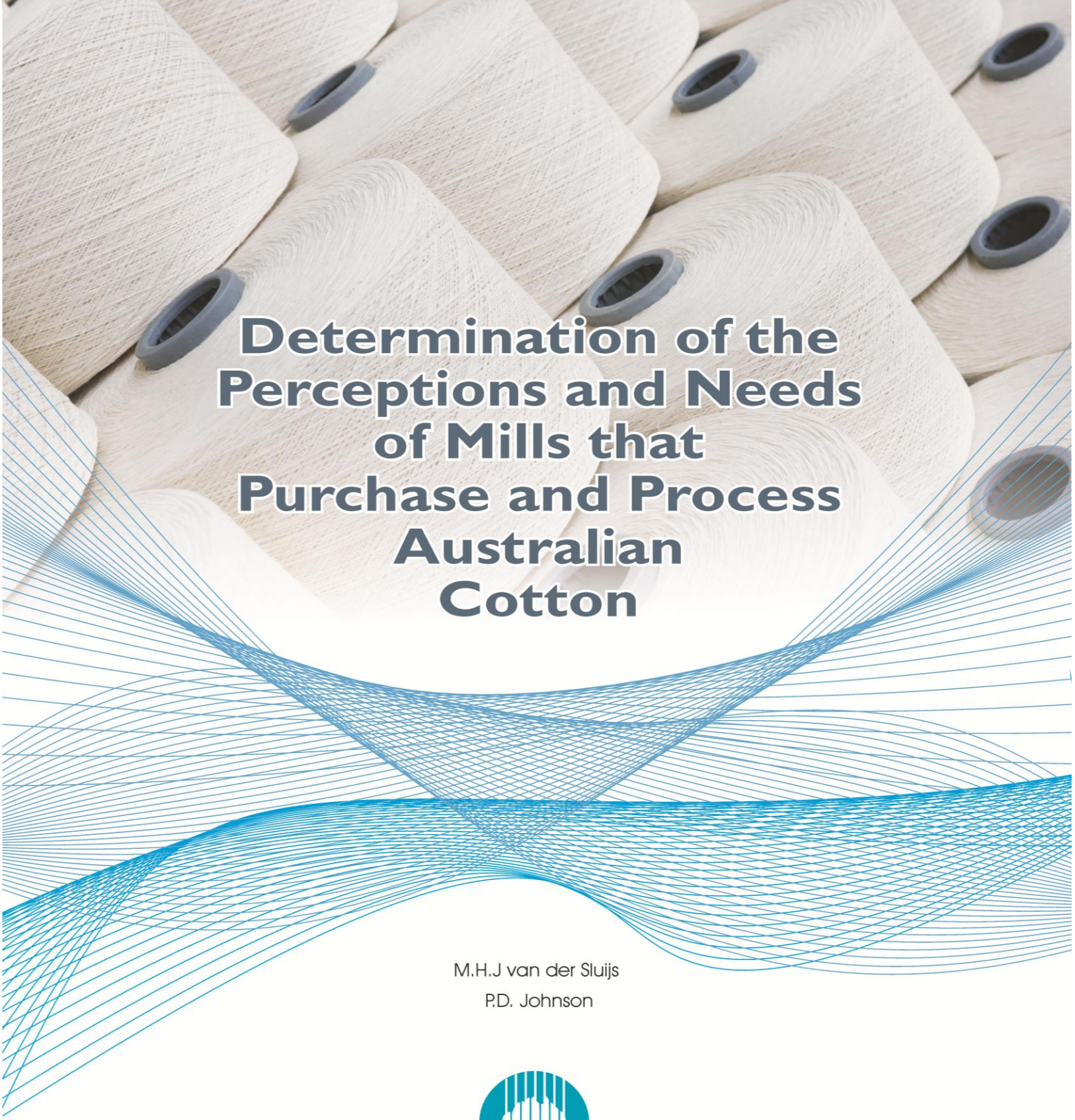

Determination of the Perceptions and Needs of Mills that Purchase and Process Australian Cotton

M.H.J van der Sluijs

P.D. Johnson

CSIRO

Australian Government

Cotton Research and Development Corporation

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Compiled by M.H.J van der Sluijs
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Acknowledgements

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Correspondence on this report should be addressed to:

Mr Marinus H. J. van der Sluijs

Textile Technologist and Project Leader

CSIRO Materials Science and Engineering,

Belmont, Victoria 3216,

Australia.

Email rene.vandersluijs@csiro.au

Ph 61 3 5246 4000

Fax 61 3 5246 4057

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GLOSSARY OF TERMS

Bale – 227 kg (500 pounds) of pressed and bound cotton fibre

Bale Lay-Down – Cotton bales set in a row for the start of mill processing. The start of mill processing is called 'opening'.

Carded Yarn – Yarn spun from carded and drawn sliver. Carding and drawing are steps in the mill used to clean and parallelise fibre in preparation for yarn production. Carded yarn is less expensive than 'combed' yarn but is inferior in terms of yarn quality because short fibres and neps are still present.

Colour – Colour is a primary indicator of grade. Discolouration is due to range of influences including trash and dust content, rain damage, insect secretions, UV radiation, heat and microbial decay. Colour in cotton is defined in terms of its reflectance (Rd) and yellowness (+b), which are measured by a photoelectric cell.

Combed Yarn – Sliver from the card is combed to remove short fibre and nep and to make fibres parallel to the sliver axis. Combed sliver translates into more uniform and stronger yarn.

Contamination – The International Textile Manufacturers Federation (ITMF) identifies 18 sources of contamination in its bi-annual survey of spinning mills [40].

Dust – Any material other than cotton fibre in a sample is referred to as trash or non-lint content. Trash in cotton usually consists of leaf and other parts of the cotton plant. Dust was measured by the AFIS and refers to dust particles per gram of <500µm.

Fineness – Cotton fineness is described in terms of linear density or weight per unit length of fibre, the unit for which is usually milligrams per kilometre (mtex).

Ginning – The separation of fibre (lint) from cotton seed.

Grade – Historically grade is a subjective interpretation of fibre colour, preparation and trash content against USDA standards.

Length Uniformity (UNI) – This measurement is expressed as the uniformity index and is the ratio of measurements from the fibrogram. The uniformity index refers to the ratio between the mean length and the upper half-mean length

Maturity – The cotton fibre is a single elongated plant cell and maturity refers to its degree of cell wall thickening.

Micronaire (MIC) – Airflow measurement based on the pressure difference obtained when air is passed through an accurately weighed plug of cotton fibres. Originally calibrated to give fineness (in micrograms per inch) the method actually measures specific surface area (surface area per unit mass) and therefore reflects a combination of the sample's fineness and maturity.

Nep – Neps are fibre entanglements that have a hard central knot or nucleus that is detectable. There are a variety of test instruments and methods to measure nep content although the Uster Advanced Fiber Information System (AFIS) nep module has the status of being the only method with a recognised standard procedure.

Seed coat Nep – Are fibre entanglements that have a seed coat attached to the fibres and measured using the AFIS nep module.

Short Fibre Content – The most common definition of short fibre content is the proportion by mass of fibre shorter than one half inch. In this report we will refer to the Short Fibre Index (SFI) as measured by HVI as well as Short Fibre Content (SFC) as measured by the AFIS.

Spinning Ability – There is a wide range of indices used to measure spinning ability. The most commonly applied index is the number of (yarn) ends down per thousand spindle hours.

Staple Length – This measurement is usually based on a photoelectric scan of fibres protruding from a 'Fibrosampler' comb. The fibres protruding from a comb make up the fibrogram from which the upper half-mean length is measured. This measurement corresponds closely with the physical classer's staple or modal length of the sample.

Stickiness – A reference to when cotton is made sticky from cotton plant and/or insect exudates. Sticky cotton does not process well especially through the card and drawframe. Stickiness can be objectively measured although none of the current methods determines the source of the stickiness. Exudate from insects such as whitefly and aphids is the cause of most 'stickiness' problems in mills [40].

Strength – The strength of cotton fibres is usually defined as the breaking force required for a bundle of fibres of a given weight; the test value being a measure of breaking stress or tenacity, expressed in terms of grams per tex (g/tex or GPT).

Trash – Any material other than cotton fibre in a sample is referred to as trash or non-lint content. Trash in cotton usually consists of leaf and other parts of the cotton plant. Trash can be measured in number of ways; in this report we will use the trash measurement as provided by the AFIS and refers to trash particles per gram of >500μm.

Yarn Count (Ne) – Yarn count is a measure of yarn linear density or mass per unit length. Cotton spinners use English cotton count system or Ne to measure yarn linear density. Ne is equivalent to the number of 840 yard lengths (wraps) in one pound of yarn. The metric unit gram per kilometre (or tex) is obtained by dividing 590.5 by the Ne yarn count.

EXECUTIVE SUMMARY

During 2002 and 2003 the Australian Cotton Industry through the then CSIRO Textile and Fibre Technology Division with the support of the Australian Cotton Co-operative Research Centre (CRC) and the Australian Cotton Shippers Association (ACSA) conducted a survey of 31 international and domestic spinning mills to determine what their needs and perceptions were of Australian cotton. Spinning mills in Indonesia, Japan, Thailand, Korea and Australia were surveyed. This survey [1] found that Australian cotton was generally well received with all countries rating neps and Micronaire, along with short fibre content as properties that needed improvement. The low level of contamination, colour, grade, spinning ability and staple length of Australian cotton created the best impressions.

The information collected by the survey was very valuable from a marketing perspective and assisted in shaping directions in research from breeding and growing through to ginning and classing.

In 2007 a further survey was carried out by Technopak (a management consulting firm in India) on behalf of the Cotton Research and Development Corporation (CRDC) and ACSA. Thirty four companies in China, Indonesia, Thailand, Japan, Hong Kong, Korea, India and Pakistan were surveyed. This survey's [2] findings were similar to the findings made in the previous survey conducted in 2002/03.

The aims of the current survey described in this report were to:

1. Review / benchmark the perceptions of Australian cotton against baseline data collected in the 2002/03 survey.
2. Identify / quantify potential emerging trends with regards to raw fibre / textile demand.
3. Quantify mills' value perception of various licensing / branding programmes (e.g. Cotton USA/BMP Cotton / Supima etc.)
4. Identify points of differentiation / value perception of Australian cotton versus other cotton origins and fibres.
5. Establish the demand potential for higher quality Australian cotton.

Thirty five companies that purchase Australian cotton and a management consulting firm were interviewed, during 2009 and 2010, in regard to its quality in yarn production. A survey-interview approach, which entails person-to-person interviews conducted around a set of scripted questions, was used. Spinning companies from Japan, Korea, Thailand, Hong Kong/China, India and Indonesia were surveyed as well as the last remaining cotton spinning company in Australia. The survey consisted of a series of background questions about each spinning company's production, raw fibre use and spinning facilities followed by a series of more open-end questions about the quality of Australian cotton fibre. Information gathered during the survey interviews was enhanced by objective measurement of fibre samples gathered from bale lay-downs in mills of more than half the spinning companies surveyed.

As expected the 30-39 Ne yarn count range was the most important for the spinner's surveyed, accounting for 42% of their production, followed by the <30 Ne yarn count, accounting for 39% of the production and the 40-59 Ne yarn count, accounting for 15% of the production, with 4% in the >60 Ne yarn count range. Australian cotton made up 32% of the blend in the 40-59 Ne range, 19% in the 30-39 Ne range and 5% in the <30 Ne range. There was negligible use of

Australian cotton in yarn counts >60 Ne, with this market dominated by US Pima and Egyptian cotton. However with the price and shrinking of Extra Long Staple (ELS) cotton there is a potential for Long Staple Upland cottons to be used in greater quantities in the 50-70 Ne count range providing they meet certain specifications. It is felt that this is an area where the Australian Long Staple Upland (ALS) fibre could be used; supported by the fact that the surveys demonstrated significant usage of the premium Upland SJV Ultima fibre in the 60-80 Ne market.

Despite the range of spinning systems and yarns produced in the spinning mills surveyed, the average impression of Australian cotton fibre properties was quite consistent. All countries rated neps and short fibre content as properties that needed improvement. The low level of contamination and stickiness, colour grade, spinning ability and staple length of Australian cotton created the best impressions.

Whilst it is difficult to be accurate about the exact proportion of Australian cotton that meets preferred specifications, from the 2009/10 bale lay-down test results it can be said that in general less than 50% of Australian cotton bales met spinner's preferences with regards to short fibre content and less than a third of Australian cotton bales met spinner's preferences with regards to nep values. Australian cotton was better in regard to Micronaire, strength, length and uniformity.

As far as contracted specifications are concerned, US Upland cotton from the San Joaquin Valley (SJV) cotton was still superior to competitive growths particularly in terms of strength and Micronaire, with Micronaire values typically lower and occurring in a narrower band of values. Australian cotton was ranked second after SJV with staple length and grade similar to SJV. Encouragingly, Australian cotton scored particularly well for key non-contracted specifications; particularly contamination, trash content and spinning ability where it was considered vastly superior to competing growths.

In regards to licensing programmes, product quality, marketability and traceability of product were the three most important characteristics of a branded raw cotton product, followed by social responsibility and environmental credentials, according to survey respondents. If these characteristics are translated into consumer brand recognition, which subsequently generates demand pull for a licensed product, then barriers to participation such as legal/compliance costs, increased paperwork and cost of raw material are negated.

Overall, the preferred method of bale packaging was clearly cotton bags, followed by polyethylene film, jute/hessian and lastly woven polypropylene. Plastic bale strapping was considered the most suitable method to tie bales followed by wire ties and metal straps.

Across all markets, Casual Attire was clearly identified as the key product growth category for both downstream textile demand and raw cotton demand. Street attire and Home Textiles also showed moderate demand growth. Inner attire and Sports attire showed strong overall demand growth; however their cotton usage was low, primarily due to replacement by manmade performance fibres. Formal/Business wear showed the lowest overall textile demand with cotton being replaced by easy care manmade fibres.

Across all product categories, and across all markets, comfort was clearly identified as the most important textile property by survey respondents. Handle and breathability were also

considered important. Interestingly, within the Home Textiles segment, natural attributes and eco-credentials were seen as more important than in other market segments.

Marinus H. J. van der Sluijs (rene.vandersluijs@csiro.au)

Pete D. Johnson (petejohnson@leftfieldsolution.com.au)

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INTRODUCTION

Despite uncertainty regarding the consequences of the global financial crisis, tightening credit limits and increased competition from grains, oilseeds and manmade fibres the production and consumption of cotton remains resilient. World cotton production is estimated at 25 million tons during 2010/11, while consumption is estimated at 24.9 million tons [3], with a big rise expected in cotton production in 2011/12 to 27.7 million tons [55].

There has been a continuous decline in cotton's share of the world textile market since the late 1960s (Figure 1) and current estimates suggest its share declined to 33% in 2010 and [51]. It must however be borne in mind that while cotton's percentage of market share is declining, the consumption and production of cotton is increasing, but just not as rapidly as manmade fibres. For cotton to reverse this trend it will need to become more competitive, particularly with respect to its quality and diversity of end-uses.

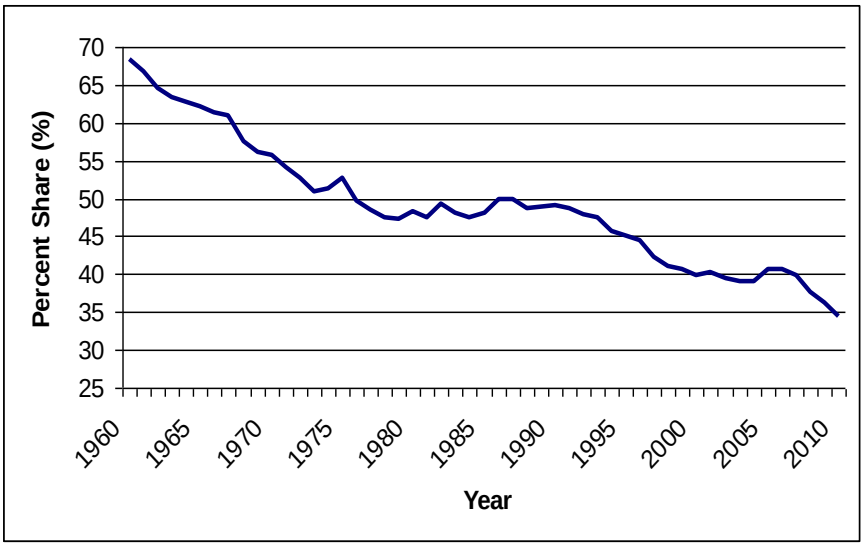


Figure 1 – Cotton's share of the World Textile Market [4, 51]

Against this picture of declining market share is the success story of the cotton industry in Australia. Up to 98% of the crop is exported and between 1998 and 2002 Australia was the third largest exporter of cotton lint after Uzbekistan and the USA. In comparison with major cotton producing countries such as China, India, the USA, Pakistan, Central Asia and Brazil, Australia is a small but significant producer of the world's medium to high medium quality cotton.

Despite its relatively small crop, Australian exports still make up over 10% of the medium/high medium grade cotton volume in the export market [4]. It is currently the sixth largest exporter after the USA, India, Uzbekistan, Brazil and West Africa. Nearly all of Australia's cotton lint is exported for high quality end use in mills in South East Asia. At 34%, China continues to be the major destination of Australian cotton followed by Indonesia with 26%, Thailand with 20%, Korea with 8% and Japan with 5%. The other significant export countries were Malaysia, India, Hong Kong, Taiwan and Bangladesh [5] (Figure 2).

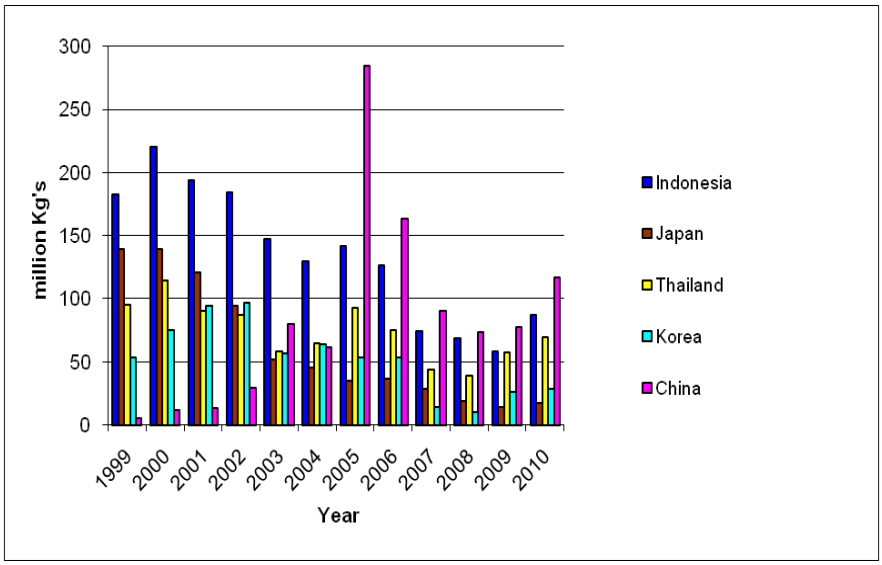


Figure 2 – Australian cotton exports by destination [5]

The development and adoption of new technologies such as biotechnology, precision agriculture, better management of water and soil fertility, the use of integrated pest management and advances in plant breeding has led to improved yields and fibre quality.

Australian cotton is generally viewed worldwide as a quality fibre purchased for a premium with the intention of producing high quality fine count yarns, normally combed ring spun, for use in the woven and knitted apparel sectors.

The quality of Australian cotton has always been measured relative to competitive growths and in particular with cotton from the San Joaquin Valley (SJV) in California; which has long been regarded as the premium Upland growth in the world export market. Over the years Australian cotton has been facing increased competition from cotton produced by Brazil, West Africa, US (especially Fibermax), Zimbabwe and to a lesser extent India (Shankar 6). While comparisons with other growths are important the Australian industry realises that it needs to be proactive in the specification and traceability of its own product.

A Best Management Practices (BMP) program launched in 1997 represents the cotton industry's commitment to the world's best practice in cotton production. Although it is a voluntary farm management system, a significant proportion of the larger cotton growers are certified. This program ensures that cotton is produced with best practice across a range of focus areas such as; land and water, soil health, biodiversity, climate change and energy, bio-security, chemical and insect and pest management, human resources and technology [9]. BMP has assisted the industry achieve a 40% improvement in water use efficiency over the past decade [34], thereby offsetting reduced water availability. This BMP program was extended in 2004 to the Classing sector and in 2008 to the Ginning sector. It will be introduced to the Warehousing and Despatch sector in 2011, with introduction to the Harvesting/Picking sector under consideration.

Total lint area and production dropped during the drought but yields continued to rise due to new varieties and better management. In comparing total production across total planted

hectares, Australia's yields are amongst the highest in the world and almost three times the world average - see Figure 3 [30].

