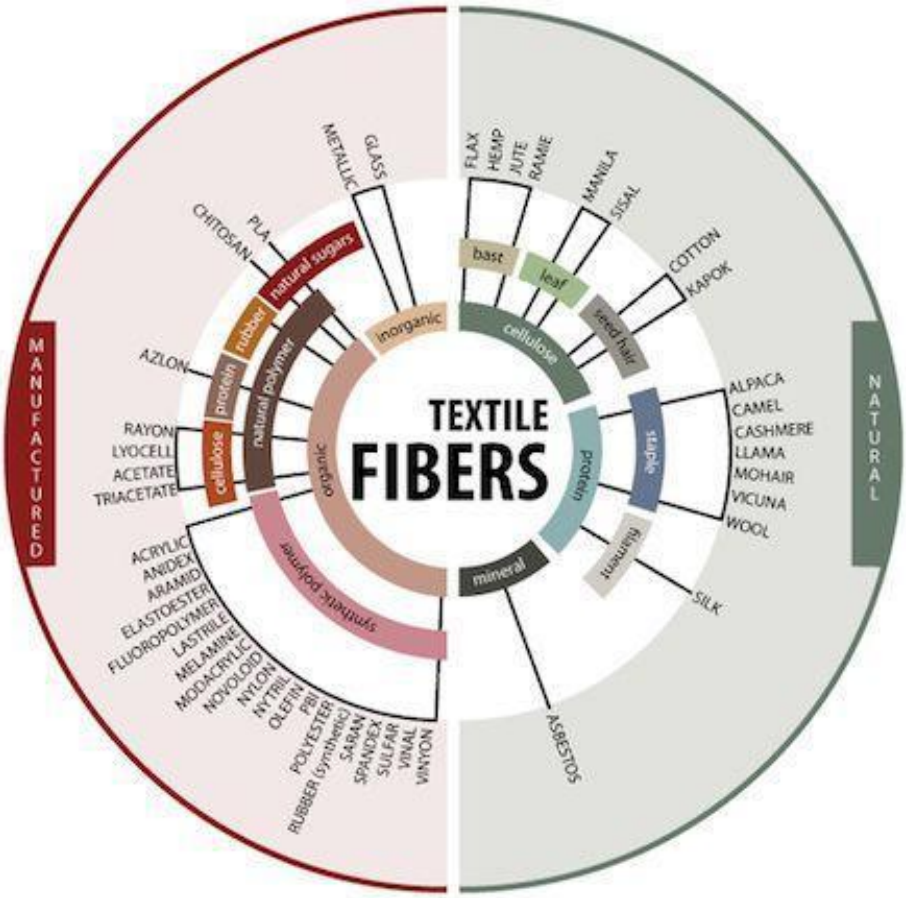
Figure 7 Ten most used fibres/materials for clothing manufacture

Crop based fibres
Cotton
Viscose (Rayon)
Linen
Hemp
Bamboo
Animal sourced fibres
Silk
Wool
Leather
Down
Synthetic fibres
Polyester
Nylon (polyamide)
Elastane

The following chart (Figure 8) shows the full range of fibres used in textile production.

Figure 8 Material source of fibres used in textile production[32]

[32] Makers Valley. (2017). Back to Basics: fibers vs. fabrics. https://blog.makersvalley.net/back-to-basics-fibers



* Generic classification based on chemical composition as defined by the Textile Fiber Products Identification Act. (Manufactured Catagory)

KEY DATA FINDINGS
Total clothing fibre use: Polyester (PET) 52% Other synthetics 10% Cotton 24% Manmade cellulosic fibre 6.5% [not natural] Other natural fibre (plant, animal) 7%

7. RECYCLED CONTENT IN CLOTHING

Very little recycled sourced fibre is currently used in clothing fabric production. This is changing, with small volumes of both polyester and recycled natural fibres emerging on the market. The Ellen Macarthur Foundation[33] and Textile Exchange[34] estimate that fibres that are currently derived from clothing recycling account for less than 2% with post-consumer textile fibre less than 1%. There is a more widespread use of polyester from recycled bottle sources, and this may now account for up to 15% of the total polyester fibre into clothing.

The Swedish based company Re:Newcell is currently building a large cellulose fibre recycling plant that will be operating from mid 2022. This will initially process 60,000 tonnes of fibre for use into clothing, expanding to 120,000 tonnes. They are targeting 360,000 tonnes output by 2025. The demand for recycled content by brands globally is likely to drive major expansion of this sector for both synthetic and cellulose based clothing.[35] More information on these initiatives is contained in the technology summary of our Global Scan report.

[33] Ellen MacArthur Foundation. (2017). *A new textiles economy: redesigning fashion's future*. https://ellenmacarthurfoundation.org/a-new-textiles-economy
[34] Textile Exchange. (2021). *Preferred Fiber and Materials Report 2021*. https://textileexchange.org/textile-exchange-preferred-fiber-and-materials-market-report-2021/
[35] https://www.renewcell.com/en/circulose/

Beyond Re:Newcell there are a range of suppliers of clothing fabric or fibre that includes recycled fibre. None of these are sourcing fibre from Australia at present. There is no local monitoring of recycled fibre content in clothing. Increasing recycled content will be a priority for a product stewardship scheme as finding recycling options for discarded clothing relies on markets for this material back into clothing. If targets for recycled content are established there will need to be effort put into monitoring the level of local and global recycled fibre content in our clothing.

KEY DATA FINDINGS
Recycled content in clothing Recycled clothing fibre<2% Total recycled fibre -all sources <10%

8. CLOTHING IN USE

8.1. CLOTHING IN AUSTRALIAN HOUSEHOLDS

New clothing entering the market each year is only part of the picture and we are seeking to understand the size of our wardrobes and how much clothing is in use in Australia. There is currently no local data on the amount of clothing being held in Australian households. Based on data from like countries, we estimate clothing in use to be 3.75 times annual sales, so a total of 1.44 million tonnes [36]

The question of whether wardrobe inflow and outflow are matched is not known in Australia, but data from like countries indicates an annual 5-8% increase of owned clothing.[37] This indicates that we are holding more of our clothes in our wardrobes each year. The reversal of this practice may flush more of our clothing into charity and other reuse opportunities.

8.2. CLOTHING NEVER WORN

One aspect of this stockpiling of clothes is the purchase of clothes that subsequently never get worn by the purchaser. No local data is available but global studies have estimated that a significant percentage of clothing purchased is never worn by the purchaser. The trend to online purchase of clothing may be contributing to this with the bypassing of “try on” practice. A common reason given for garments not being worn is that they are the wrong size. In some cases, the lack of uniform sizing could be contributing to this. Greater care in purchase decisions could help to

[36] Maldini, I., Duncker, L., Bregman, L., Piltz, G., Duscha, L., Cunningham, G., Vooges, M., Grevinga, T. H., Tap, R., & Balgooi, v. F. (2017). *Measuring the Dutch clothing mountain*. https://www.hva.nl/kc-fdmci/gedeelde-content/projecten/projecten-fashion/measuring-the-dutch-clothing-mountain.html
[37] Ibid.

decrease the practice of purchase without use. There may also need to be a focus on flushing unworn clothing into charity donation without a long delay.

8.3. CLOTHING WEAR RATES

A number of surveys in like countries have shown that although we may own many garments, many of these have not been worn in the past year. Some surveys suggest that only 55% have been worn. An average of the surveys would estimate 70 % have been worn in the past year. The retention of clothes that are not being worn prevents potential use by others after donation. It can contribute to a challenge where many donated garments are many years out of fashion before being donated. Reducing the amount of unworn clothing can be achieved by moderating purchase, or by more regular reviewing of clothing inventories and more timely discarding of clothes not being used.

8.4. WASHING AND DRYING IMPACTS

A key focus on clothing circularity has been on durability and product life. In the UK WRAP has estimated the average life of a garment to be 2.25 years. The condition of clothing is related to the original quality of the fabric and the clothing manufacture. It is also influenced by the way consumers wash and dry their clothing. The research undertaken by WRAP has identified that through better washing and drying practices it is possible to extend the average life of clothing life by nine months (extending the average life to around three years).[38] This would reduce consumers' clothing carbon, water and waste footprints by 20-30%.