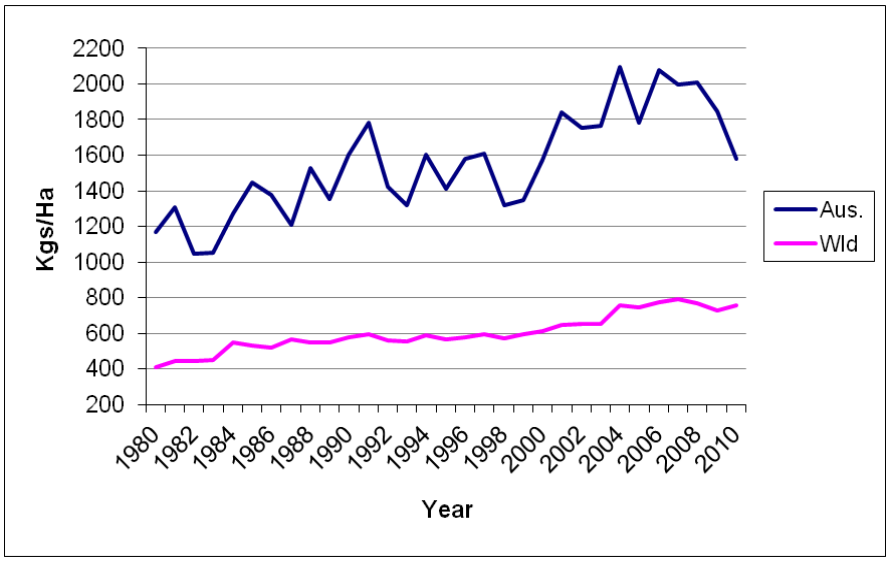


Figure 3 – Australian and World cotton lint yields [30]

Transgenic cotton was first commercially released in Australia in 1996. The technology was rapidly adopted by growers and by 2008; ninety five percent of the crop was genetically modified (GM) herbicide and insect tolerant varieties. Adoption of varieties with the insect tolerant Bollgard II® technology has seen insecticide use decrease by over 80% compared to a decade ago [31] which is one of the largest reductions documented with this technology in the world to date [32].

Additionally, preliminary desktop studies undertaken in 2009 for the UK Carbon Trust showed Australian cotton production had the lowest carbon footprint in terms of on farm emissions of any of the major cotton producers in the world [33].

It is important for the cotton industry to understand that different fibre properties are required for different spinning systems. Table 1 lists the number of spinning positions installed in the short staple[1] spinning sector in 2009 and an estimate of the proportion of world yarn produced on each system. It is estimated that in 2009 almost 21.5 million tons of cotton yarn (100%) or 36 million tons, when considering cotton rich blends, was produced on these spinning systems, with forecasts suggesting that this will increase to almost 38 million tons in 2011. Cotton remains the dominant fibre processed on these spinning systems with a market share of >65% [14, 30].

[1] For the production of yarns from cotton or other fibres that are shorter than 64 mm.

Table 1 – Number of World Short-Staple Spinning Positions [7]

Spinning System	Ring Spinning	Rotor Spinning	Air-Jet Spinning*
No. of positions	220 million	7.8 million	500,000
Yarn prod. (% est.)	> 60%	> 30%	< 10%
Max. delivery	25 m/min	300 m/min	450 m/min

*Includes Murata Vortex Spinning (MVS) positions

Table 2 lists the fibre properties required by each system to process high quality yarn efficiently. Eighty percent of all spinning machines installed produce yarns in the 5-30 Ne range [10] with the commodity yarn market in the 30-40 Ne count range.

Table 2 – Important Fibre Properties [11]

Importance rank	Ring Spinning	Rotor Spinning	Air-Jet Spinning
1	Length	Strength	Length
2	Strength	Fineness	Cleanliness
3	Fineness	Length	Fineness
4		Cleanliness	Strength

The aims of this current survey described in this report were to:

1. Review / benchmark the perceptions of Australian cotton against baseline data collected in the 2002/03 survey.
2. Identify / quantify potential emerging trends with regards to raw fibre / textile demand.
3. Quantify value perception of various licensing / branding programmes (e.g. Cotton USA/BMP Cotton /Organic, Supima® etc.)
4. Identify points of differentiation / value perception of Australian cotton vs. other cotton origins and fibres.
5. Establish the demand potential for higher quality Australian cotton.

The report is set out under each of these aims.

SURVEY METHODOLOGY

Survey Interviews

Thirty five companies that purchase Australian cotton were interviewed in regard to its quality in yarn production. The survey-interview approach, which entails person-to-person interviews conducted around a set of scripted questions, was taken to ensure a high and consistent response. The questionnaire developed for the survey provided a standardized and consistent structure to the interviews, whilst the person-to-person contact ensured questions were not only answered but properly clarified with interviewees. The personal contact also gave interviewees the opportunity to ask questions about the study and provide more detail about particular aspects that affected their business.

The questionnaire was written by CSIRO Materials Science and Engineering (CMSE) in consultation with the Cotton Research and Development Corporation (CRDC) and the Australian Cotton Shippers Association (ACSA) (Appendix 1). This survey is much more in depth than the survey conducted in 2002/3. It consisted of a series of background questions about each spinning company's production, raw fibre use and spinning facilities followed by a series of more open-ended questions about the quality and points of differentiation of Australian cotton fibre. In addition to this it also asked questions to identify emerging trends, to determine perception on licensing/branding programmes and to gain a better understanding of the market for long staple cotton.

Interviews were between one or a number of the company personnel responsible for raw fibre purchases and two interviewers representing the Australian cotton industry. The positions of persons interviewed varied between companies from line managers in the cotton department of a particular company to company directors, CEO or owner. Where required the questionnaires were translated. All the interviews were attended by the local Austrade representative (with the exception of the interview in Australia) who in some cases acted as an interpreter. Survey interview data was collected in note form by the interviewers. In all cases spinning companies received the questionnaire in advance to allow them to familiarise themselves with it and to answer questions and gather information prior to the interview.

Survey of Bale Lay-Downs

In addition to survey-interviews, fibre samples were gathered from bale lay-downs in mills. These samples were analysed by objective measurement which provided an objective benchmark of Australian fibre quality against the quality of other growths, with which it competes in the marketplace. Samples were collected four times from spinning companies from April 2009 through to December 2010. Tables 4 and 5 below; list the number of mills that participated, the number of lay-down samples tested and the origins of bales in mill lay-downs. Of the 34 mills surveyed only 17 contributed bale lay-down samples, with only three mills supplying samples for all testing rounds. Test results on fibre samples from lay-downs surveyed were averaged for each growth, i.e. country or area of origin, and expressed with y-error bars of 1 standard deviation giving an indication of the variation. Standard deviations were not expressed for averages of two or less test results (see Page 60).

Australian cotton is mainly laid down with bales from the USA and Brazil but also with cotton from Africa (both South and West Africa), Uzbekistan, Greece and India. Fibre samples from

each bale in a lay-down were collected by the spinning mills using a formal sampling procedure developed by CMSE and demonstrated during the visit to each spinning mill (Appendix 2).

Lay-down samples were sent by spinning mills to CMSE where they were checked and sub sampled. Samples were tested at CMSE for neps, seed coat neps and short fibre content using an Uster Technologies AFIS PRO[2], for maturity using the Siromat™[3] and for fibre fineness using the Cottonscan™[4]. Samples were also sent to the Auscott Classing office[5] in Sydney Australia. At this Classing facility fibre properties were tested on an Uster Technologies High Volume Instrument (HVI 1000). The HVI results are from one repetition and results from the AFIS, Siromat™ and Cottonscan™ are the average value for five repetitions. Tests were carried out under standard conditions according to ISO 139. Where samples received were too small to test on all instruments the samples were tested only by AFIS PRO, Cottonscan™ and Siromat™.

Table 4 – Number of mills supplying lay-down samples

Mill Country	No. of Mills
Japan	2
Thailand	3
Korea	3
Hong Kong	2
India	2
Indonesia	5
Total	**17**

[2] The International Cotton Testing Committee (ITMF) has recommended that the AFIS system be used as the International Standard method for counting neps. There are currently 903 AFIS installations in 59 countries.

[3] Developed by CSIRO with funding from the Australian Cotton Industry

[4] Developed by CSIRO with funding from the Australian Cotton Industry

[5] A BMP certified Classing facility.

Table 5 – Origin of bales in mill lay-down samples

Country	No. of Samples
Australia	145
Brazil	33
China	10
Greek	6
India Shankar 6	24
India Other	10
Tanzania	10
US California/Arizona (CA)	72
US Memphis/Eastern (EMOT)	64
US Fibermax	34
US Texas	5
US SJV	36
US Other	23
Uzbekistan (CIS)	4
Zimbabwe	9
Spain	1
Chad	5
Africa Other	4
Total	**495**

SELECTION AND BACKGROUND OF SURVEY COUNTRIES AND COMPANIES

Spinning companies represented in the survey were selected on the basis that a significant proportion of the cotton they processed was from Australia. On this basis companies from Japan, Republic of Korea (also referred to as South Korea, but referred to simply as Korea in this report), Thailand, India, Hong Kong/China, Indonesia and Australia were approached for the survey. Spinning companies were contacted for interviews by Austrade officials in Osaka, Seoul, Bangkok, Hong Kong, Jakarta and New Delhi; whilst contact for an interview in Australia was made directly by CMSE**.** To date, Australian cotton has only made up a relatively small proportion of cotton used by Chinese mills due to drought reduced production in Australia over the last decade. The drought has coincided with the key period of increased Chinese cotton import activity. For this reason and the sheer scope and diversity of Chinese spinning capacity, it was not practical or meaningful to survey spinning mills in mainland China.

Visits to conduct interviews were made between March 2009 and March 2010. In most cases interviews were with people responsible for buying or over-seeing cotton purchases rather than the mill production managers.

A total of 34 spinning companies, one large cotton merchant and one management consulting firm were included in the survey; Japan (6), Korea (4), Thailand (6), India (10), Hong Kong (2), Indonesia (8) and Australia (1). As expected all of the spinning mills surveyed, with the exception of one mill, operated ring spinning (just over 6.6 million spindles), with all the mills also operating open end rotors (just under 48 000 rotors) and some mills operating air-jet spinning (including MVS)(just under 22 000 positions). These mills consumed just under 2 million tonnes of cotton in 2009/10 of which 117,000 tonnes or 515,000 bales (10%) was Australian cotton. Spinning mill details are listed in Appendix 2.

The majority of spinning capacity of survey respondents (81%) was allocated for production of yarns below 40 Ne, with 15% between 40 and 59 Ne. Just 4% of overall spinning capacity was allocated to yarn production finer than 60 Ne.

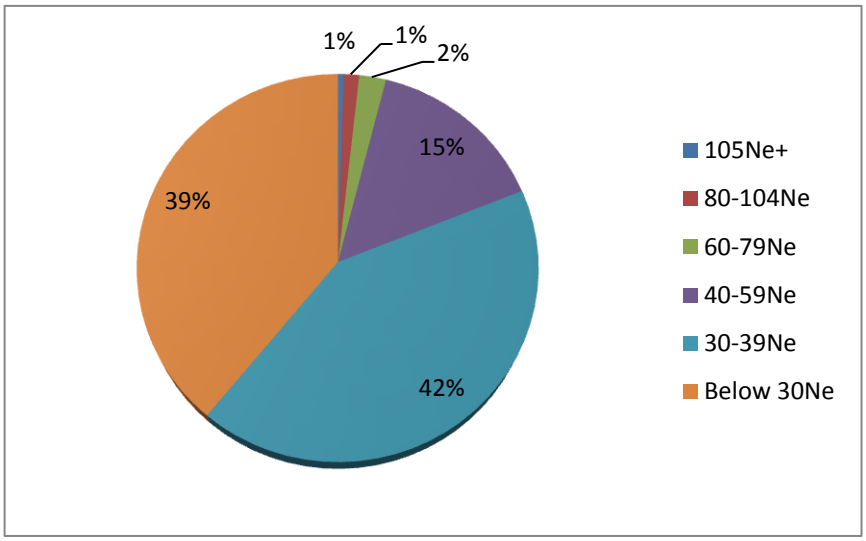
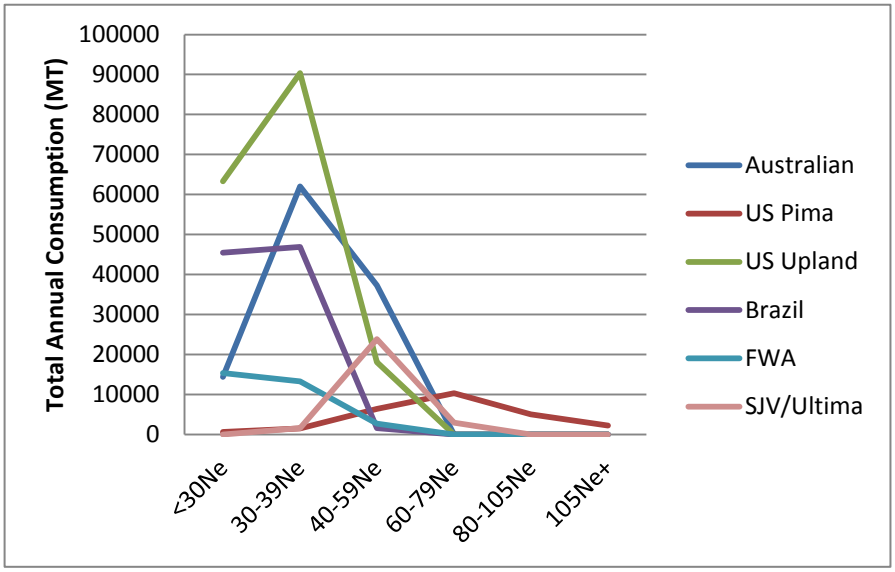


Figure 4 – Breakdown of yarn counts – Overall data

It was not surprising to note that, as shown in Figure 5, the utilisation of Australian cotton in the <30 Ne was relatively low, with the bulk of its usage in the 30-39 Ne range. While the volumetric usage of

Australian cotton does drop off in the premium 40-59 Ne range, it needs to be remembered that this area makes up only 15% of total mill consumption.



Note – consumption in Indian and Chinese markets was excluded due to the fact that their usage was skewed toward domestic growths.

Figure 5 – Breakdown of growths used in various yarn count categories – Overall data

Therefore, the proportion of Australian cotton used increases to the point where it can be considered to be the base fibre in the 40-59 Ne count range of survey participants; making up 32% of the cotton used, as illustrated in Figure 6.

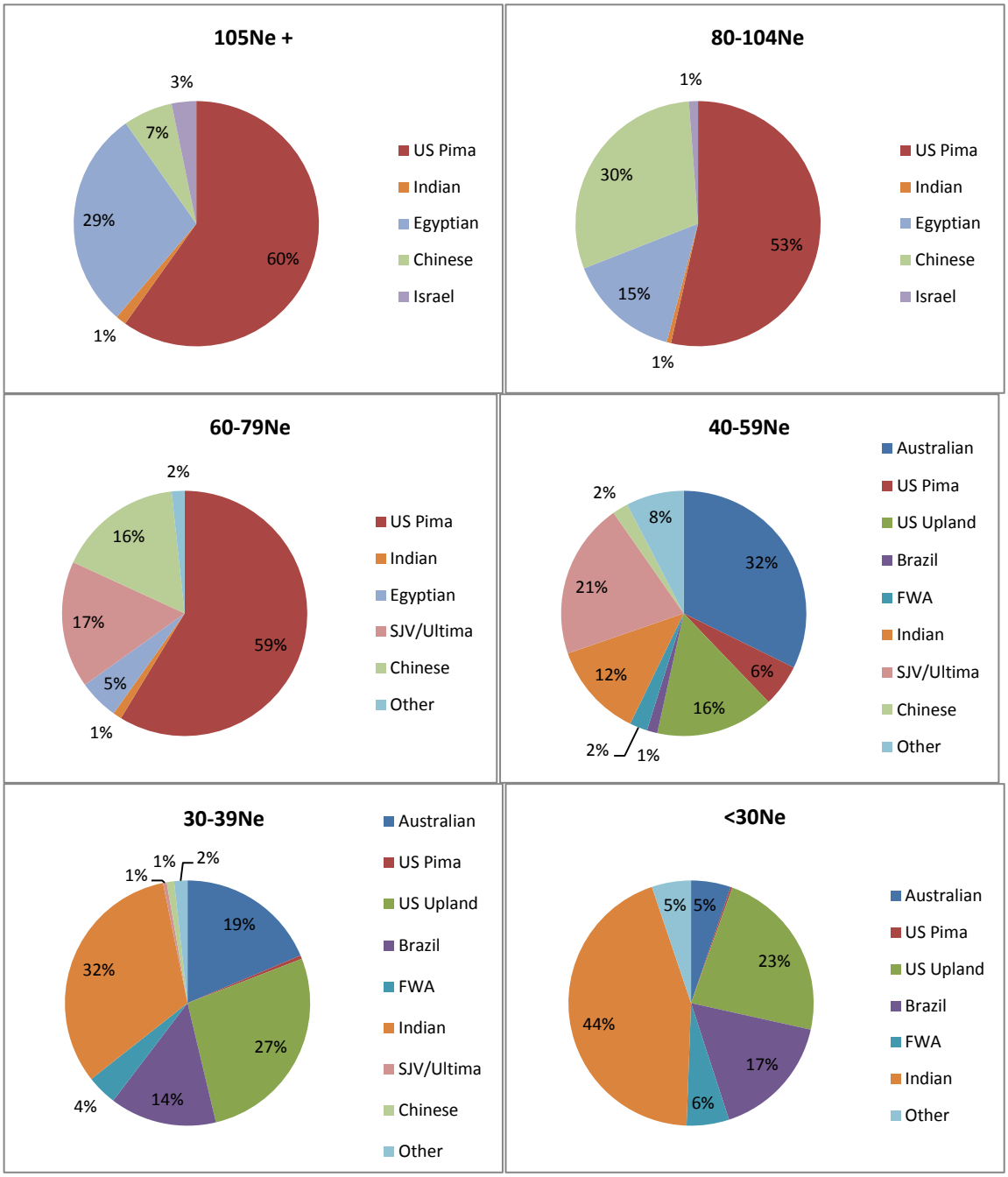


Figure 6 – Breakdown of growths used in various yarn count categories – Overall data

Japan

Although Japan is still regarded as one of the world's leading exporters and importers of textiles its share in both markets has reduced considerably since 1980. This decrease in textiles has resulted in Japan becoming a large net importer of clothing; accounting for nearly 7% of the world's clothing trade [12]. The major destinations for Japanese exports are China followed by Hong Kong, the European Union, US and Vietnam. The major supplier is China [29].

This trend is reflected in a substantial decrease in spinning capacity in the Japanese market to about 651 000 ring spindles of which only approximately 486 000 ring spindles are currently in operation [6]. This reduction in spinning capacity is also noted by the International Textile Machinery Shipment Statistics (ITMF) [7] which also noted that there have been minimal installations of new ring spinning spindles in the last few years. Our survey participants accounted for a significant portion of the Japanese market, with a combined capacity of just over 382 000 ring spindles, 2 500 open end rotors and 64 vortex spindles. Combed yarns made up between 20-100% of the ring spun production. Compact spinning made up a very small proportion (less than 5%) of the ring spinning capacity.

In the last five years, the survey participants showed a net reduction in spinning capacity, especially ring spinning, with a number of mills closing down or relocating to China, Indonesia and Vietnam where they are managed as joint ventures or fully owned subsidiaries. It is estimated that there are still 20-25 spinning mills operational in Japan.

Japanese raw cotton consumption has been steadily decreasing since 1990 and is currently estimated at 105,000 MT per annum (see Figure 7).

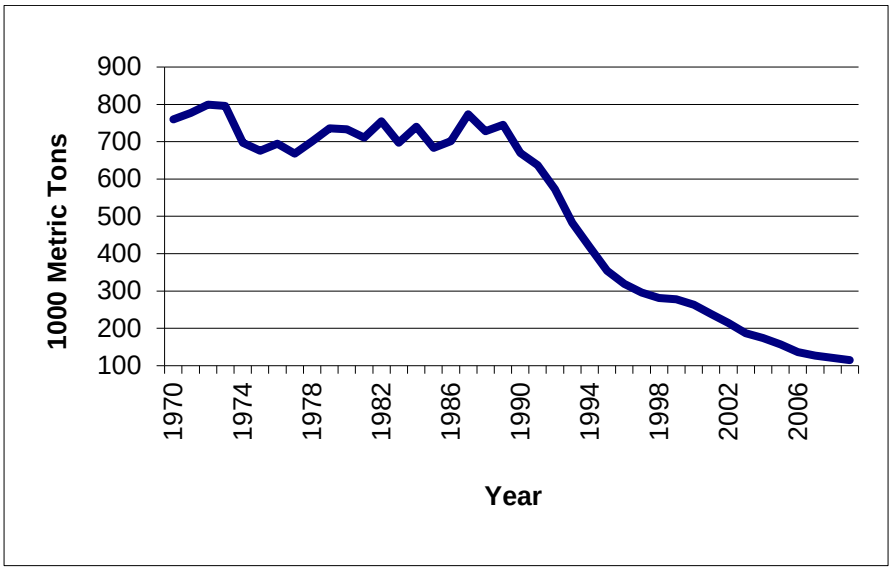


Figure 7 – Japanese mill Cotton Consumption [4]

Traditionally Japan was the major user of Australian cotton but since 2002 the consumption of Australian cotton has also decreased and is currently estimated at 14,000 MT per annum (see Figure 8).