KEY DATA FINDINGS
Total clothing in use 5,325,000,000 units 1,440,000 tonnes 70% of clothing has been worn in the past year

9. CLOTHING REUSE

[38] WRAP. (2017). Sustainable clothing: a practical guide to enhancing clothing durability and quality. https://wrap.org.uk/resources/guide/sustainable-clothing-guide

Of course, new clothing is only part of the picture and Australia has a healthy reuse network built primarily on the great work of charities and their op shops. Through this sector a significant proportion of secondhand clothing finds new owners and extended wear. Based on estimates of customs data on import of new clothing and export of secondhand clothing, it is estimated that charities receive 190,000 tonnes of clothing annually. This is amongst the highest rates of donation in developed countries. This is an estimate, and it is possible the amount could be higher. This means charity agency staff and volunteers are handling and sorting over 720 million items of clothing annually. This is a gigantic contribution to clothing reuse and extending the life of the clothes we manufacture.

Beyond the charity sector, there are a range of informal reuse channels from online sales to family hand-me-downs. This is estimated to account for a further 20,000 tonnes or 75 million units of clothing reuse. Both these reuse pathways are continuing to expand and will probably play a greater role in the future as we move from a linear clothing use model.

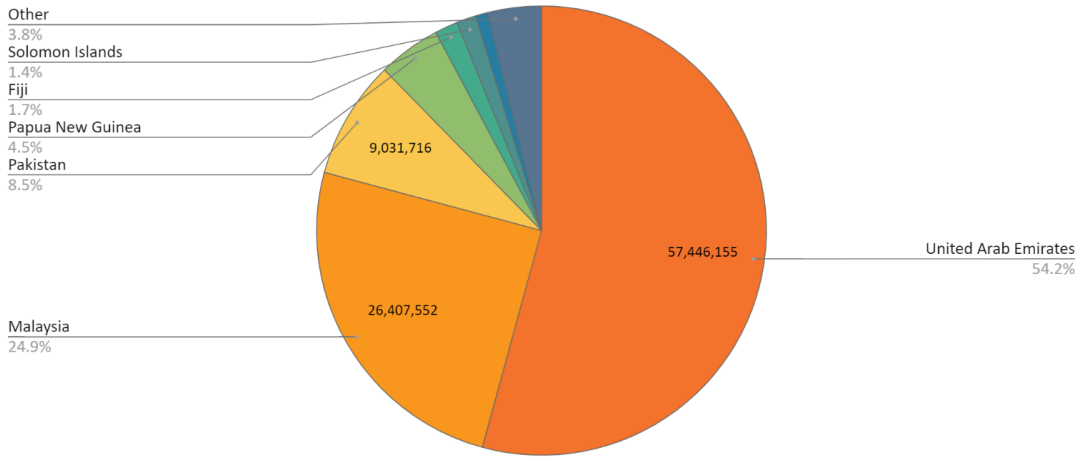
The cost of discarding unwearable clothing is significant for charities with an estimated 14% or 27,000 tonnes disposed of by this route.[39] This highlights the importance of developing a fibre recycling sector to underpin reuse. The large volume of hosiery and underwear purchased and then donated contributes to this waste problem for charities.

[39] MRA Consulting. (2021). Measuring the Impact of the Charitable Reuse and Recycling Sector: A comparative study using clothing donated to charitable enterprises

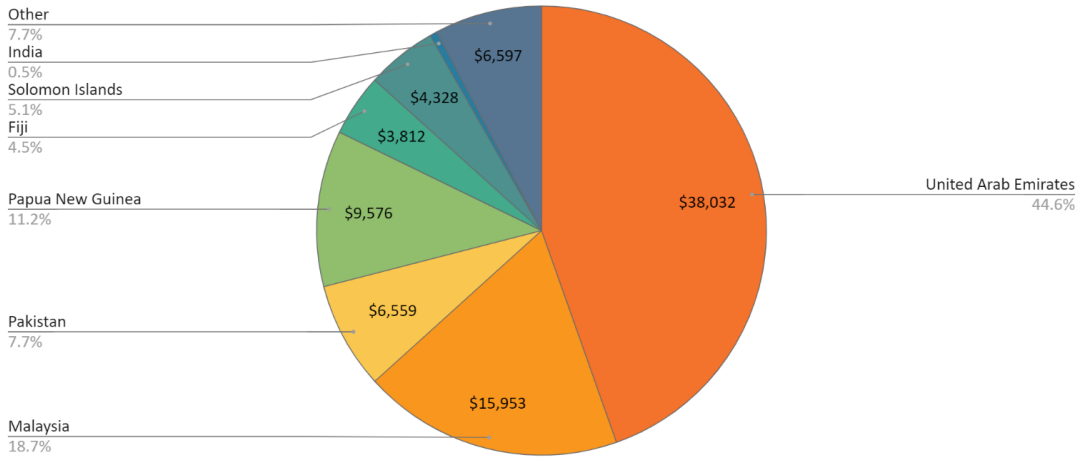
There are over 2676 charitable recycling outlets across the country.[40] These range in size and profile from larger stores operated by national charities such as Vinnies, Salvos Stores, Red Cross, through to small local charities.

Of the donated clothes, charities and other agents sell as much as they can through local outlets. Beyond this an estimated 62% of their inflow, or 105,900 tonnes (2018/19) is exported to developing countries, primarily as wearable clothing. Australian clothing is exported primarily to Asia, the Middle East and Pacific nations.

Figure 9 Used clothing export by weight 2018-19



While a large proportion of exported clothing is shipped to United Arab Emirates and Malaysia, after subsequent sorting it is sold in a range of other developing countries.
Figure 10 Used clothing export by value ($M dollars) 2018-19.

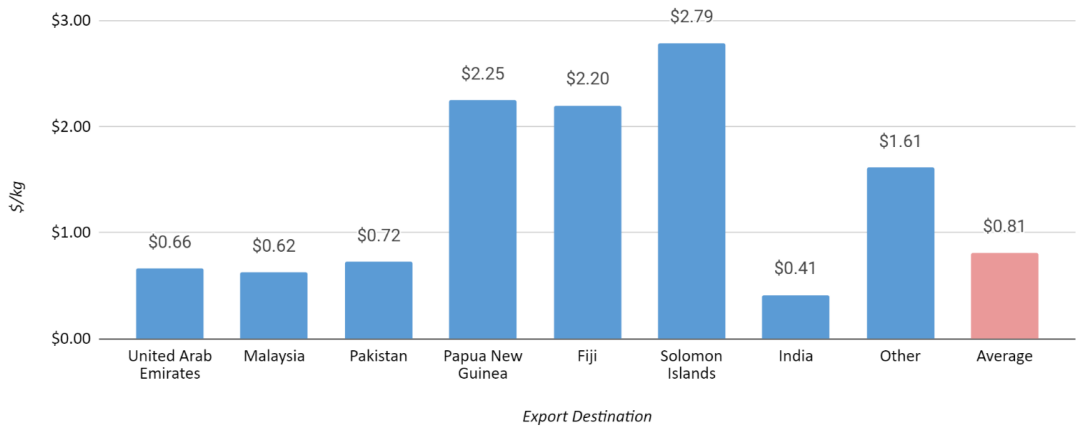


The value of used clothing exports varies based on quality, level of local sorting, clothing type, and country of destination. When exported largely unsorted, the value per item of clothing is around 20-25 cents. The transaction for exported used

[40] Ibid.

clothing is usually referenced in cents per kilo. When sorted appropriately for the receiving market this increases to 80-85 cents per item. This clothing provides both employment and lower cost clothing in the receiving countries. Ultimately, it enters the waste stream in the receiving country, and many of these lack the engineered landfill destinations that dominate here.

Figure 11 Used clothing export by destination value A$/kg 2020-21



KEY DATA FINDINGS
Annual clothing donations and other reuse: 2676 charitable reuse outlets 210,000 tonnes 796 million units of clothing Annual export of clothing (2019-19) $85,000,000 value 105,900 tonnes

10. DATA GAPS

There is a need to keep refining and expanding the range of data through stakeholder engagement and global research. There are gaps in what we currently

know about the full life cycle of clothing. Some of this information is crucial to initiatives like the development of a national product stewardship scheme, while others are more applicable to a broader circular economy benefit.
Gaps we need to address include:

- a better understanding of pre-consumer clothing waste, covering production waste and unsold garments,
- the amount of wearable and unwearable clothing destined for landfill here and abroad,
- the evolving informal reuse channels, particularly online
- the scale and potential of garment alterations and repair,
- the significance and trend of clothing rental, and importantly,
- the triggers that lead to discarding and disposal, remembering that not all clothing has suffered product failure at this stage.