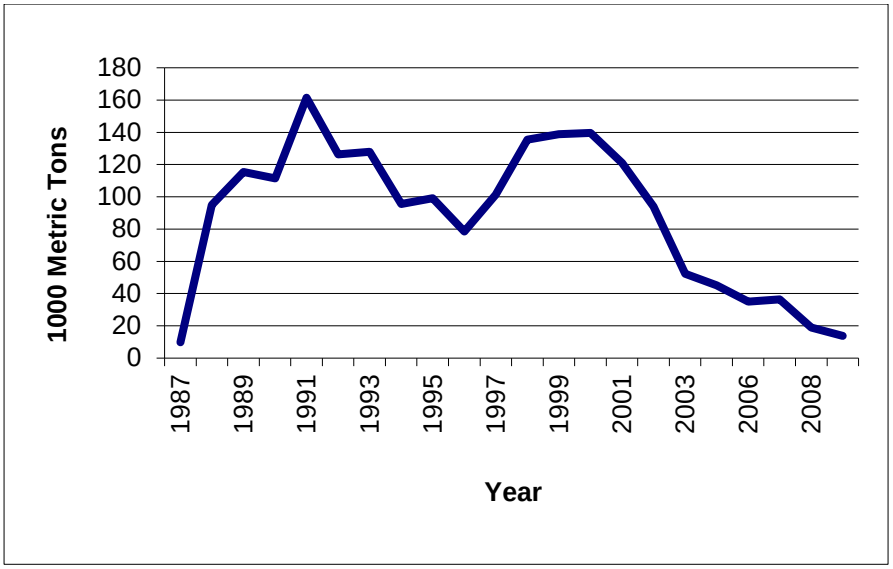


Figure 8 – Japanese mill Consumption of Australian Cotton [8]

The proportion of Australian cotton used in mill lay-downs surveyed varied from 20-100% with cotton from USA (SJV; CA; Fibermax and EMOT) and to a lesser extent Brazil making up the rest of the blend.

Four of the six Japanese mills require HVI data with cotton shipments with these mills retesting 5-20% of the incoming bales on either their own HVI lines or outsourced for testing. Feedback from the mills suggest that the visual classification of cotton according to the United States Department of Agriculture (USDA) standard grade boxes, to determine colour and foreign matter is preferred with HVI data only used to verify fibre properties; if problems encountered during yarn production. As in mills in other countries retests were conducted to mainly check the quality of incoming bales against the sales contract and to assist in bale lay-down management.

This reduction in raw material consumption has also led to a steady decrease in cotton yarn production since 1990 and is currently estimated at 59,000 MT per annum (see Figure 9). Imports of cotton yarn have steadily decreased since 2000 and currently estimated at 68,000 MT per annum, with exports averaging 4,000 MT per annum.

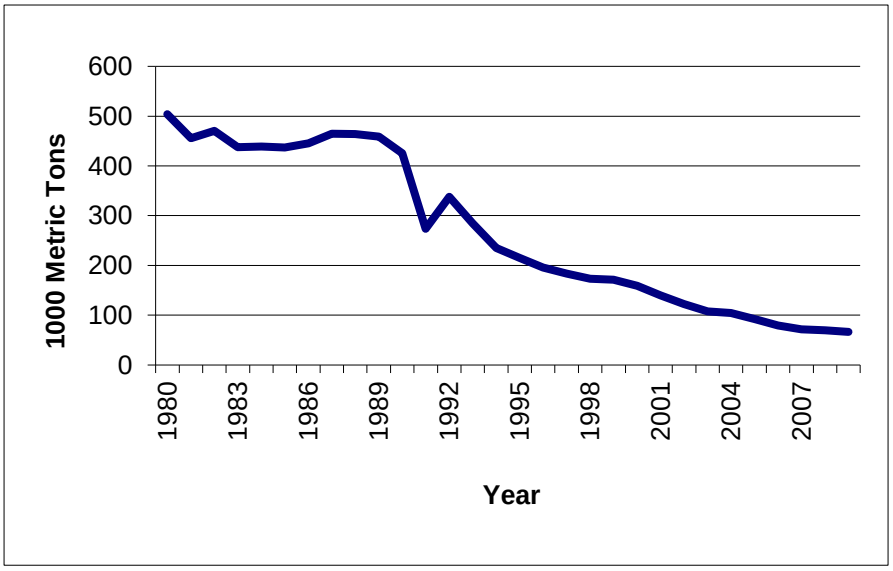


Figure 9 – Japanese mill Cotton Yarn Production [4]

Our survey recipients consumed just less than 32,000 MT of cotton per annum, producing about 32,000 MT of cotton yarn per annum.

Japan was traditionally a high quality fine count spinner producing yarns in the Ne 80 and above count range and producing specialised blended yarns. Over the years this has changed with Japanese companies importing large quantities of fabric and finished goods. The Global Financial Crisis (GFC) has also led to a reduction in the demand for leisure goods which has resulted in substantial reduction in the purchase of ELS cottons for fine count yarns. There is currently a demand for coarse count yarns, with more than 95% of the yarn produced being below 60 Ne, with the majority between 40-60 Ne, with a large proportion of this yarn being core spun yarns. The next strongest category was for 30-39 Ne yarns (see Figure 10). The mills surveyed reported stable to decreasing consumption across all yarn counts.

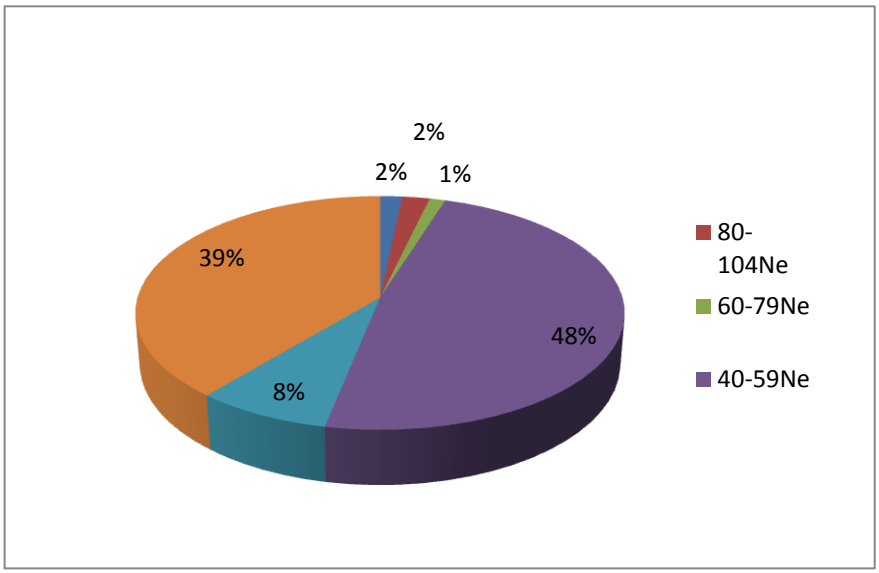


Figure 10 – Yarn Counts Produced - Japan

In recent years, the consumption of Fibermax cotton has increased due to the reduction in the size of the Australian crop, and subsequent increase in relative price which has created a gap for replacement growths; with estimates suggesting Fibermax now accounts for nearly 30% of Japanese consumption, followed by Australian cotton at nearly 20%, as outlined in Table 6.

Table 6 - Breakdown of consumption by growth for Japanese survey participants

Growth	% of Consumption
Other	40
Fibermax (US Upland)	29
Australian	19
SJV Ultima	4
US Pima	3
CA (US Upland)	2
Brazil	2
Egyptian Pima (Egyptian)	1
Indian Pima (Indian)	0.6
Sudanese Pima (Other)	0.3

Others refer to cotton from an origin not stated or provided by survey participants.

Within this breakdown, the small portion of 80-105 Ne yarn production and above was made up of mainly US, Egyptian, Indian and Sudanese ELS cotton. A small quantity of ELS was also used in <30 Ne. Consumption of the growths has been summarised in Figure 11.

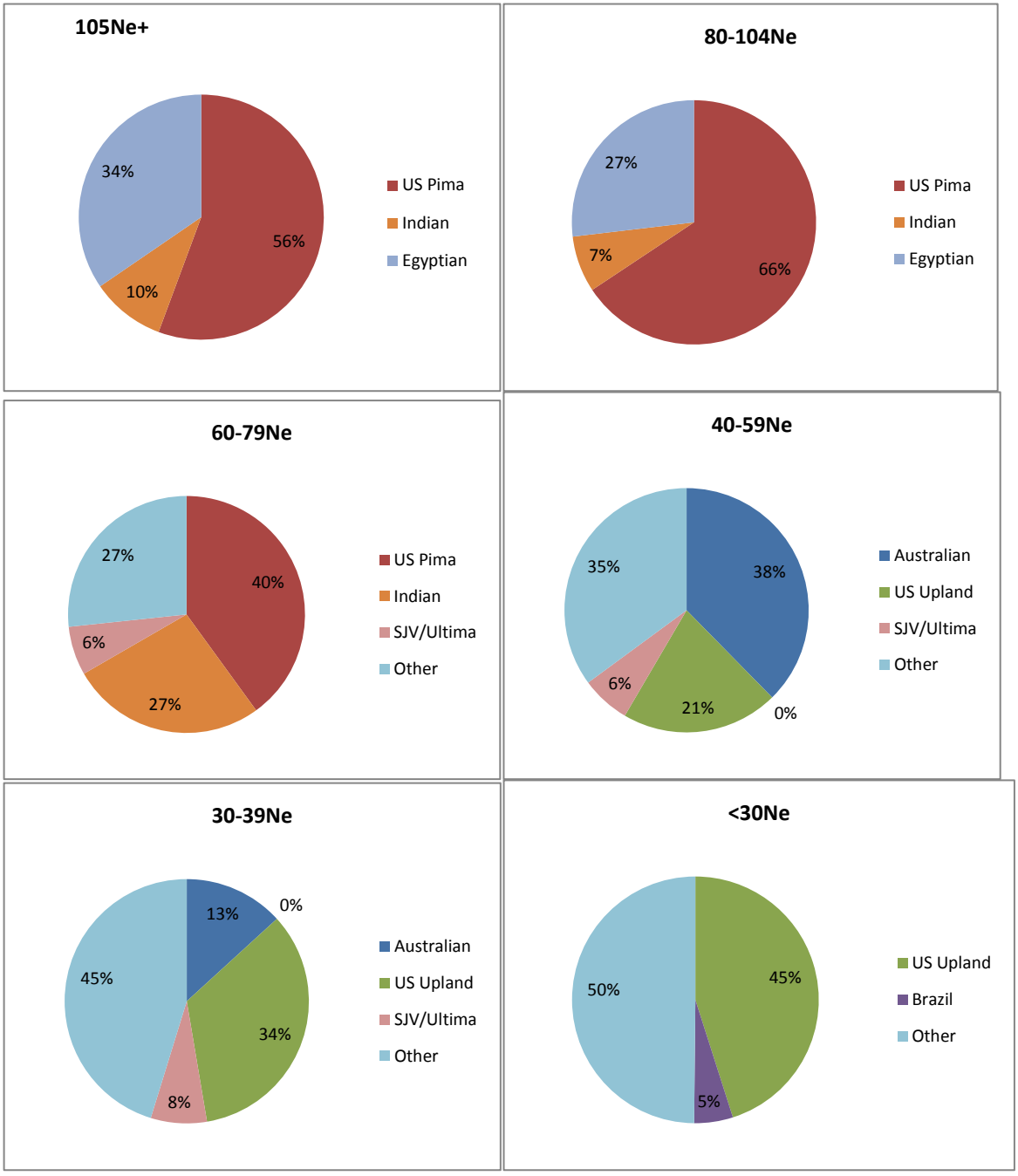


Figure 11 – Breakdown of growths used in various yarn counts - Japan

Although cotton was the major fibre used the mills surveyed also use polyester, viscose, modal, wool, linen, ramie and acrylic in various blends.

Thailand

The textile and clothing industry in Thailand plays a significant role in the country's economic and social development. It is the largest employer in the manufacturing sector employing around 1.3 million people. The industry is fully integrated, modern, privately owned, has a skilled workforce, has

been able to attract considerable foreign direct investment and is well situated to become a regional hub with the formation of ASEAN[6] [24, 25, 26, 28].

Thailand is considered to be one of the leading exporters and importers of textiles. It has been steadily increasing its market share of the world trade as an exporter of textiles to 1.3% in 2008; with its share as an importer remaining fairly stable at around 1% since 1990. Thailand is also a major exporter of clothing accounting for 1.2% of the world trade although this has been decreasing since 1990[12]. The largest market for Thailand's exports is the US and the European Union followed by members of ASEAN [28].

The majority of companies in the textile sector can be classified as small or medium size enterprises with only a few large companies. There are an estimated 1918 textile factories in operation in Thailand of which there are 150 spinning mills [26]. The spinning capacity in Thailand is currently around 4 million ring spindles, which has remained fairly static over the last 5 to 10 years, and 50 000 open end rotors [7, 50]. Around 10% of this capacity was idle during the GFC. Some of this capacity is now being reactivated. Our survey participants accounted for a little over 20% of the spinning capacity in Thailand, with almost 850,000 spindles. Of this capacity, 99.1% comprised ring spinning, 0.8% open end rotors, and 0.1% air jet positions. Combed yarns generally made up between 90-100% of production, with one mill at 75%, and another at just 10%. Compact spinning made up less than 10% of the ring spinning capacity; this was an area of investment and upgrading for most survey participants.

Five of the six mills surveyed have installed new capacity in the last five years. Greater investment had been made in ring spinning, with at least 136 000 spindles installed, of which about one third was for compact yarn production. A smaller degree of investment had been made in open end rotors.

Thailand produces around 5% of its raw cotton requirements and is thus entirely dependent on raw cotton imports. The largest supplier of cotton has consistently been the US, followed by Australia, West Africa, India and Brazil [24]. Raw cotton consumption by Thailand has grown steadily since 1998 and has remained fairly consistent since 2002. Currently it is estimated at 397,000 MT per annum (see Figure 12).

[6] ASEAN is the Association of Southeast Asian Nations, comprising; Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

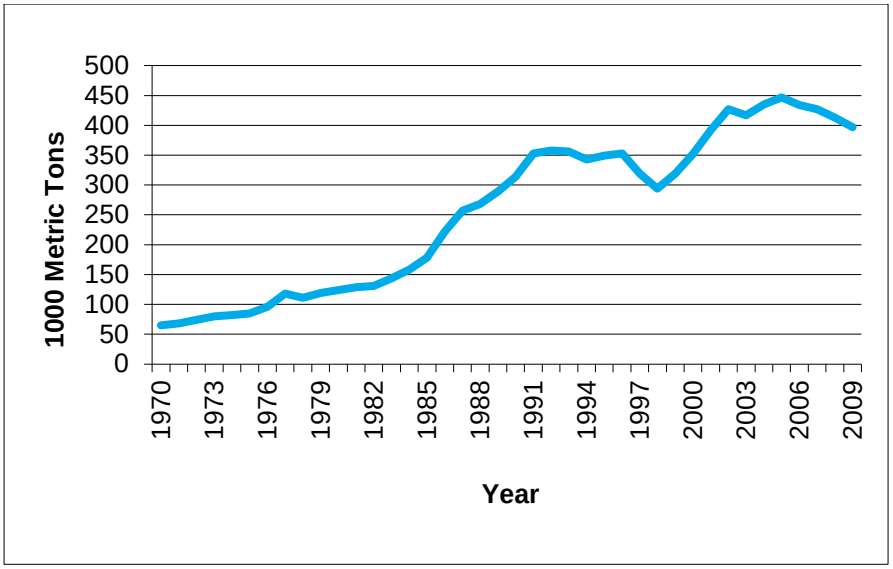


Figure 12 – Thailand Cotton mill Consumption [4]

Thailand has traditionally been a major user of Australian cotton but consumption of Australian cotton has decreased since 2000 and is currently estimated at 59,000 MT per annum (see Figure 13).

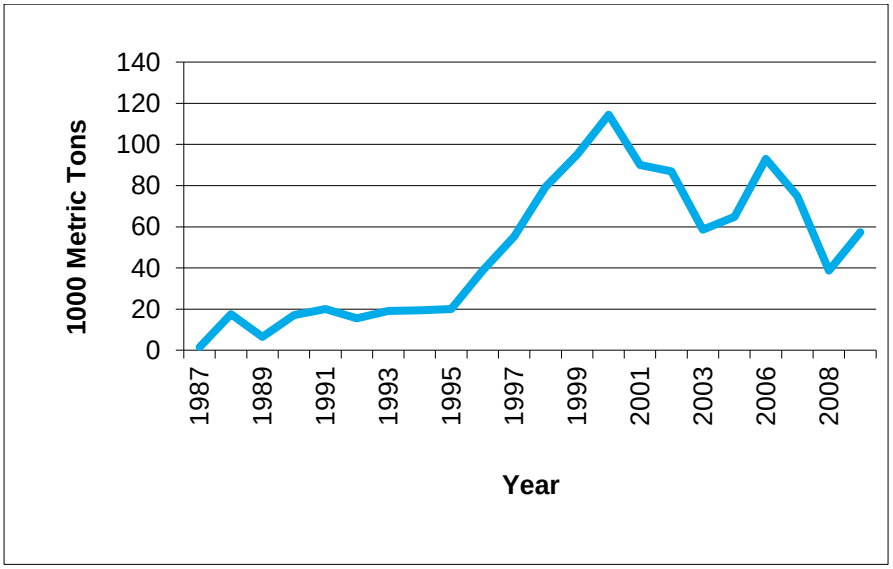


Figure 13 – Thailand mill Consumption of Australian Cotton [8]

The proportion of Australian cotton used in mill lay-downs surveyed varied from 6-60% with cotton from USA (SJV and Fibermax), West and Southern Africa, Brazil, and to a lesser extent Zimbabwean, Indian and Greek cotton making up the rest of the blend.

Four out of the six mills in Thailand require HVI data with cotton shipments with three of the mills retesting 100% and three mills testing between 10-20% of incoming bales on their own HVI lines. As in mills in other countries retests were predominately conducted to check the quality of incoming bales against the sales contract and to assist in bale lay-down management. The data is also used to a lesser extent to assist in the prediction of yarn quality and production.

Yarn production has been steadily increasing since 1999 and has remained fairly steady since 2002. Yarn production is currently estimated at 318,000 MT per annum (see Figure 14). Only a small

amount of cotton yarn is imported. In 2008; 13,000 MT per annum, was imported with exports steadily increasing since 1990 and is currently estimated at 58,000 MT per annum.

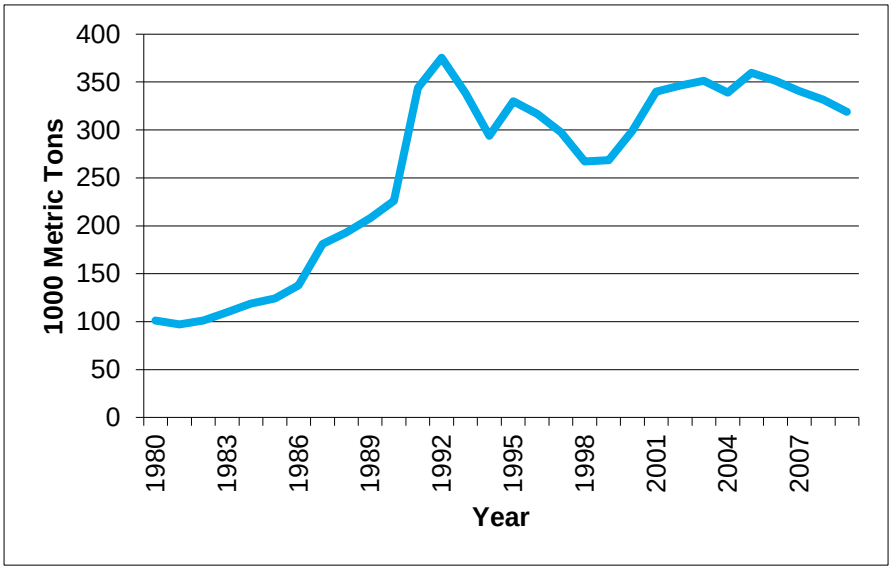


Figure 14 – Thailand mill Cotton Yarn Production [4]

Our survey recipients consumed a total of just under 112,000 MT per annum, producing about 107, 000 MT of yarn. Around 39% of the yarn produced was between 30-39 Ne, with most mills suggesting their average count was 30-32 Ne. At 28% the count ranges below 30 Ne as well as 40-59 Ne were significant sectors.

Interestingly, there was a consumption gap in the 60-79 Ne area, with the 80-104 Ne and 105 Ne and finer yarn counts accounting for around 5% of production. Finer count yarn producers reported that changing consumer attitudes over the last 12 months had seen a reduction in demand for 80 Ne and finer double yarns, which was being replaced with 50-60 Ne doubled yarns due to price considerations. This trend was showing signs of reversing as economic conditions improve (see Figure 15).