It is recommended that when operational, the Product Stewardship Scheme maintains a broad range of clothing sales, use and end of use data, on which to measure circularity trends and to prioritise activity and support.

11. GLOSSARY

Definitions adapted from Dutch Clothing Mountain Report, WGSN Sustainability Glossary.

Carbon footprint	The total greenhouse gas emissions caused by a person, event, organisation, brand or product.
Carbon neutral	A term used to describe an organisation or body with a balance of carbon sources and sinks. This can be achieved either by offsetting emissions or by adding carbon-negative processes to balance out carbon-emitting processes.
Cellulosic fibres	These consist of two families: grown (cotton, linen, hemp, bamboo, ramie, nettle) and man-made (viscose, lyocell, rayon, cupro, acetate). They should only be considered sustainable if they're either grown ethically and/or organically, such as GOTS cotton, or produced with responsibly sourced wood or plants, like FSC-certified Tencel.
Chemical recycling	Adopts a series of chemical processes to depolymerize/dissolve the fibre from of the fabric into monomer/solvent form either to make newer fibre compound of it or extract one compound from a mix.
Circular design	Circular design is an approach that replaces the 'take-make-waste' linear model with a circular model of design in which products are designed to be environmentally low-impact, to last for a longer time and to be easily reused or recycled at the end of their useful life. The aim is to eliminate waste and to enable continuous, closed-loop use of resources.
Climate change	Global heating driven by human emissions of greenhouse gases, as well as large-scale shifts in weather and climate patterns, including increased weather emergencies.
Closed-loop recycling	Recycling processes that turn materials back into raw feedstock of equal quality. For textiles, this means the creation of recycled fibres and yarn. The chemical recycling of polyester creating new yarns would be considered closed loop, and the new product would be marketed as recycled polyester. In the textile and fashion industry, this process remains very rare. Focusing on the exact same raw component nevertheless restricts recycling options.
Clothing	Wearable products including those made out of textiles (e.g. shirts, trousers, etc.). Excludes single use wearable items such as PPE.
Clothing charities	Charities that receive donated clothing and sort and sell these either locally or through export.
Clothing utilisation	The average number of times a garment is worn before it ceases to be used
Cradle-to-cradle	Refers to a programme and certification by the Cradle to Cradle Products Innovation Institute that works to innovate and promote a circular economy throughout the supply chain. The programme enables and supports partnerships and initiatives between brands and manufacturers, while the levels-based certification ensures the

	product fits into a low-waste and low-impact circular model via high environmental and social performance.
Deadstock	Originally an industry term for excess inventory that has never been sold to a customer, deadstock is now also used to describe products that are no longer available for sale from their original brand but that are still desirable, such as unworn vintage.
Design for disassembly	Designing products with materials, systems and components that are recyclable and reusable, to reduce consumption of resources and consider the complete lifecycle of a product.
Developing countries	A developing country is a sovereign state with a less developed industrial base and a lower Human Development Index relative to other countries.
Downcycling	Using a mechanical process, discarded textiles are turned into new products, usually with a lower value and industrial application. Textiles are cut into cleaning cloth, shredded to create insulation/fill and/or fibres are bonded in composite materials.
End of life	The point at which a product can no longer be used in its existing state and, in a linear economy, would be disposed of by being sent to landfill or burned. In a circular economy, end-of-life means the start of a new cycle, as products are reused or recycled into other items or resources.
End-of-use	The point at which a product can no longer be used in its existing state and, in a linear economy, would be disposed of by being sent to landfill or burned. In a circular economy, end-of-life means the start of a new cycle, as products are reused or recycled into other items or resources.
Extended Producer Responsibility (EPR)	Extended Producer Responsibility is an environmental management strategy and policy approach that allocates producer's responsibility - be it financial and/or physical–– for the management of products in the post-consumer stage of a product's life cycle.
FOB	Free on Board FOB is a term in international commercial law specifying at what point respective obligations, costs, and risk involved in the delivery of goods shift from the seller to the buyer
Greenwashing	Fabricating or exaggerating claims to deceive consumers into thinking their products are environmentally friendly. This can be done in numerous ways, from hiding key information to overstating claims in order to distract consumers from unsustainable practices.
High-value recycling	Using a mechanical or chemical process, discarded textiles are regenerated into new products, usually with a higher value application such as yarns, fabrics and garments.
Household textiles	Towels, sheets, curtains and other non-wearable textile products.

Item/garment	Piece of clothing. Sometimes items include more than one garment, such as in packaging including several pairs of socks, and sets of underwear.
Landfill	Any household or commercial waste that's not recycled or reused will usually end up at a landfill site, also known as a tip, rubbish dump or garbage dump. Landfills cause a number of environmental issues, from infrastructure damage to pollution of local roads and rivers and contamination of groundwater and soil. Once full, the ground above a landfill may be reclaimed for other uses.
Life cycle assessment	Lifecycle assessment (LCA) is a technique used to analyse the environmental impact of all stages of a product or service lifecycle from cradle-to-grave or cradle-to-cradle, from the raw material through to manufacturing and use to end-of-life disposal or recycling.
Lifecycle	The 'life' of a garment refers to its time in use; it's lifecycle is all the stages of sourcing, growing, production, distribution, consumption, use, reuse and disposal.
Linear model	A material that follows the 'take-make-waste' model of linear production, being extracted from the earth and then sent to landfill after use, rather than the preferable circular model. It's recognised that we now need to move, as a global society, from a linear to a circular approach.
Mechanical recycling	The process of recycling the textile fabric back into fibres without the use of any chemicals. This process includes shredding and carding process to extract the fibres from the fabric. This fibre can then be spun to make yarn for either woven or knitted fabric.
Microplastics	Very small pieces of plastic, less than 5mm in size, that contain synthetic polymer, semi-synthetic polymer or modified natural polymer and cannot biodegrade in the environment. They are used extensively in beauty formulas and are also shed from clothing when it is washed. There is research to show these particles negatively impact marine life and are being consumed by humans through the food chain. The impact on the body is yet to be fully realised, but early research points to negative impacts on the digestive system, lungs and immunology. New EU legislation is in the pipeline to ban microplastic-producing ingredients from being used in beauty products.
Mono materials	Materials that only consist of one material or fibre rather than a blend. It is easier to recycle a garment or product made from one single material, as this avoids having to separate several materials and then recycle them all separately.
Natural fibres	Natural fibres used in clothing textiles come from natural sources. Protein and cellulosic fibres are most commonly used within textile manufacturing for clothing. Protein fibres are sourced from animals, such as wool, silk and cashmere. Cellulosic fibres come from plant sources, including cotton, flax, hemp and jute.

Nylon (Polyamide)	Nylon is a generic designation for a family of synthetic polymers composed of polyamides. Nylon is a silk-like thermoplastic, generally made from petroleum, that can be melt-processed into fibers, films, or shapes.
Open-loop recycling	Processes by which textiles are deconstructed, shredded or otherwise processed and used as inputs for the manufacture of lower value products, such as insulation or fill. See also: downcycling.
PET plastic	PET (polyethylene terephthalate) is one of the most commonly used thermoplastic polymers globally. It has a wide range of uses, from polyester fibres for textile production to food and drinks packaging. PET is not biodegradable but can be recycled into rPET and reprocessed into new products.
Polypropylene	Polypropylene is a thermoplastic polymer used in a wide variety of applications. Polypropylene belongs to the group of polyolefin plastics and is widely used in Australia.
Post-consumer textile waste	Items that have been discarded by the final user and are no longer intended to be used as a consumer item. Post-consumer waste is most commonly created in household settings and is harder to collect, identify and recycle than pre-consumer waste. Activities such as collection, sorting, repair and resale can revalorise this material.
Post-growth economy	An economical structure that, instead of continuous financial growth, focuses on ecological impacts and societal health via fairly distributed economy.
Post-industrial textile waste	Textile by-product from the manufacturing stage (eg. clipping waste, offcuts, roll ends and remnants). Also termed pre-consumer waste in some cases.
Pre-competitive	Addressing problems in a collaborative, rather than competitive manner. Pre-competitiveness recognises the need for those who might be in competition (for example fashion brands) to work together toward a shared goal.
Pre-consumer textile waste	Materials or products that are discarded before reaching the consumer. This can range from materials lost during the production processes, such as fabric scraps or paper cuttings, to damaged or unsold stock. Pre-consumer waste is used more readily within recycling, as access to materials and identification is more readily available.
Product Stewardship	Product Stewardship is based on the idea that actors throughout a supply chain retain a level of responsibility for offsetting the social and environmental impacts of the materials/product produced and consumed (“shared responsibility”).