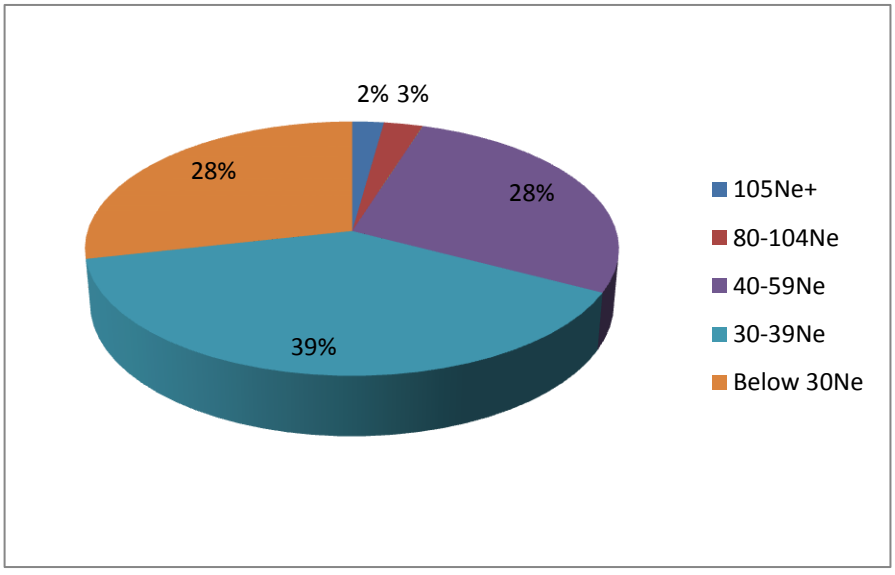


Figure 15 – Yarn Counts Produced - Thailand

Increasing demands for zero contamination and higher strength yarn by most mills as presents increased opportunities for Australian cotton. Yarn tenacity of 17.5 cN/tex is seen as the minimum requirement for weaving yarns, and to achieve this, spinners either have to increase the twist of the yarn, or source cotton with higher fibre strength. The minimum strength required by the mills was ≥ 29g/tex.

Reduced production of SJV cotton (which is renowned for its strength of ≥32 g/tex) is therefore opening up a market gap for Australian fibre, as other growths were not seen as having the potential to increase their strength.

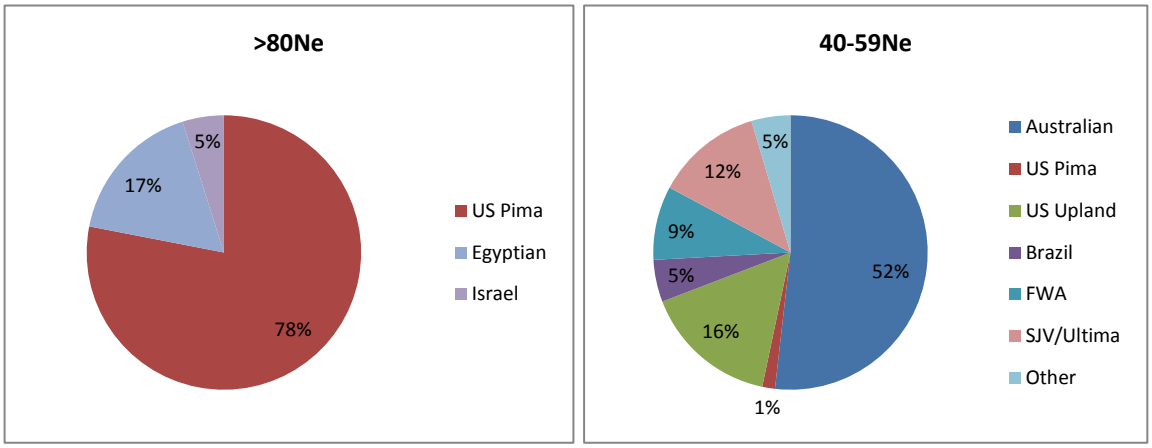
The key issues limiting further utilisation of Australian cotton were supply consistency, price and some concern over neps.

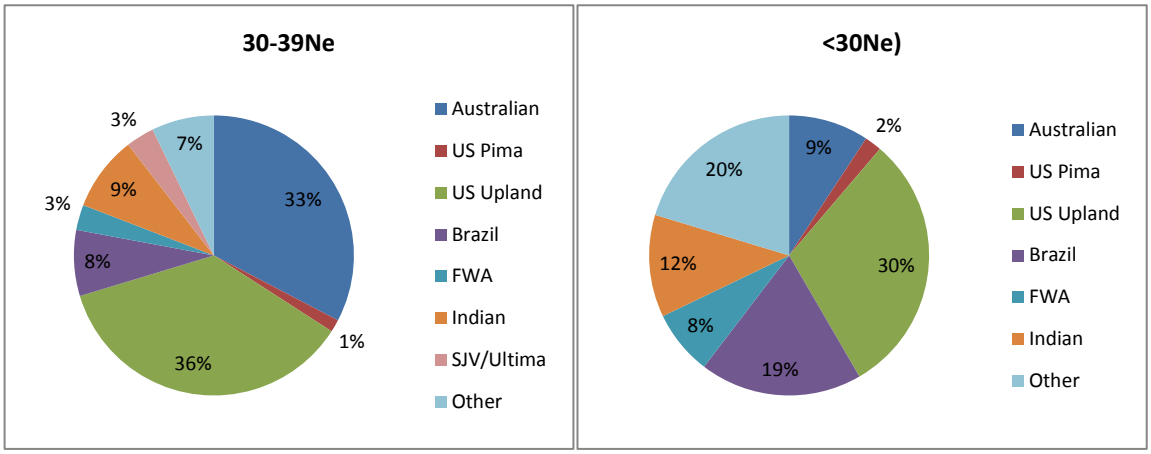
Australian cotton made up a large portion of the consumption mix for our survey participants, as outlined in Table 7.

Table 7 - Breakdown of consumption of main growths for Thailand survey participants

Growth	% of Consumption
Australian	30%
EMOT (US Upland)	27%
Brazil	10%
Indian Shankar 6 (Indian)	7%
West African (FWA)	6%
SJV Ultima	5%
US Pima	5%
Zimbabwe	5%
Other	4%

Within this breakdown, the very small proportion of 60-79 Ne yarn production was made up entirely of US Pima cotton. Consumption in other count ranges has been summarised in Figure 16.





Note – proportions for 80-104Ne and 105Ne + were the same.

Figure 16 – Breakdown of growths used in various yarn counts - Thailand

Korea

Korea is considered to be one of the leading exporters and importers of textiles. Its share of world trade as an exporter has however been steadily decreasing to 4.1% in 2008; with its share as an importer also decreasing to 1.6%. Korea, as is the case with Japan, is now a major net importer of clothing accounting for 1.1% of the world trade, increasing since 1980 when it did not import any clothing at all [12].

Since 1999 the spinning capacity in Korea has been reducing although there have been some investments made by the industry in recent years. Currently there are just over 1.1 million ring spindles and a small number of open end rotors (not favoured in Korea as the market is perceived to be too volatile) is <13 000 open end rotors [7, 50] installed. Our survey participants accounted for a significant portion of the Korean market, with a combined capacity of just over 500 000 spindles. Of this capacity, 99.4% comprised ring spinning, 0.4% open end rotors, and 0.2% air jet (vortex). Seventy percent of the cotton yarns produced in Korea is combed and it is thus not surprising that combed yarns made up between 98-100% of our survey participants production. Compact spinning made up less than 10% of the ring spinning capacity.

In the last five years, the survey participants showed a net reduction in open end capacity, while ring spinning and air jet equipment had been installed as either new or replacement machinery. Anecdotal evidence suggests the reduction in open end capacity is in line with a broader trend in the Korean market, with open end production suffering from cheap Chinese competition.

Not surprising Korean raw cotton consumption has been steadily decreasing since 1991 and is currently estimated at 197,000 MT per annum (see Figure 17).

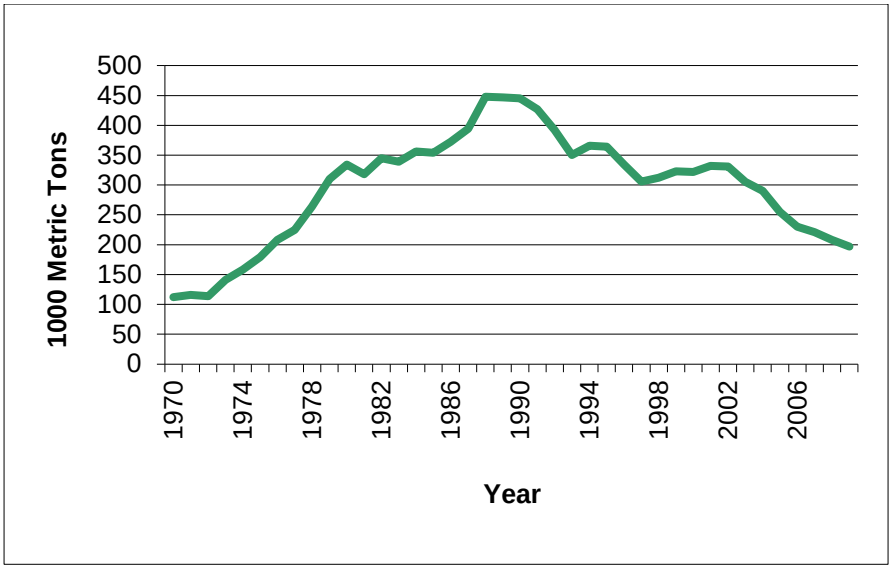


Figure 17– Korean mill Cotton Consumption [4]

Korea has traditionally been a major user of Australian cotton but consumption of Australian cotton has also decreased since 2002 and is currently estimated at 26,000 MT per annum (see Figure 18).

The proportion of Australian cotton used in mill lay-downs surveyed varied from 9-38% with cotton from USA and Brazil and to a lesser extent India making up the rest of the blend.

All the Korean mills require HVI data with cotton shipments with two of the mills retesting 100% and two mills testing between 10-20% of incoming bales on their own HVI lines. As in mills in other countries retests were conducted to check the quality of incoming bales against the sales contract, to help with bale lay-down management and to predict yarn quality.

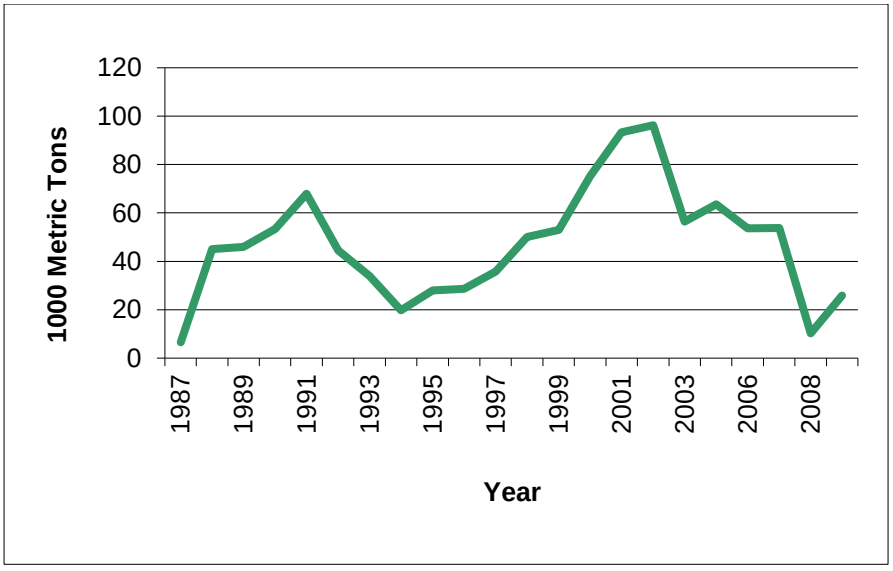


Figure 18 – Korean mill Consumption of Australian Cotton [8]

This reduction in raw material consumption has also led to a steady decrease in cotton yarn production since 1993 and is currently estimated at 195,000 MT per annum (see Figure 19). Imports of cotton yarn have remained fairly stable since 2000 averaging around 200,000 MT per annum, with exports averaging around 30, 000 MT per annum.

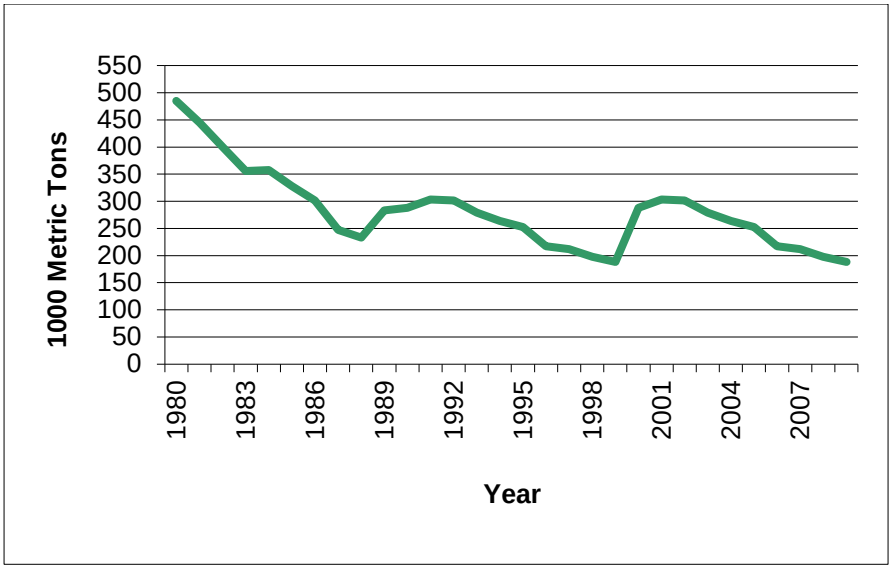


Figure 19 – Korean mill Cotton Yarn Production [4]

Our survey recipients consumed a total of just under 104,000 MT of cotton per annum and produced about 95, 000 MT of yarn. More than 90% of the yarn produced was below 40 Ne; with the majority between 30-39 Ne (see Figure 20). The mills surveyed reported stable consumption across all yarn counts.

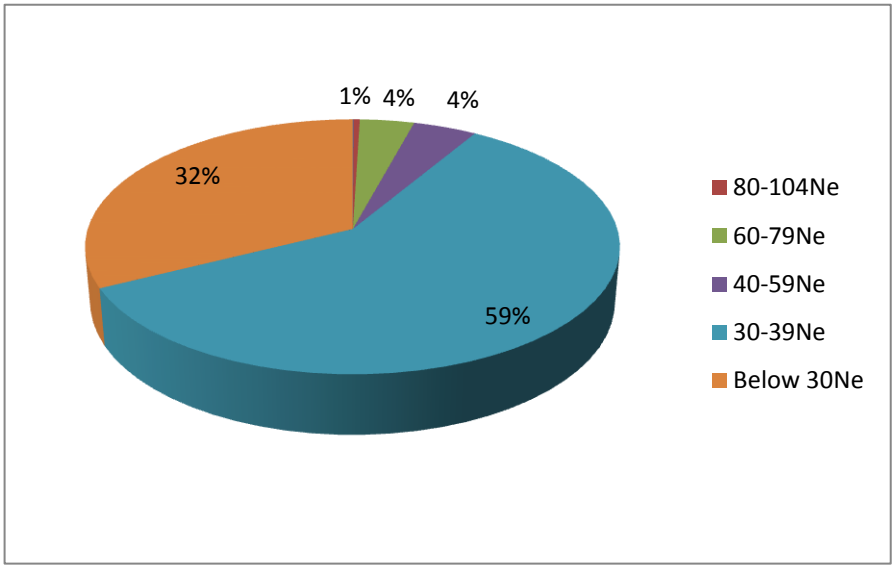


Figure 20 – Yarn counts produced - Korea

In recent years, Brazilian cotton has become the growth of choice for Korean spinning mills, with estimates suggesting it now accounts for between 60-70% of Korean consumption. Until the mid 1990's Korea used mostly SJV cotton, before a consumption switch to CIS due to price. Contamination issues with CIS cotton saw Australian cotton find favour in the early 2000's before drought and wide price differentials saw Brazil find greater favour from 2004 onwards.

All of the survey recipients indicated they were now in the process of reducing the proportion of Brazilian cotton in their mix, partly as a result of narrowing price differentials and partly as a result of the increased availability of Australian cotton.

Our survey recipients showed slightly below estimated trend consumption of Brazilian cotton, as outlined in Table 8.

Table 8 - Breakdown of consumption by growth for Korean survey participants

Growth	% of Consumption
Brazil	57%
US Fibermax (US Upland)	24%
Australian	9%
US Pima	5%
Indian Shankar 6 (Indian)	4%
Egyptian ELS (Egyptian)	1%

Within this breakdown, the small portion of 80 Ne yarn production and above was made up entirely of Egyptian ELS cotton. Consumption of other growths has been summarised in Figure 21.

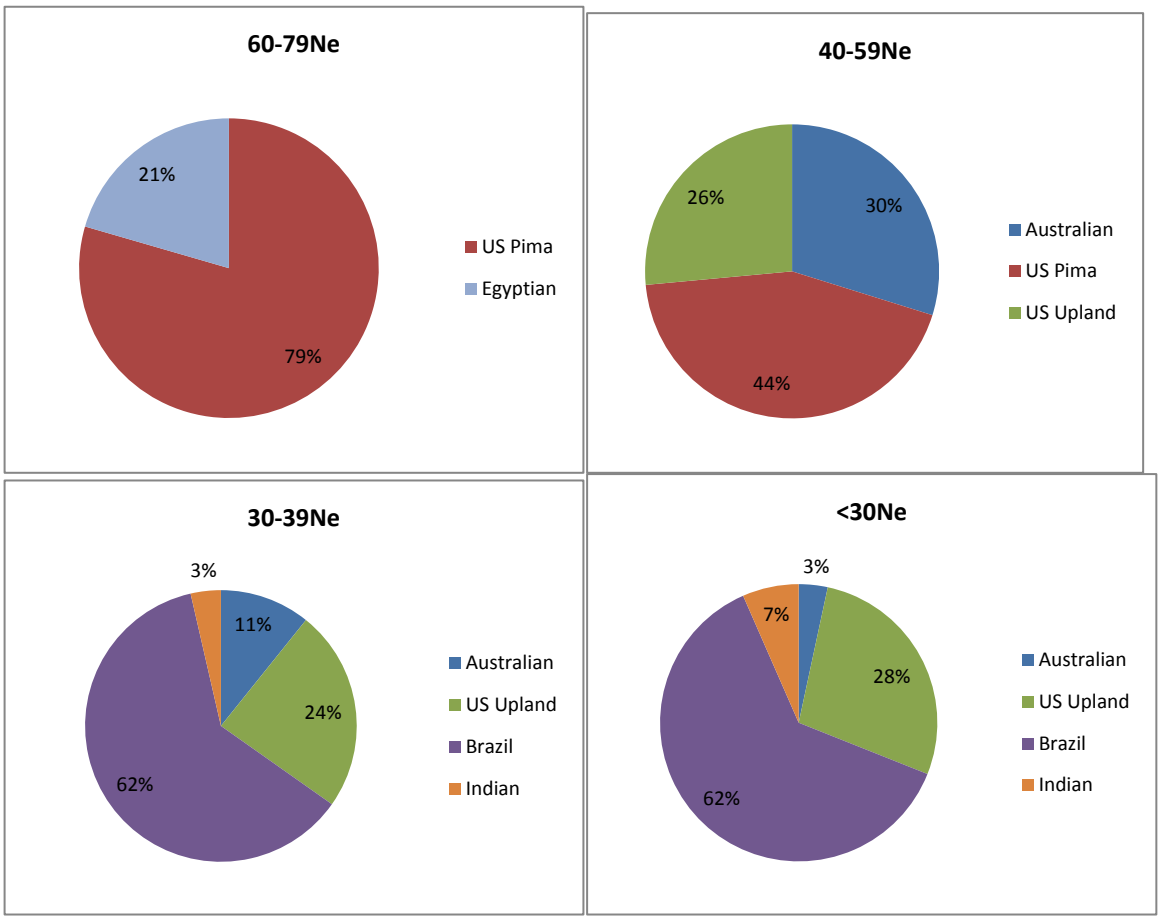


Figure 21 - Breakdown of growths used in various yarn count categories - Korea

Mills surveyed were also using polyester, viscose, modal, wool and acrylic to varying degrees.

Hong Kong

Estimates suggest that the spinning capacity is currently around 130 000 ring spindles and 15 000 rotors [7, 50]. There has been no new spinning equipment installed since 2006 and it is expected that this capacity will reduce over time as a number of the Hong Kong based companies continue to relocate to the Peoples Republic of China (PRC), mainly to the Guangdong Province.

With just over 104 million short staple ring spindles, 3.6 million long staple[7] ring spindles and just over 2.1 million open end rotors; the PRC dominates in the production of short staple spun yarns [7,50]. In 2009 the PRC had 47.5% of the world's installed short staple capacity and 27% of the world's open end rotor capacity [14]. Due to this large capacity the PRC produces in excess of 63% of the world's cotton yarn production and 60% of the world's manmade fibre yarn production [4, 13]. This share of the world yarn production is projected to continue increasing to 64% in 2011 [30]. Due to these large installations it is not surprising that the PRC is the second largest exporter of textiles as well as the third largest importer of textiles accounting for 26.1% and 6.2% of the world's trade respectively. At 33.2% of the world's trade in clothing, the PRC is the largest exporter of clothing and the thirteenth largest importer of clothing [12].

One of our survey participants still has some spinning capacity installed in Hong Kong whereas the other has relocated to PRC. The survey participants have installed new capacity in the last five years in ring spinning with one of the groups installing around 40 000 spindles in the last 12 months. Of the installed capacity, 98.6% comprised ring spinning, 1.3% open end rotors, and <0.1% air vortex. Combed yarns generally made up between 20-100% of production, with one mill producing 100% combed yarns. Compact spinning made up less than 38% of the ring spinning capacity and this continues to be an area of investment for the survey participants. Seventeen percent of the installed capacity of one of the participants comprised the Nu-Torque™ spinning system[8].

Raw cotton consumption by Hong Kong has steadily been decreasing since 1991 and it is currently estimated at 24,000 MT per annum (see Figure 22).

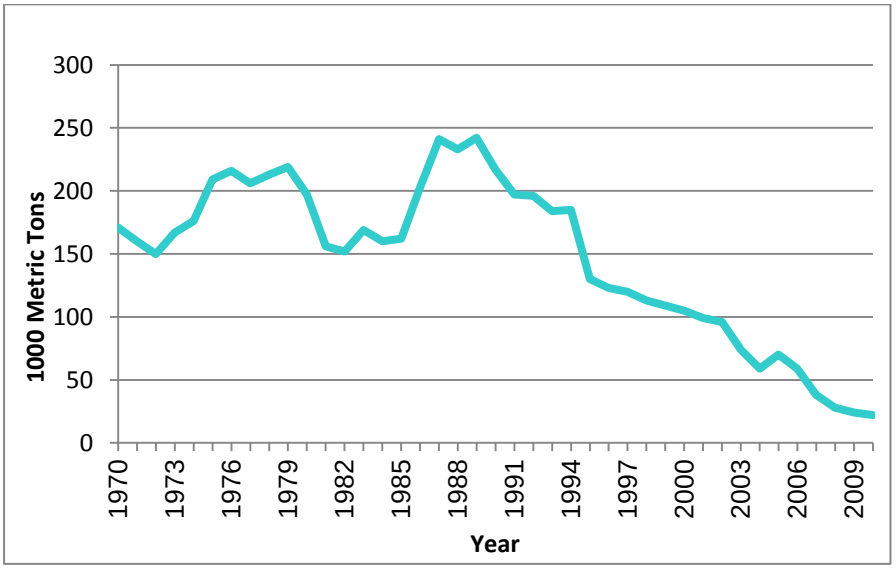


Figure 22 – Hong Kong mill Cotton Consumption [4]

[7] Production of ring spun yarns made from wool and other fibres longer than 80 mm.

[8] A novel spinning system patented by Central Textiles and the Hong Kong Research Institute of Textiles and Apparel which incorporates Sirospun

Hong Kong has traditionally not been a major user of Australian cotton with consumption of Australian cotton steadily decreasing since 2001 and is currently estimated at around 2,000 MT per annum (see Figure 23).

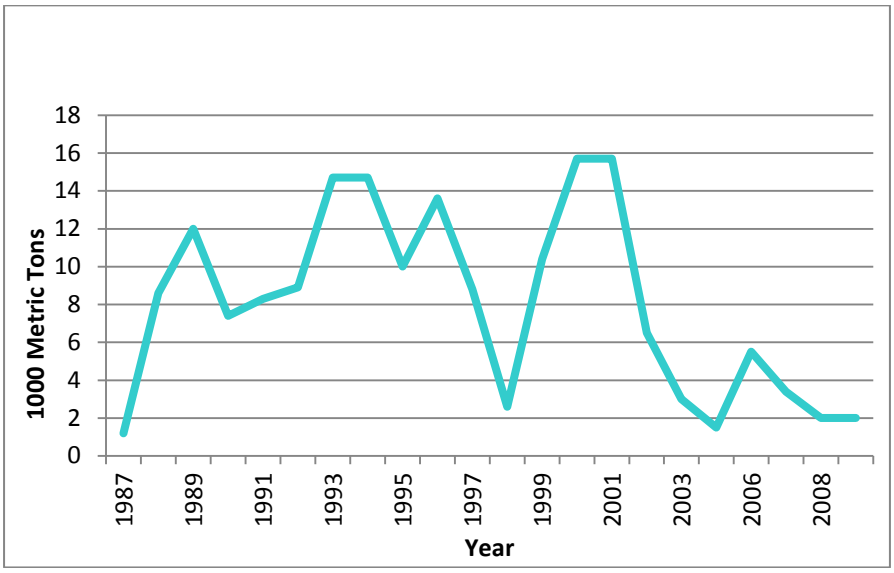


Figure 23 – Hong Kong mill Consumption of Australian Cotton Imports [8]

The proportion of Australian cotton used in mill lay-downs surveyed varied from 60-100% with cotton from USA and China making up the rest of the blend.

Both mills require HVI data with cotton shipments. The mills do have their own HVI lines which are used to check the quality of incoming bales, assist in bale lay-down management and also to predict yarn quality and production.

Yarn production has been steadily increasing since 1999 and has remained fairly steady since 2002. Yarn production is currently estimated at just below 29,000 MT per annum (see Figure 24).
Imports of cotton yarn have steadily increased since 1990 but decreased in 2008 to just under 561, 000 MT per annum. Exports have been reducing since 2006 and are currently estimated at 12,600 MT per annum.

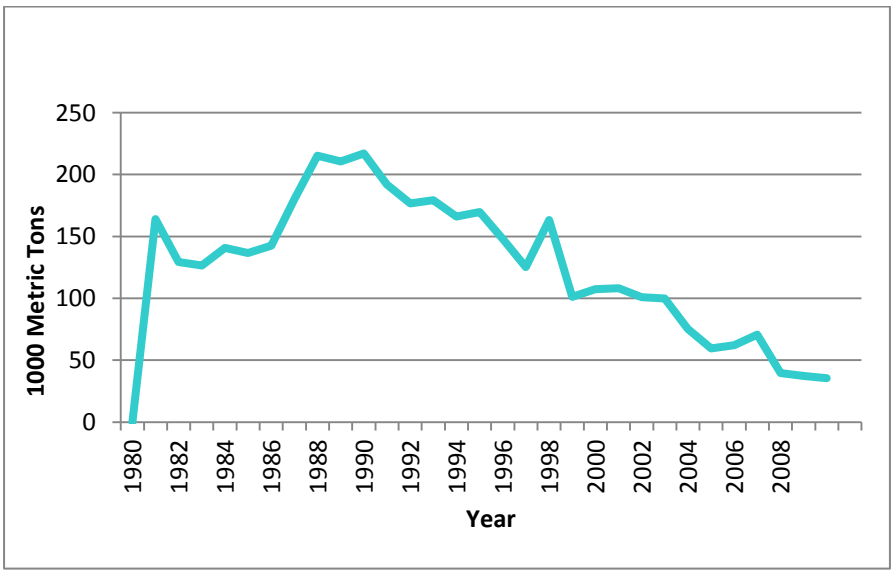


Figure 24 – Hong Kong mill Cotton Yarn Production [4]

Our survey recipients consumed around 60,000 MT of cotton per annum, producing about 57,000 MT of cotton yarn. Around 62% of the yarn produced was below 30 Ne, 14% in 30-39 Ne, 10% in 80-105 Ne, 9% in 50-60 Ne followed by 5% in 60-80 Ne. There is a negligible amount in the +105 Ne category (see Figure 25).

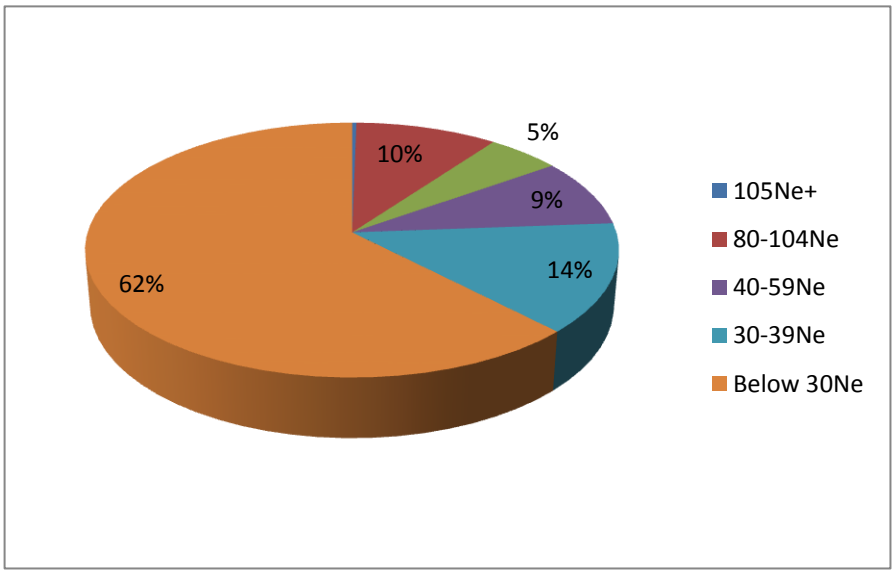


Figure 25 – Yarn counts produced – Hong Kong

Increasing demands for zero contamination and reduction of SJV acreage are seen as creating increased opportunities for Australian cotton. The key issues limiting further utilisation of Australian cotton were supply consistency, price and some concern over neps, short fibre content and Micronaire.

Australian cotton made up only a small portion of the consumption mix for our survey participants, as outlined in Table 9.

Table 9 - Breakdown of consumption of main growths for Hong Kong survey participants

Growth	% of Consumption
EMOT (US Upland)	64%
China Xinjiang ELS (Chinese)	19%
US Pima	11%
Australian	6%

The main cotton used by survey participants was Memphis/Eastern predominately for production of denim yarns produced on ring and rotor. This is followed by Chinese ELS cotton from Xinjiang followed by US Pima. Australian cotton was mainly used in blends in the 30-40 Ne yarn count range as can be seen in Figure 26.

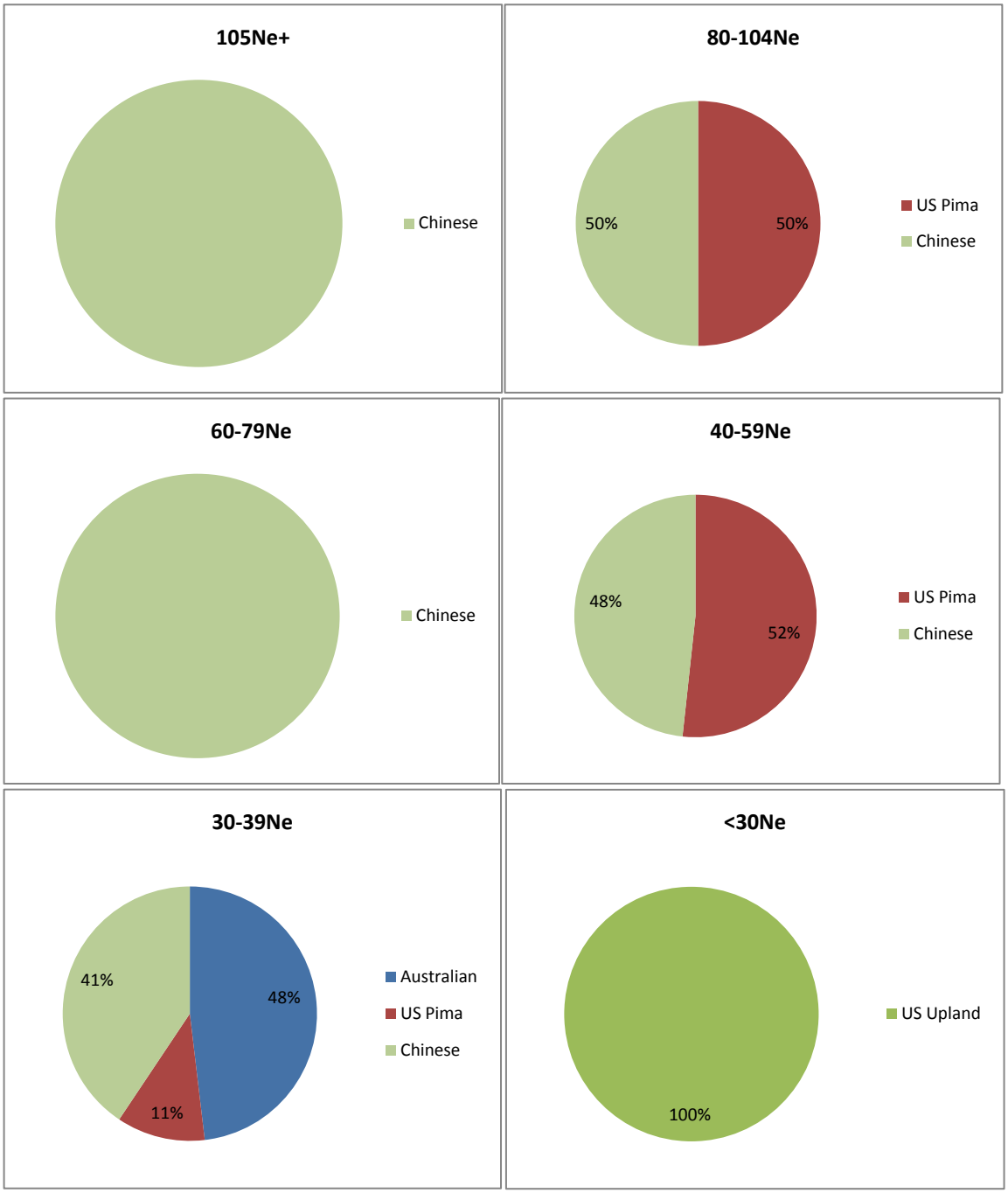


Figure 26 - Breakdown of growths used in various yarn count categories – Hong Kong

India

India is the fifth largest exporter of textiles, steadily increasing since 1990 and now accounts for 4.1% of the world's trade in 2008 [12]. The largest market for India's exports is the European Union followed by US and the United Arab Emirates [28].

Due to government led initiatives there has been substantial investment into the textile and clothing industry [28]. The Indian Textile industry currently comprises 1608 spinning mills and 200 vertical mills with a further 1219 spinning units in the small scale decentralised sector [18]**.** The total spinning capacity is currently around 38 million ring spindles, the second largest after the PRC and 495 000 open end rotors, the fourth largest after PRC, Russia and Turkey [7]. Currently India produces in excess of 9.5% of the world's cotton yarn production and 6.5% of the world's manmade

fibre yarn production [4, 13]. Manufacturing cost to produce ring and open end cotton and manmade fibres are still the lowest in India; with these costs only rising marginally since 2008 [49]. Our survey participants accounted for around 7% of the Indian market, with just under 2.4 million spindle positions. Of this capacity, 99.5% comprised ring spinning, 0.4% open end rotors, and 0.1% air vortex. Combed yarns generally made up between 25-100% of production, with most mills producing 100% combed yarns on their ring spindles. Compact spinning made up less than 20% of the ring spinning capacity, but this was an area of investment and upgrade for most survey participants.

Indian raw cotton consumption by India has been steadily increasing peaking in 2006 at 3,954,000 MT and is currently estimated at 3,888, 000 MT (see Figure 27).

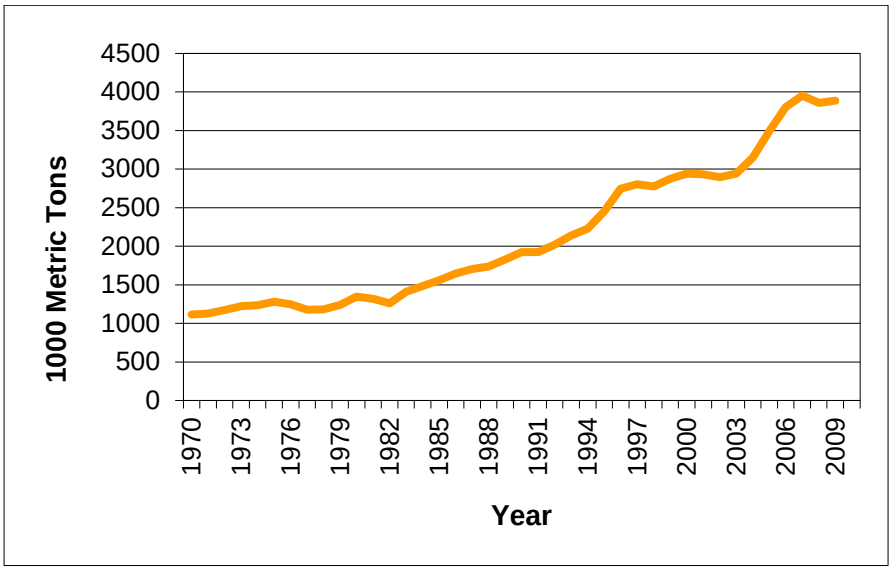


Figure 27 – Indian mill Cotton Consumption [4]

Over half of the total Indian cotton imports are ELS [27]. India has traditionally not been a major user of Australian cotton with consumption of Australian cotton peaking in 2000 and decreasing rapidly since 2001 and is currently estimated at around 15, 000 MT per annum (see Figure 28).

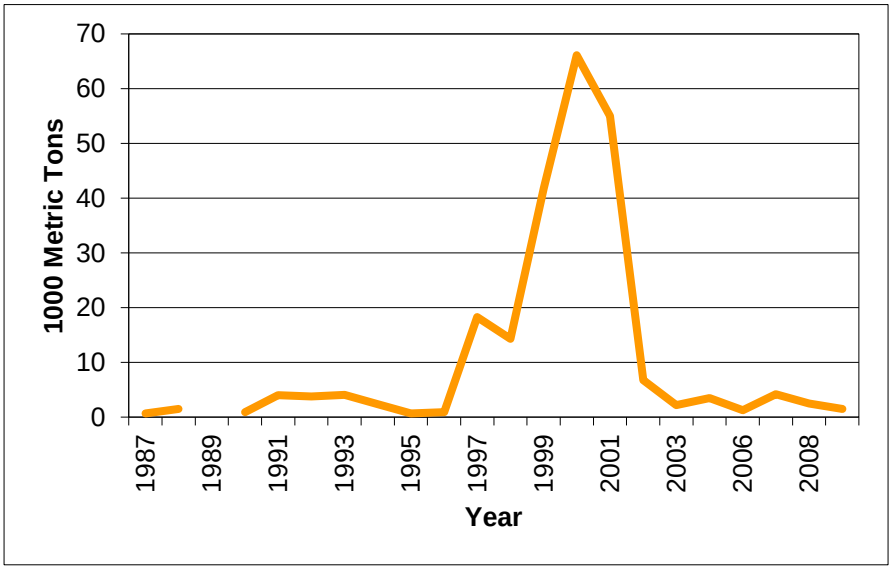


Figure 28 – Indian mill Consumption of Australian Cotton [8]

The proportion of Australian cotton used in mill lay-downs surveyed varied from 6-15% with cotton from India, CIS and USA making up the rest of the blend.

All Indian mills require HVI data with cotton shipments and seven of the ten retested incoming bales on their own HVI lines. These retests were mainly conducted to check the quality of incoming bales and to help with bale lay-down management. Generally only 10% is retested although two mills retest 100% of the bales received.

Yarn production has been steadily increasing, dropping slightly in 2009 and is currently estimated at 2, 905,000 MT per annum (see Figure 29).

India does not traditionally import a large quantity of cotton yarn. It has however been steadily increasing since 2004 and is estimated to be 5,400 MT per annum in 2008. In contrast to this India exports large qualities of cotton yarn. Exports have also steadily increased since 2003 and are estimated to have peaked at 639,000 MT per annum in 2008.

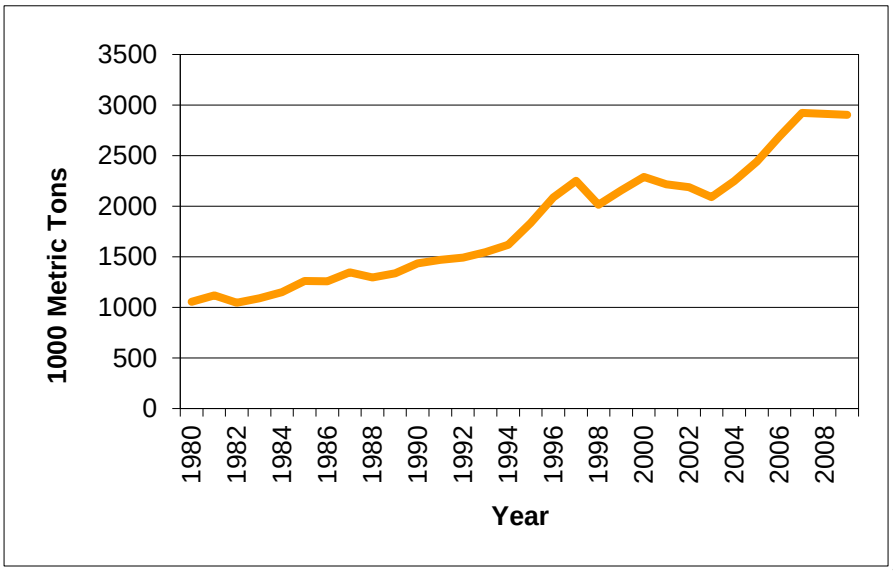


Figure 29 – Indian Cotton Yarn Production [4]

Our survey recipients consumed a total of just above 112, 000 MT per annum, producing about 107, 000 MT of yarn. Around 44% of the yarn produced was below 30 Ne and also between 30-39 Ne; with many mills suggesting that the best business was currently in the 30-39 Ne count range. The fine count market was severely affected by the GFC, but as the demand for luxury goods improve it is hoped that this market will improve. The majority of the yarns produced were for the domestic textile market (see Figure 30).