R-strategies/Waste Hierarchy	A set of priorities for the efficient use of resources. The R-strategies have a hierarchy should be followed in order to transition to a circular economy. This hierarchy is: refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle, recover.
Re-shoring/right-shoring	Reshoring is the return of production processes to the home country of a company, in contrast to offshoring. Right-shoring is a more nuanced approach that considers the optimum mix of onshoring, offshoring, and nearshoring production.
Recirculation	All activities that work toward a circular economy – specifically those which put clothes in use for longer.
Recycling	Recycling is the process of breaking down textiles into raw materials which are then used to make new products.
Repairability/repairable	Repairable products can be restored to their original functionality by repair and mending techniques, either by the consumer, a repair service, or the manufacturer that originally created them. There is a growing movement called Right To Repair that petitions for products to be able to be repaired by default.
Repurpose	Repurposing is a process of transformation, where products, materials or content are used in a different way to the original intended purpose.
Resale	In resale and re-commerce systems, previously bought products are sold again to new owners. Marked by the rise of re-commerce platforms and in-house marketplaces, the re-commerce economy has the potential to disrupt traditional retail strategies and bring circularity into the mainstream.
Retail value	Value of the retail volume at the point of sale.
Retail volume	Volume of sales to consumers, measured in items, including both offline and online purchases and excluding second-hand products (reused).
Reuse	Textile products are used again, with no alteration to the original item.
Second-hand item	Item that was owned and used by another person before, including garments bought in second-hand shops or markets, items given or exchanged.
Sharing economy	An economic model of short-term peer-to-peer transactions, acquiring, providing, or sharing access to goods and services, usually facilitated by an online platform that connects buyer and seller. Examples include AirBnb and thredUp. The sharing economy trend is driven by the evolution of big data as well as changes in attitudes to consumerism. The landscape is growing and evolving rapidly, but faces challenges around regulation and concerns about abuses.

Social economy	A diversity of enterprises and organisations such as cooperatives, foundations, social enterprises and charities sharing common social-objective values over profit. For example, The Salvation Army.
Stewards	Organisations which put products on the market (also called Producers).
Supply chain	The activities, people and resources that together work to produce a product or service, from sourcing raw materials to final delivery to the end-user. Companies must optimise supply chains in order to keep costs down, maintain fast production cycles and stay competitive.
Synthetic fibres	Synthetic or artificial fibres are man-made thread or filaments from which a textile is created. These fibres are usually made from fossil or petrol-based components via polymerisation, a process that extrudes the material through spinnerets combining monomers that make a long chain of material called polymer.
Textiles	Textile-based products and materials including all clothing, accessories and home textiles.
Unwearable clothing	Garments that are no longer suitable for wearing due to wear or damage.
Unworn item	Item that has not been worn in the last year or not worn at all.
Upcycling	The process of transforming waste materials and discarded or unwanted products into something of a higher quality or value, often using crafts or artisanal knowledge as tools.
Use phase	The phase in which a garment is used, this includes consumption, wearing, washing and repairing if it is done by the first user. In a linear economy, the use phase leads to disposal; in a circular economy, the use phase leads to recirculation.
Value chain	The activities involved in a company making a product or service, comprising the stages involved in creating a product from conception to distribution. A value-chain analysis helps a company evaluate the individual elements and details involved in each part of its business process, while also helping to increase production efficiency through the elimination of unnecessary waste to help deliver greater value at a lesser cost.
Waste	Unwanted, unusable, zero value or defective materials and substances. Anything discarded after its primary use is classed as waste, in contrast to the term 'byproduct', which refers to a joint product that has minor economic value. According to the EU Waste Framework Directive, if the substance is passed on to be reused or recycled it is still legally considered waste if it's no longer required by the person or organisation that produced it. Waste can be

	elevated to become a by-product or a resource through any process, innovation or system that brings its value above zero.
Wearable clothing	Secondhand clothing that remains in a suitable condition for further wear.

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