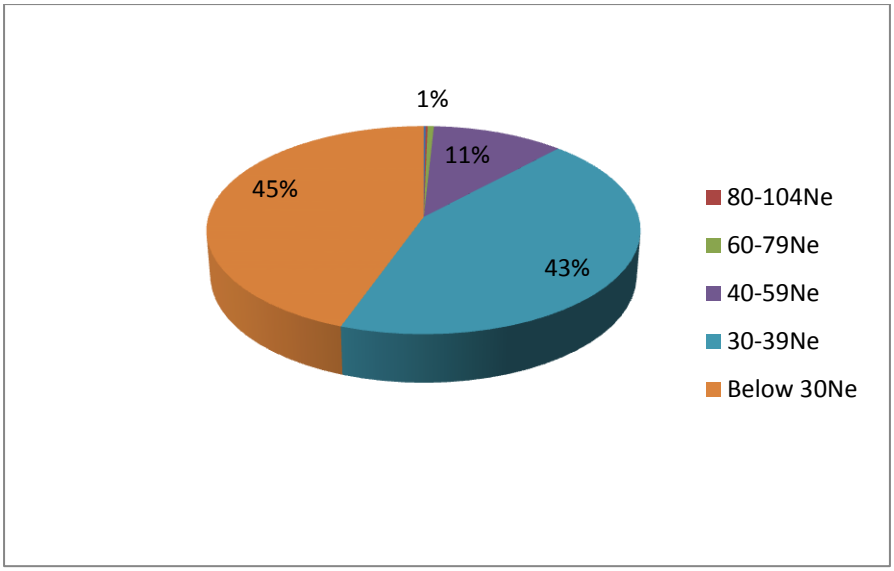


Figure 30 – Indian Cotton Yarn Counts

With the improved quality, quantity and competitive price of Indian cotton it is no surprise that the growth of choice for Indian mills is locally grown cotton, especially Shankar 6. Indian cotton accounts for nearly 90% of the cotton used by our survey participants. This is followed by cotton from the US, CIS and a small percentage of Australian cotton.

Australian cotton is generally viewed by Indian spinners as one of the best quality and best specified cotton available with price and freight costs being the only deterrent for larger consumption. Some mills produce yarns with 100% Australian cotton as they can demand a premium of between 2-20 Us c/kg due to the guarantee of contaminant free yarns to be used for high quality garments and light/pale shades. A small percentage of Egyptian and US Pima are used to produce finer yarns, as outlined in Table 10 and Figure 31.

Table 10 - Breakdown of consumption of main growths for Indian survey participants

Growth	% of Consumption
Shankar 6	50%
Indian	39%
CIS	3%
US	3%
Fibermax	2%
Australian	1%
SJV	0.4%
Egyptian/US Pima	0.45%

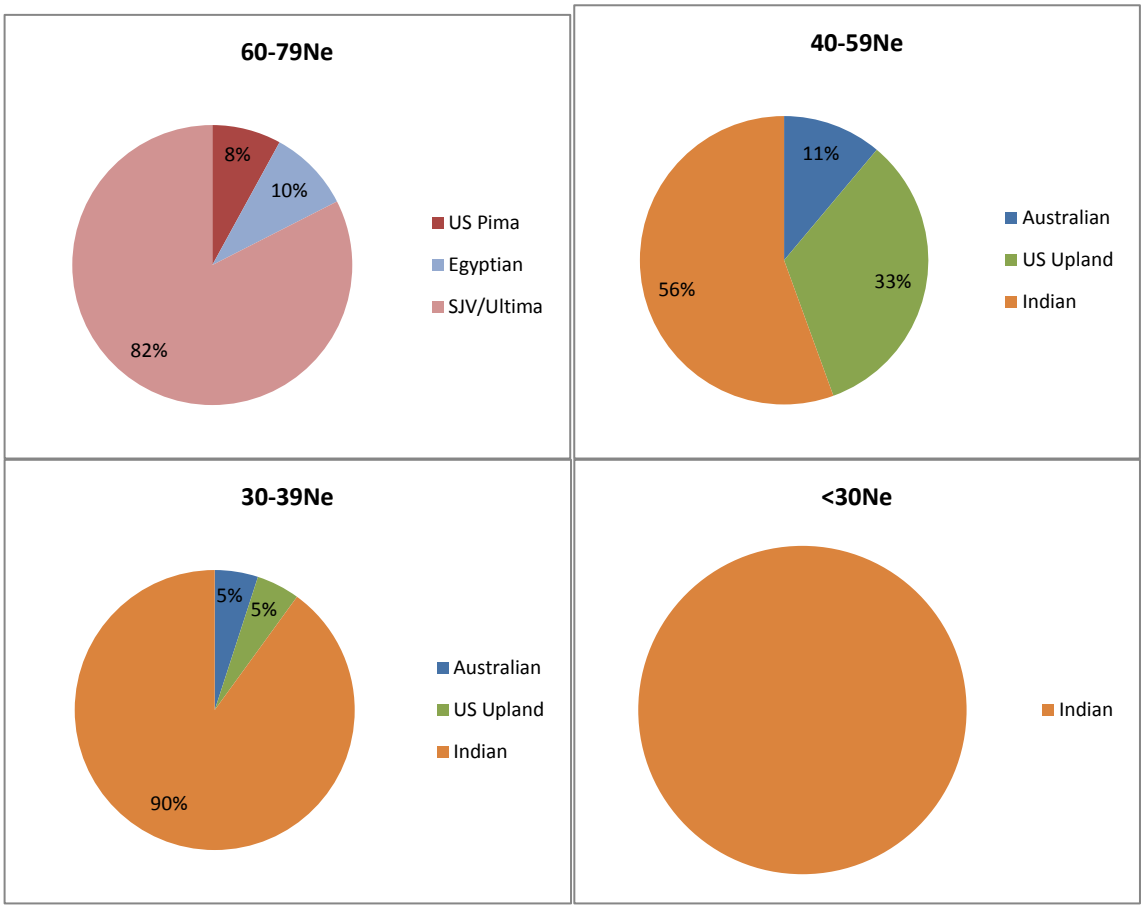


Figure 31 – Breakdown of growths used in various yarn count categories India

Mills surveyed were also producing yarns from polyester, viscose, wool and acrylic to varying degrees

Indonesia

Indonesia is considered to be one of the leading exporters and importers of textiles. Although it has increased its imports to 1.2% of the world's textile trade its exports declined to 1.5% of the textile world trade in 2008. It is also a major net clothing exporter accounting for 1.7% of the world's trade, a decrease from 2000 [12]. The textile and clothing industry remains an important component of the Indonesian economy, although its relevance has declined as the country's export sector has become more diversified [28]. The largest market for Indonesia's exports is the US and the European Union [28].

Estimates suggest that the spinning capacity is currently around 8 million ring spindles, the fourth largest after the PRC, India and Pakistan and 110 000 open end rotors, the eleventh largest after PRC, Russia, Turkey, India, US, Brazil, Uzbekistan, Ukraine, Bangladesh and Pakistan [7,50]. Currently Indonesia produces in excess of 2% of the world's cotton yarn production and in excess of 4% of the world's manmade fibre yarn production [4, 13]. Our survey participants accounted for around 28% of the Indonesian market, with over 2.2 million spindle positions. Of this capacity, 98.5% comprised ring spinning, 1% open end rotors, with the rest air jet and air vortex. Combed yarns generally made up between 0-100% of production, with most mills producing 50-100% combed yarns on their ring spindles. Compact spinning made up less than 5% of the ring spinning capacity, but this was an area of investment and upgrade for most survey participants.

Raw cotton consumption by Indonesia has been steadily increasing peaking at 518, 000 MT in 2001. Since that time it has decreased and is currently estimated at 443, 000 MT per annum (see Figure 32).

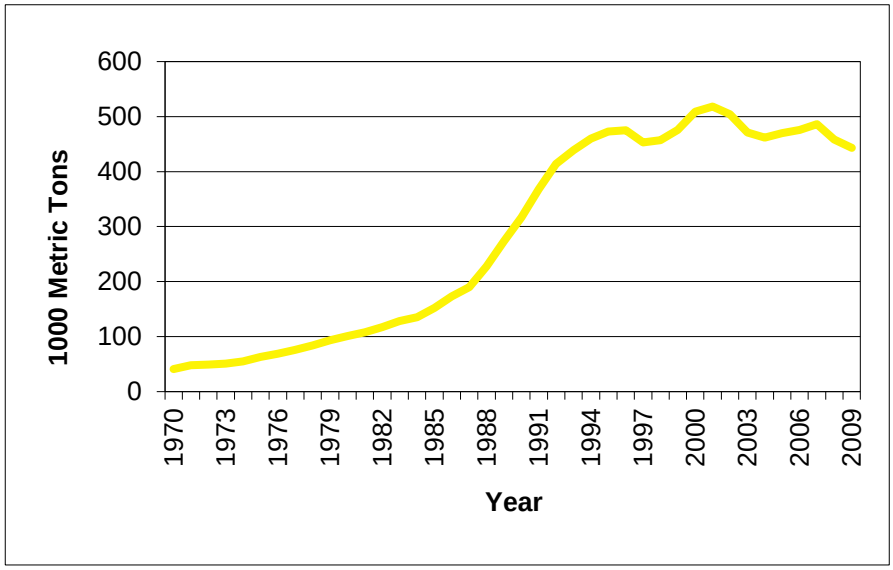


Figure 32 – Indonesian mill Cotton Consumption [4]

Indonesia has traditionally been a major user of Australian cotton but consumption of Australian cotton has also decreased since 2002 and is currently estimated at 57, 000 MT per annum (see Figure 33).

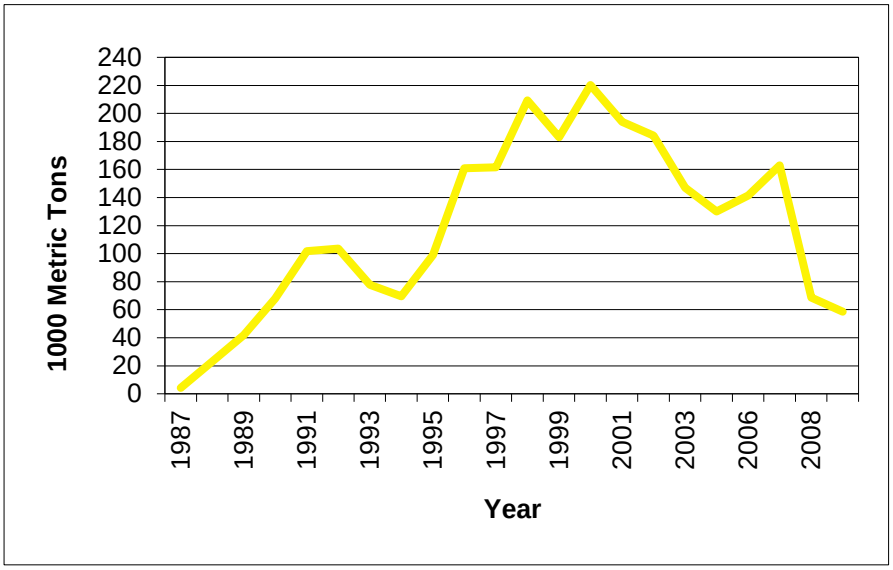


Figure 33 – Indonesian mill Consumption of Australian Cotton Consumption [8]

The proportion of Australian cotton used in mill lay-downs surveyed varied from 20-100% with cotton from USA, Brazil and West Africa making up the rest of the blend.

Five out of the eight Indonesian mills require HVI data with cotton shipments with all eight retesting incoming bales on their own HVI lines. Four mills retest 100% of incoming bales. The data is used to check against the sales contract as well as to assist in bale lay-down management and the prediction of yarn quality and production.

Yarn production has been steadily increasing and peaked in 2005. Since then it has somewhat decreased and is currently estimated at 794, 000 MT per annum (see Figure 34).

Imports of cotton yarn steadily increased to 2003, thereafter decreasing and in 2008 returning to the 2003 level of 32, 000 MT. Exports also steadily increased to 2003, thereafter steadily reducing and is estimated to be at 104, 000 MT per annum in 2008.

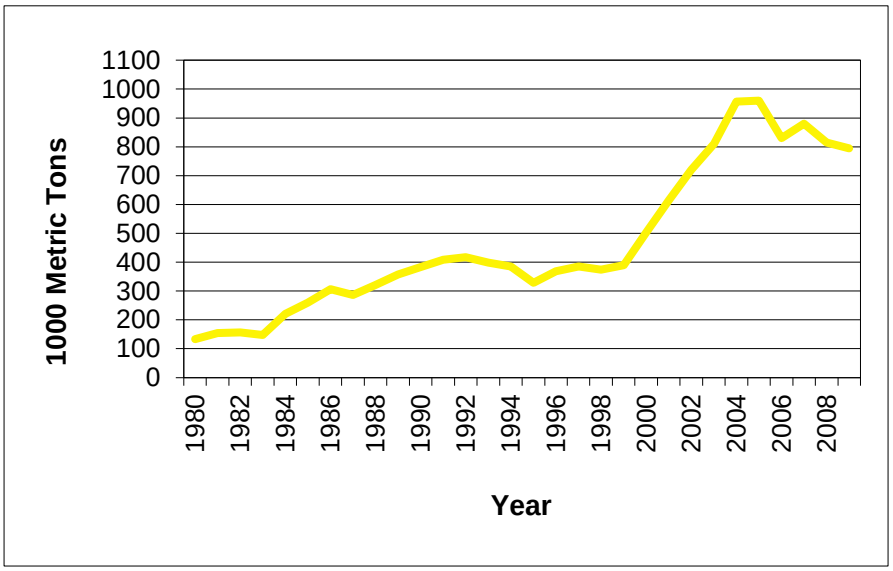


Figure 34 – Indonesian Cotton Yarn Production [4]

Our survey recipients consumed around 225, 000 MT of cotton per annum, producing about 197, 000 MT of cotton yarn. Around 46% of the yarn was 30-39 Ne, 35% below 30 Ne, 15% in the 40-59 Ne category and 4% in the 60-79 Ne category (see Figure 35).

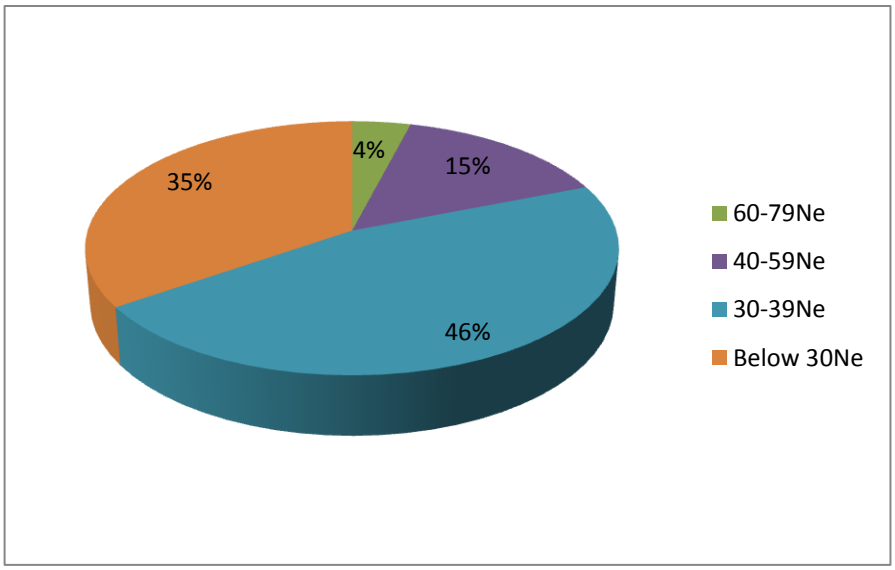


Figure 35 – Yarn counts produced – Indonesia

A number of the survey participants produced 100% Australian cotton yarns as part of their product mix, and one mill's entire consumption comprised Australian cotton. The key advantages of using Australian cotton were seen as shipment time, reliability of shipments and overall cotton quality;

particularly contamination free. Consistency of supply and price were seen as key issues limiting further utilisation of Australian cotton.

US Fibermax, Australian, West African and Brazilian cotton made up the bulk of the consumption of our survey participants, as outlined in Table 11.

Table 11 - Breakdown of consumption of main growths

Growth	% of Consumption
US Fibermax (US Upland)	35%
Australian	23%
West African (FWA)	11%
Brazilian	11%
SJV Ultima	9%
EMOT (US Upland)	5%
US Pima	4%
Other	2%

Australian cotton typically made up about one third of the product mix for both 30-39 Ne yarn and for 40-59 Ne yarn. Fibermax was the main growth used for yarn counts below 40 Ne, while Ultima made up the bulk of the 40-59 Ne blend and US Pima the bulk of the 60-79 Ne blend (see Figure 36).

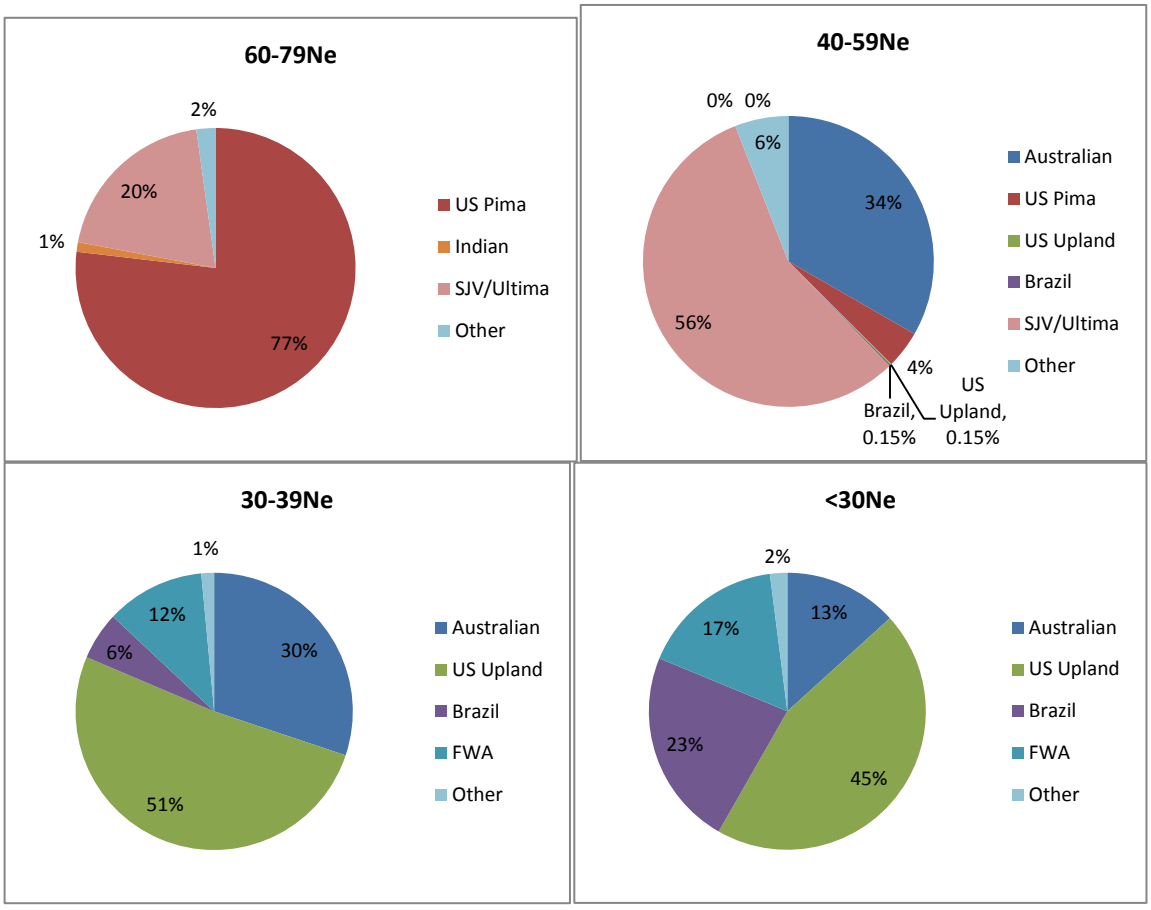


Figure 36 – Breakdown of growths used in various yarn count categories – Indonesia

Mills surveyed were also producing yarns from polyester, viscose, and various polyester/cotton, cotton/acrylic and polyester/viscose blends.

Australia

Australia is the ninth largest clothing importer in the world, accounting for 1.1% of the world's trade. The volume of clothing imports has been steadily increasing since 1990 [12].

Since the previous survey in 2003 only one cotton spinning mill is still operational in 2009, hence the spinning capacity installed is currently very small. There are no ring spindles installed with an estimated 3 000 open end rotors and close to 2 000 air jet and air vortex positions installed. In the past five years around 500 new vortex positions have been installed. It is expected that the capacity will reduce over time as downstream manufacturing continues to be relocated overseas, mainly in Asia.

Raw cotton consumption by Australia has steadily been decreasing since the mid 1990's and it is currently estimated at 9,000 MT per annum (see Figure 37).

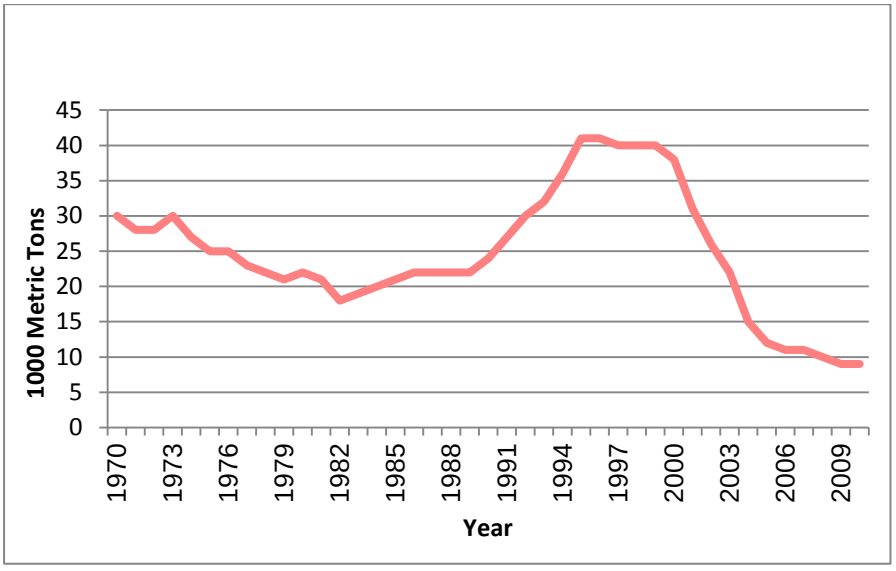


Figure 37 – Australian mill Cotton Consumption [4]

Cotton is not typically imported into Australia. No significant volumes have been imported since 1989.

The mill does require and receives HVI data which is used to check against the sales contract. The data is also used to assist in bale lay-down management and to predict yarn quality. The mill does not retest incoming bales as the quality is consistent and the classing results are considered reliable.

Yarn production has been steadily decreasing since 1998 and is currently estimated at around 10, 000 MT pa (see Figure 38).

Imports of cotton yarn have steadily decreased since 2003, estimated to be 5,500 MT per annum in 2008. Exports have also steadily reduced since 2003, estimated to be at 700 MT per annum in 2008.

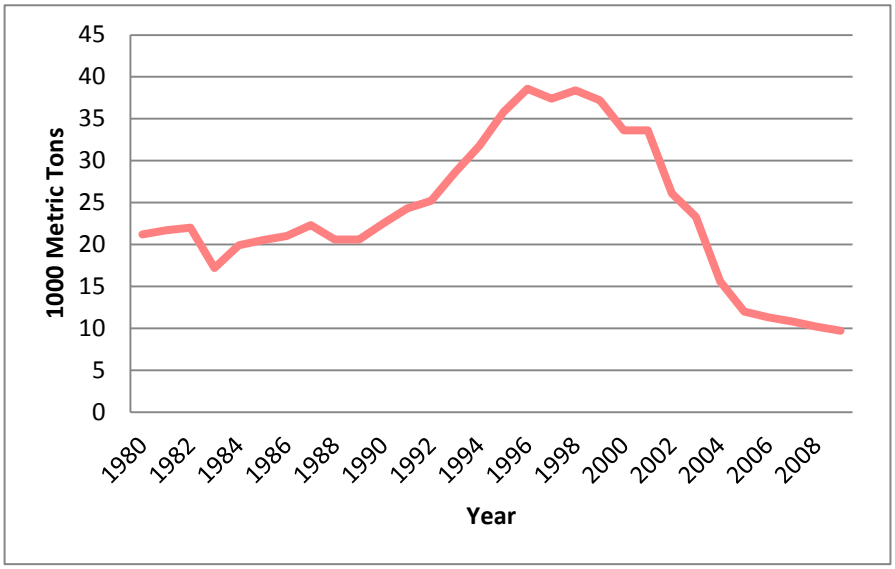


Figure 38 – Australian mill Cotton Yarn Production [4]

Our survey recipient consumes around 3,000 MT per annum, producing about 2,900 MT of yarn. Around 66% of the yarn produced was below 30 Ne with the remainder in the 30-39 Ne range (see Figure 39).

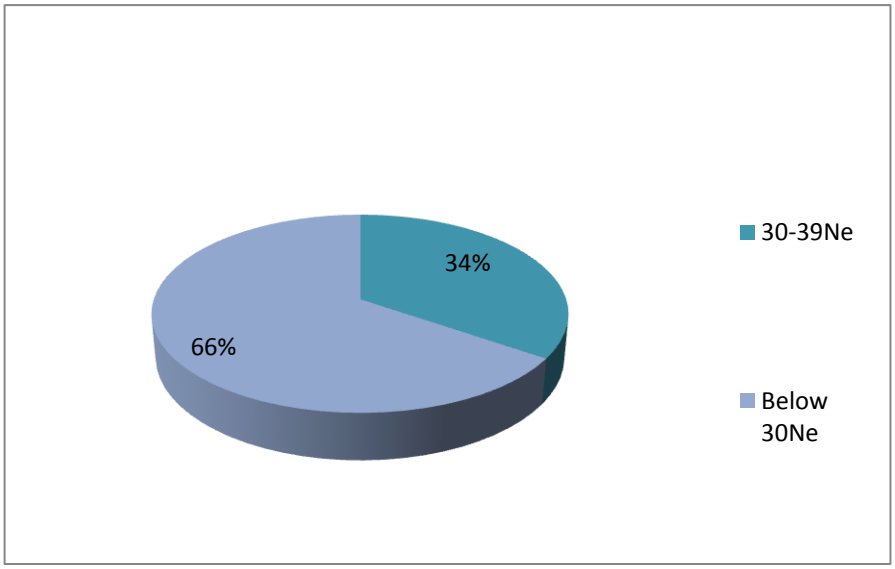


Figure 39 – Breakdown of yarn counts produced - Australia

The mill uses 100% Australian cotton in all its yarn counts. The mill surveyed also produces polyester/cotton and polyester/viscose blends.

POINTS OF DIFFERENTIATION – AUSTRALIAN VS OTHER GROWTHS

Overall the survey respondents believed that SJV cotton should be priced at a premium of 3.84 US c/lb over Australian. On average, US / Fibermax cotton was valued at a discount of 2.82 US c/lb to Australian while Brazilian cotton was valued at a 5 US c/lb discount to Australian. It should be noted that these responses were recorded during a period in time where the Cotlook A index ranged from 65-80 US c/lb (see Figure 40).

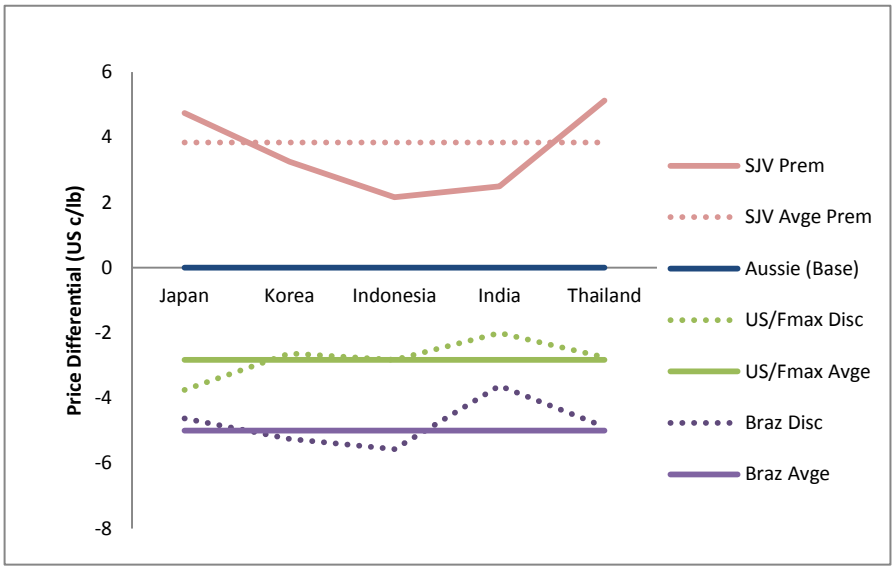


Figure 40 - Price differentials between key competing cotton growths

It was interesting to note that on average, Brazilian cotton was valued least by the two countries markets (Indonesia and South Korea) that used the greatest proportion of the cotton in their blends (Korea 62% for <30 Ne and 62% for 30-39 Ne / Indonesia 23% for <30 Ne and 6% for 30-39 Ne and 6% for 40-49 Ne). Without prompting, the following reasons were given by respondent mills for the price differentials reported.

Table 12 - Reasons for price differential of competing growth when compared to Australian cotton

	SJV Premium (3.84 US c/lb average) (% of respondents)	Fibermax Discount (-2.82 US c/lb average) (% of respondents)	Brazil Discount (-5.00 US c/lb average) (% of respondents)
Strength	100%	15%	25%
Staple Length	17%	25%	17%
Micronaire	17%	5%	8%
Spin ability	17%	5%	0%
Grade	0%	50%	29%
Trash	0%	20%	21%
Neps	6%	25%	8%
Stickiness/Honeydew	0%	10%	0%
SFI	0%	5%	4%
Contamination	0%	0%	21%
Reliability of Shipment	0%	30%	38%
Uniformity	0%	0%	33%

It was also clear, that as far as contracted specifications were concerned, SJV cotton was far superior to comparison growths; particularly in terms of strength and Micronaire. Australian cotton was ranked second for all the fibre properties, with both staple length and grade comparing well with SJV (see Figure 41).

One of the survey respondents, that operates mills in a number of countries, remarked that; *'Australian cotton is probably not the best, but the most consistent'*

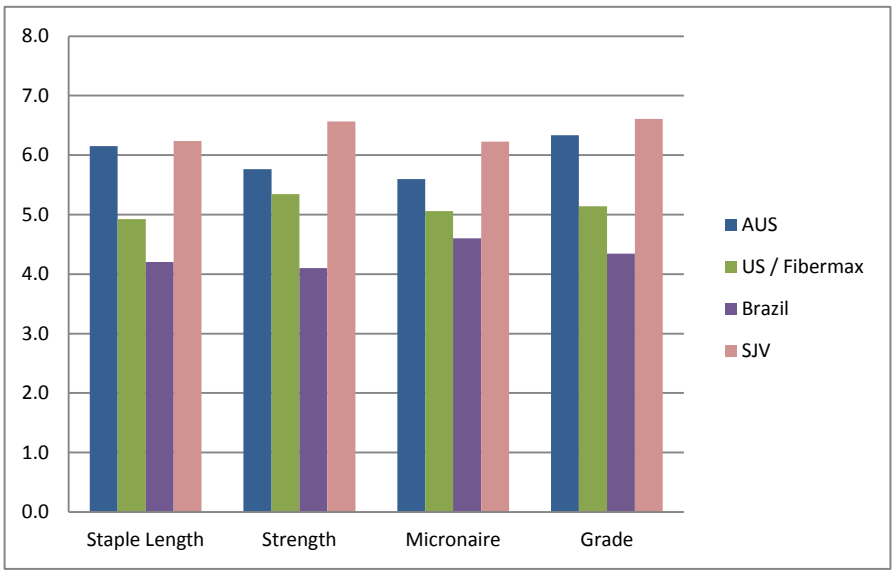


Figure 41 - Average mill perceptions of Australian cotton (contracted quality specifications)

The y axis in Figures 41; 42; 44; 46; 48; 49; 51; 53 & 54 refer to a quality ranking, whereby a score of either 8.0 or 4.0 is the highest attainable.

Encouragingly, Australian cotton scored particularly well for key non-contracted specifications, particularly contamination, trash content and spinning ability; where it was considered vastly superior to competing growths. These criteria are important as they represent the inherent nature of the origin growth that buyers expect when making a purchase, regardless of contract specifications (see Figure 42).

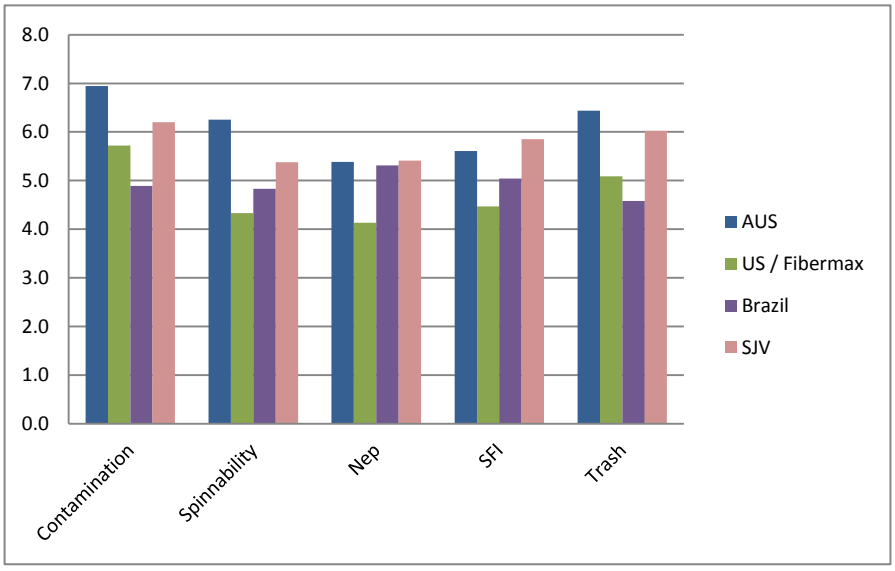


Figure 42 - Average mill perceptions of Australian cotton (non-contracted quality specifications)

The overall results highlight the following key points of differentiation between competing growths:

vs. SJV: Australia needs to improve strength and Micronaire consistency to compete.
vs. Fibermax: Fibermax is slightly inferior in most contracted specifications and appears to have some critical issues with regards to neps, spinning ability and SFI.
vs. Brazil: Competition from Brazil is currently limited by reliability issues, as well as substantial concerns regarding contamination. Brazilian typically falls behind key competitors on contracted specifications.

Overall the survey respondents reported that the quality of Australian cotton was reliable and consistent. A number of respondents stated that the Australian cotton classing data was the most reliable, and that shipping documents were '*clean*', thereby expediating contract execution. Mills surveyed also indicated that Australian cotton had a reputation for on time shipments, resulting in easier management of their cotton stocks and allowing for lower stock levels. In contrast mills reported that they needed to keep 2-3 months of Brazilian cotton in stock to compensate for reliability/logistic issues. Obviously the shortage of Australian cotton due to the drought has been an issue as well as the price.

Japan

The mills surveyed believed that compared to Australian cotton, on average (Figure 43):
SJV cotton would receive a premium of 5.25 US c/lb
Fibermax cotton would receive a discount of -3.75 US c/lb
Brazilian cotton would receive a discount of -4.63 US c/lb

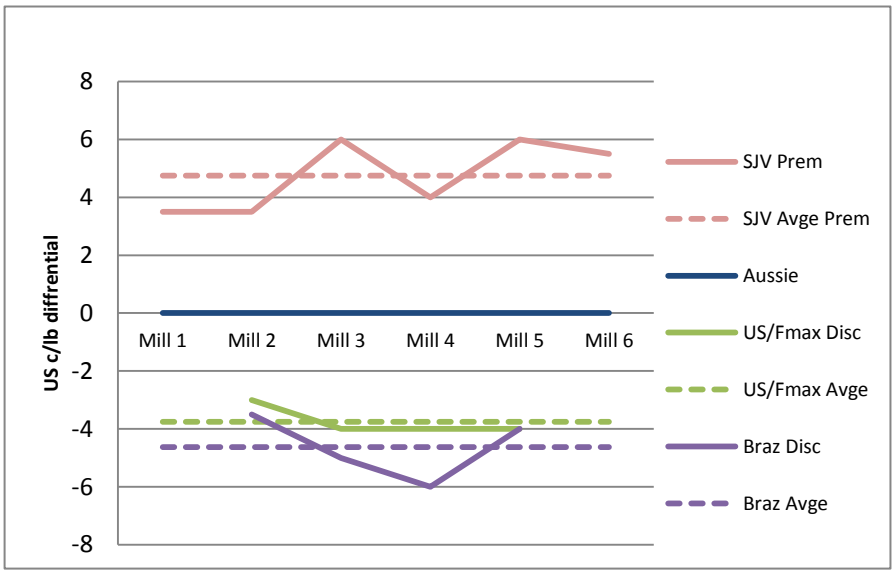


Figure 43 - Price differentials between key competing cotton growths

Without prompting for parameters, the responses in Table 13 were given by mills for the price differentials:

Table 13 - Reasons for price differential of competing growth when compared to Australian cotton

	SJV Premium (5.25 US c/lb) (% of respondents)	Fibermax Discount (-3.75 US c/lb) (% of respondents)	Brazil Discount (-4.63 US c/lb) (% of respondents)
Strength	100%	25%	20%
Staple Length	75%	0%	0%
Micronaire	33%	25%	0%
Grade	0%	100%	40%
Trash	0%	0%	40%
Neps	0%	0%	20%
Reliability of Shipment	0%	0%	20%
Spin ability	17%	0%	0%
Contamination	0%	0%	20%
Uniformity	0%	0%	40%

This information tied closely with analysis of average mill perceptions of key quality parameters used when making purchasing decisions (Figure 44):

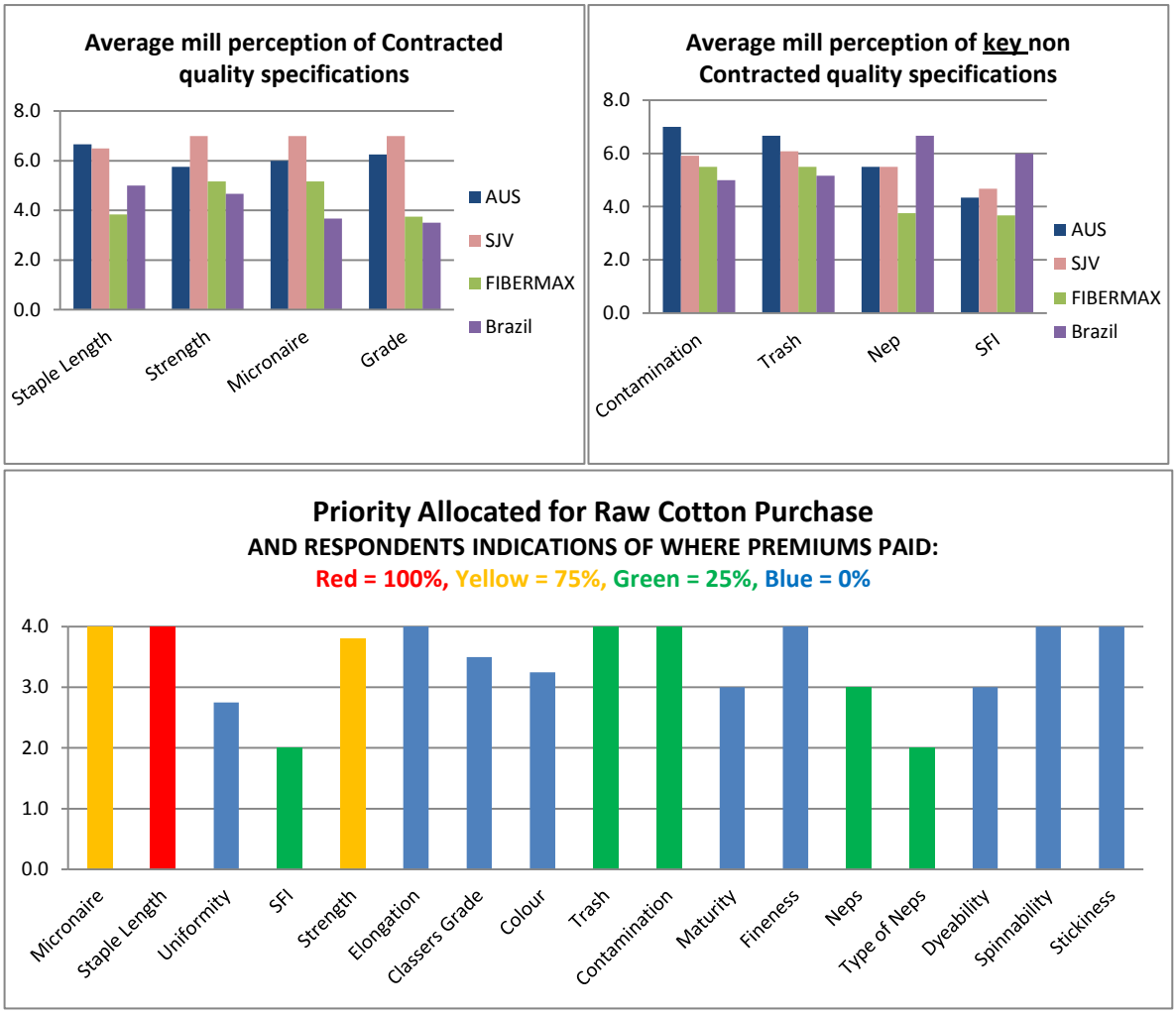


Figure 44 - Average mill perceptions of Australian cotton quality specifications and priority allocated for raw cotton purchase

In Figure 44 (above) and subsequent similar figures the colours of the bars refer to the proportion of respondents who indicated they paid premiums for specific parameters. For example, in Figure 44, Staple Length was given a high priority by surveyed mills with all the mills indicating that they would pay a premium for staple length.

Thailand

On average, the mills surveyed believed that compared to Australian cotton, on average (Figure 45):
SJV cotton would receive a premium of 5.12 US c/lb
Fibermax cotton would receive a discount of -3.12 US c/lb
Brazilian cotton would receive a discount of -4.88 US c/lb

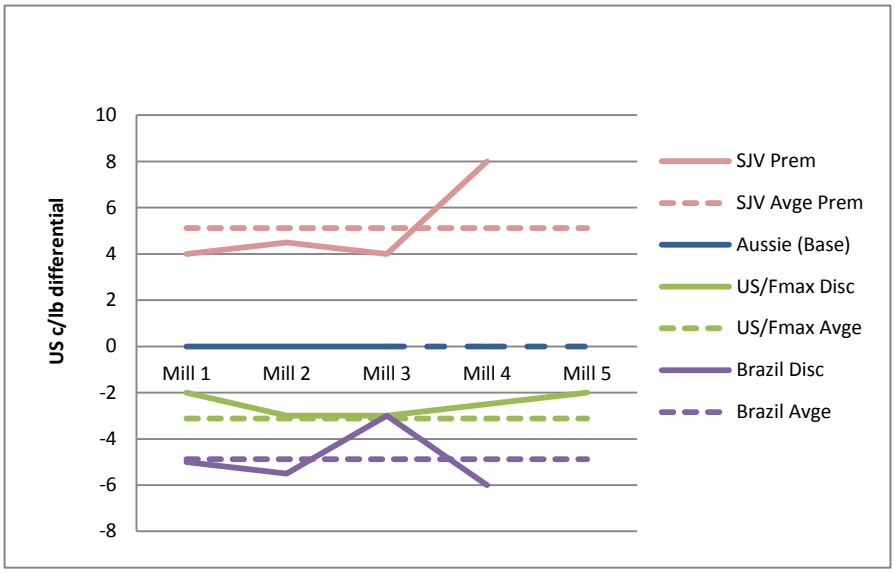


Figure 45 - Price differentials between key competing cotton growths

Without prompting for parameters, the responses in Table 14 were given by mills for the price differentials:

Table 14 - Reasons for competing growth price differential compared to Australian cotton

	SJV Premium (5.12 US c/lb average) (% of respondents)	Fibermax Discount (-3.12 US c/lb average) (% of respondents)	Brazil Discount (-4.88 US c/lb average) (% of respondents)
Strength	100%	0%	50%
Staple Length	0%	0%	25%
Micronaire	25%	0%	0%
Grade	0%	25%	25%
Trash	0%	50%	25%
Neps	0%	50%	0%
Reliability of Shipment	0%	25%	25%

This information tied closely with analysis of average mill perceptions of key quality parameters used when making purchasing decisions (Figure 46):

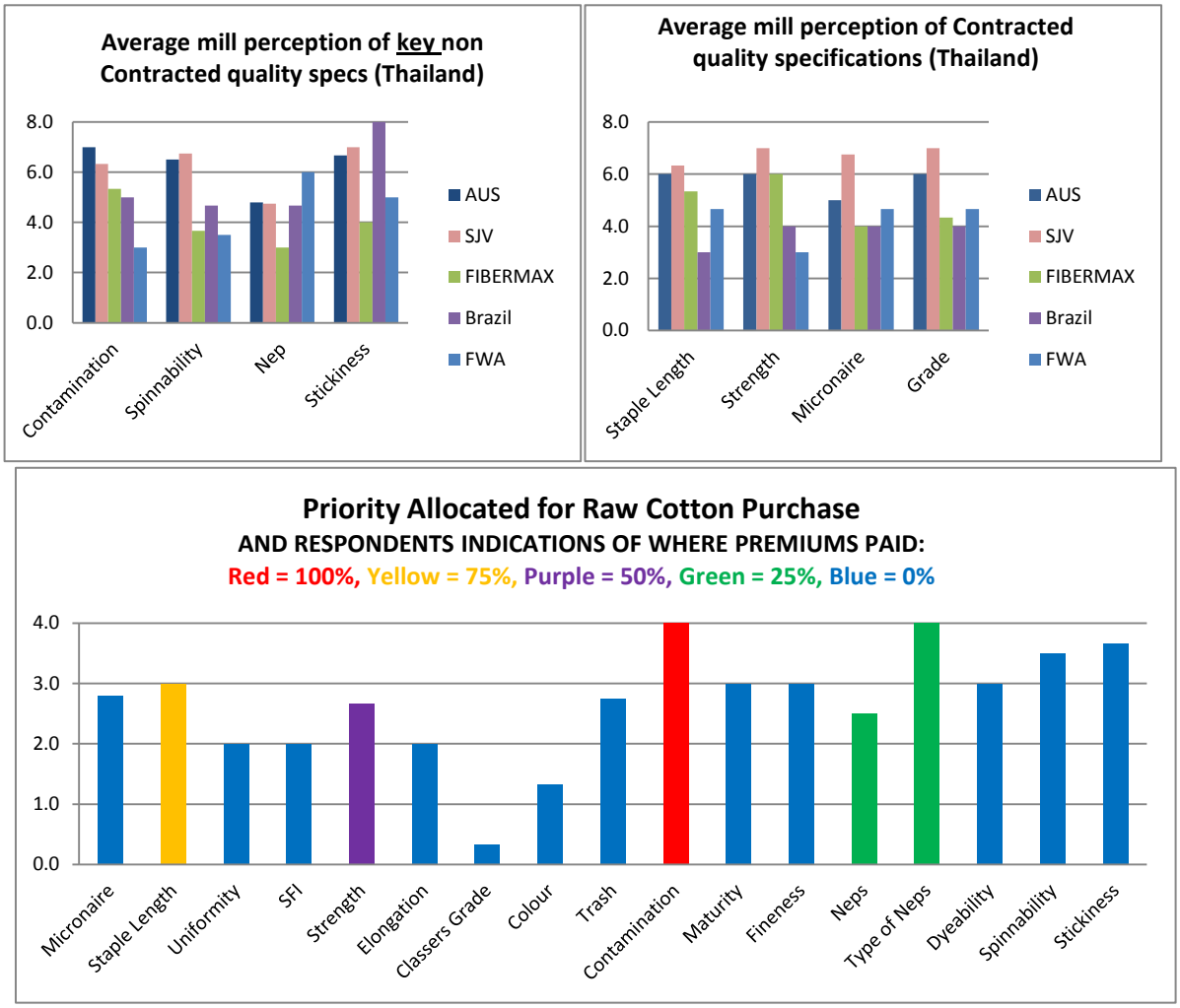


Figure 46 - Average mill perceptions of Australian cotton quality specifications and priority allocated for raw cotton purchase decisions

Korea

The mills surveyed believed that compared to Australian cotton, on average (Figure 47):
SJV cotton would receive a premium of 3.25 US c/lb
Fibermax cotton would receive a discount of -2.63 US c/lb
Brazilian cotton would receive a discount of -5.25 US c/lb

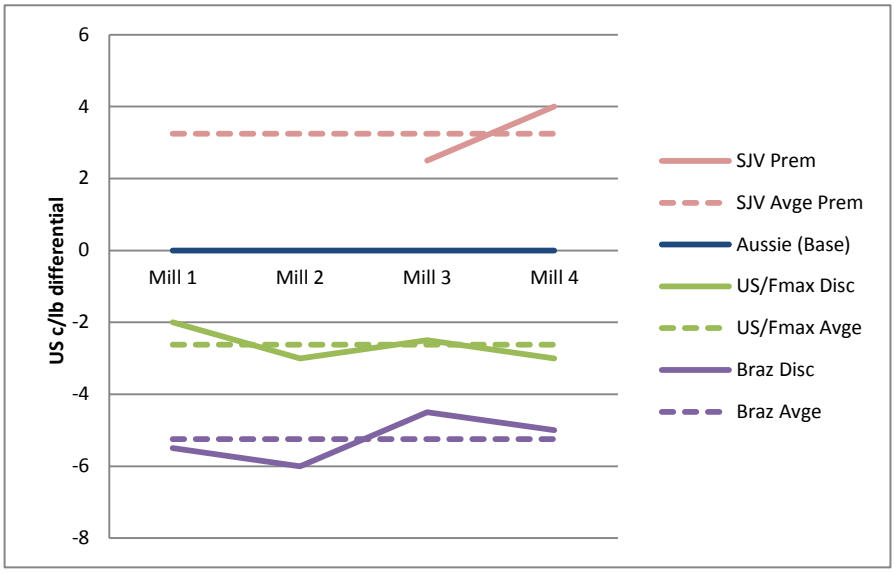


Figure 47 - Price differentials between key competing cotton growths

Until the mid 1990s Korean spinners used mainly SJV cotton but due to price switched to CIS cotton. Due to contamination problems the mills then switched to Australian, Brazilian and Fibermax cotton.

Without prompting for parameters, the responses in Table 15 were given by mills for the price differentials:

Table 15 - Reasons for Competing Growth price differential compared to Australian cotton

	SJV Premium (3.25 US c/lb average) (% of respondents)	Fibermax Discount (-2.63 US c/lb average) (% of respondents)	Brazil Discount (-5.25 US c/lb average) (% of respondents)
Strength	100%	25%	50%
Staple Length	75%	75%	75%
Micronaire	0%	0%	0%
Grade	0%	50%	50%
Trash	0%	25%	25%
Neps	0%	25%	25%
Reliability of Shipment	0%	25%	25%

This information tied closely with analysis of average mill perceptions of key quality parameters used when making purchasing decisions (Figure 48):

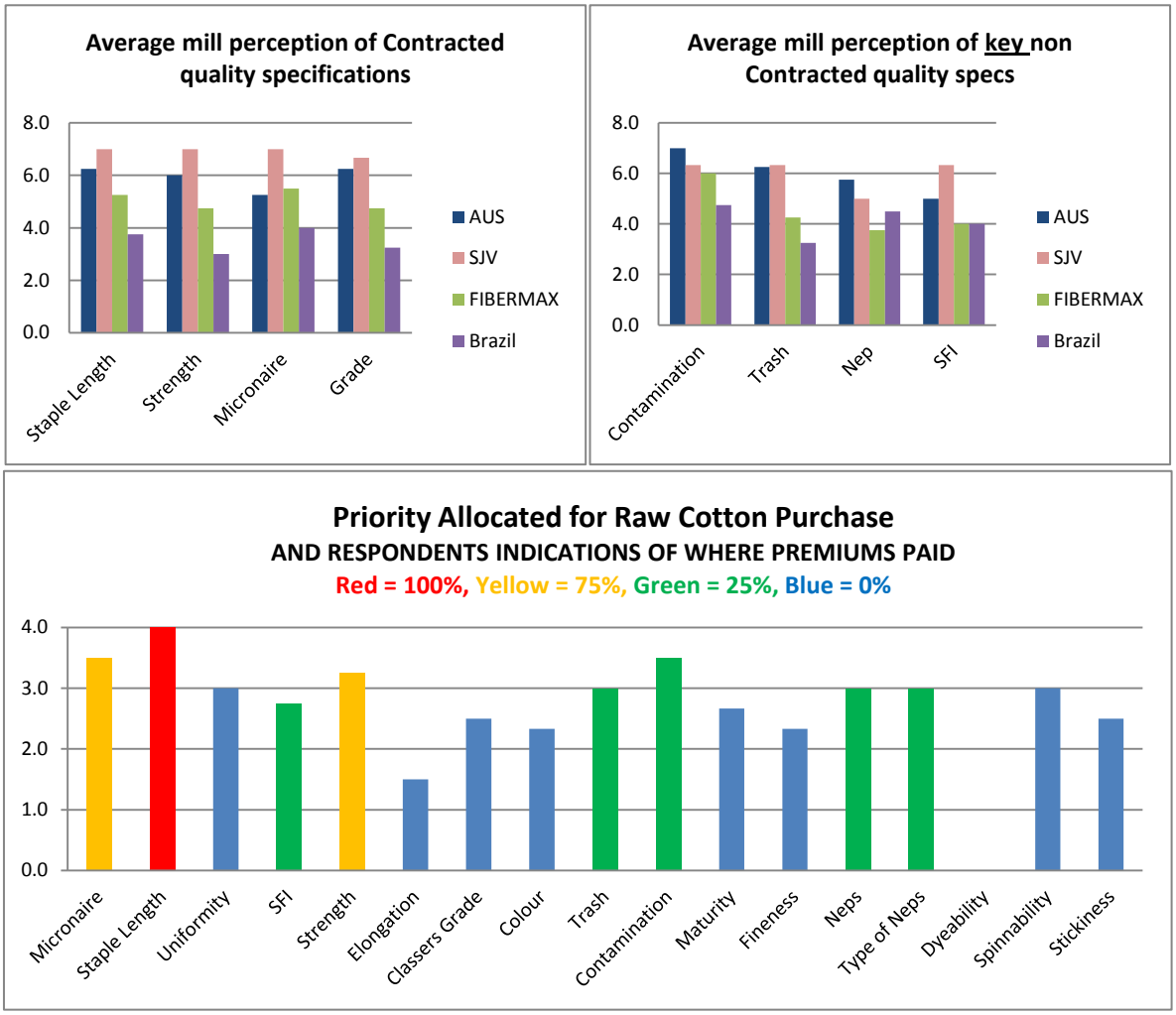


Figure 48 - Average mill perceptions of Australian cotton quality specifications and priority allocated for raw cotton purchase decisions

Hong Kong

The mill in Hong Kong that responded to this question believed that compared to Australian cotton, on average (Figure 49):
SJV cotton would receive a premium of 3.5 US c/lb
Fibermax cotton would receive a discount of -4.0 US c/lb
Brazilian cotton would receive a discount of -7.0 US c/lb

Without prompting for parameters, the responses in Table 16 were given for the price differentials:

Table 16 - Reasons for Competing Growth price differential compared to Australian cotton

	SJV Premium (3.5 US c/lb average) (% of respondents)	Fibermax Discount (-4.0 US c/lb average) (% of respondents)	Brazil Discount (-7.0 US c/lb average) (% of respondents)
Strength	50%	100%	0%
Spin ability	50%	100%	5%
Colour	0%	0%	50%
Contamination	0%	0%	50%

Note: The mill did not make mention of fibre length when comparing these origins.

This information tied closely with analysis of average mill perceptions of key quality parameters used when making purchasing decisions (Figure 49):

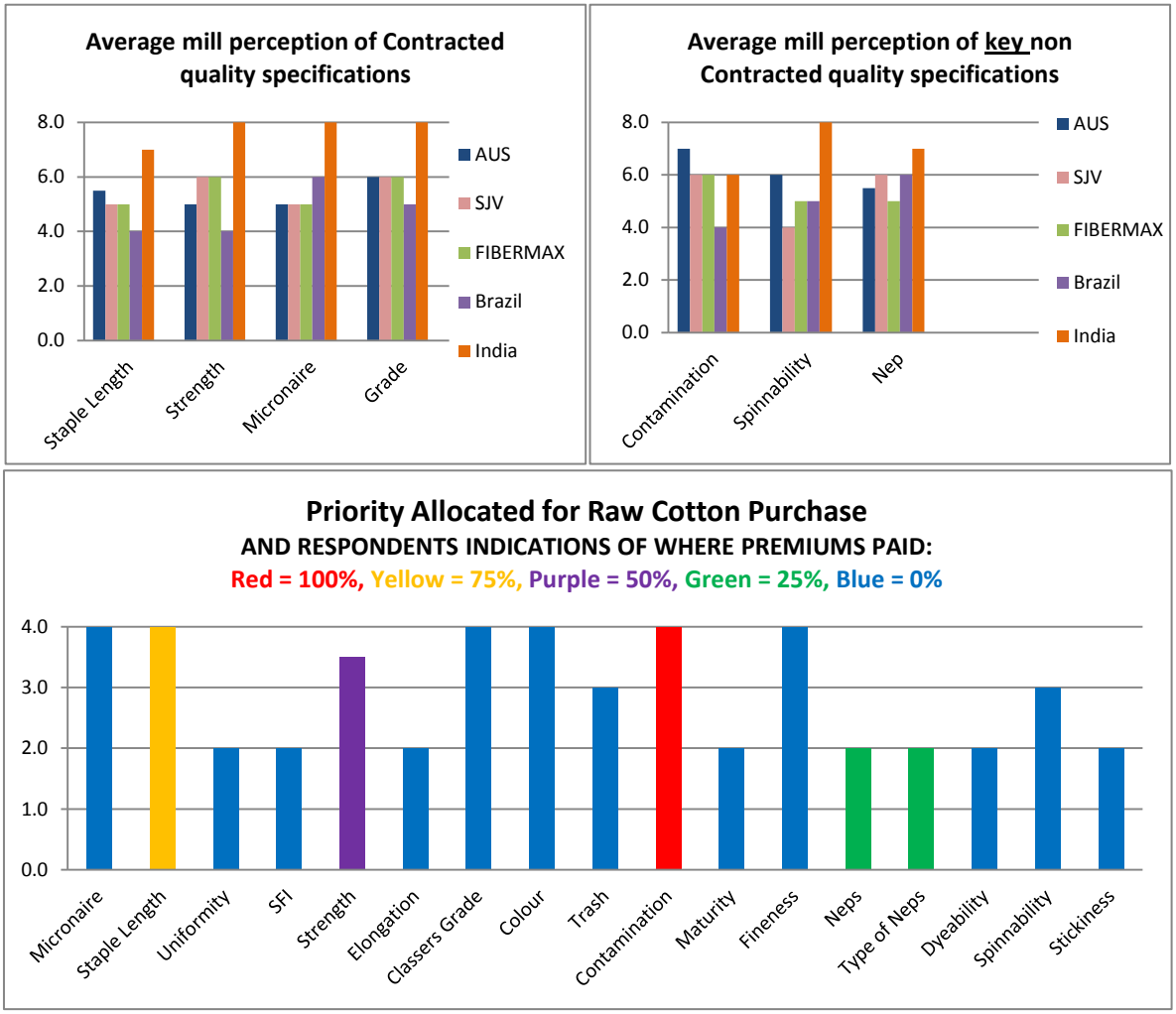


Figure 49 - Average mill perceptions of Australian cotton quality specifications and priority allocated for raw cotton purchase decisions

India

The mills surveyed in India believed that on average (Figure 50):
SJV cotton would receive a premium of 2.5 US c/lb
Fibermax cotton would receive a discount of -2 US c/lb
Brazilian cotton would receive a discount of -3.635 US c/lb

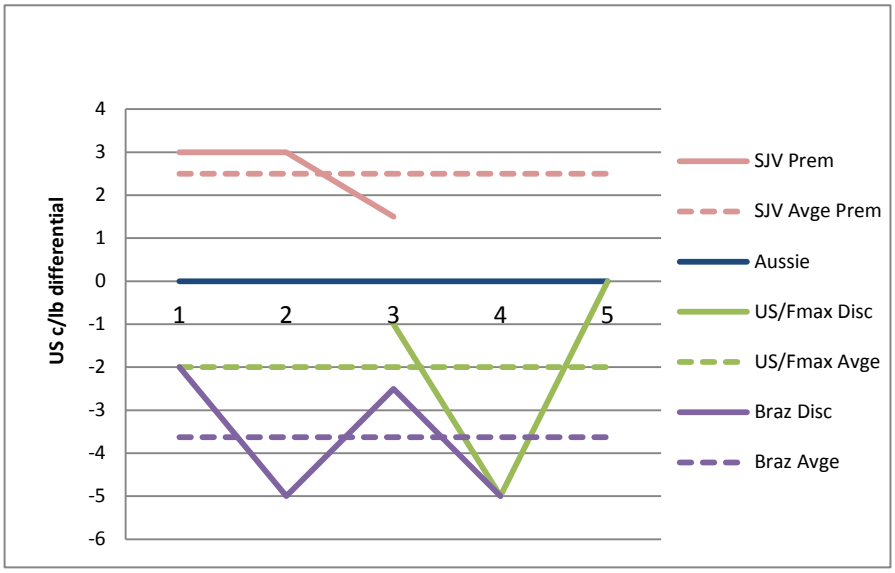


Figure 50 - Price differentials between key competing cotton growths

Without prompting for parameters, the responses in Table 17 were given for the price differentials:

Table 17 - Reasons for Competing Growth price differential compared to Australian cotton

	SJV Premium (2.5 US c/lb average) (% of respondents)	Fibermax Discount (-2.0 US c/lb average) (% of respondents)	Brazil Discount (-4.8 US c/lb average) (% of respondents)
Strength	33%	0%	0%
Length	0%	0%	0%
Colour/Grade	0%	0%	33%
Trash	0%	0%	0%
Nep	33%	0%	0%
Reliability	0%	33%	67%
Micronaire	0%	0%	33%
Honeydew	0%	33%	0%
Contamination	0%	0%	33%
Uniformity	0%	0%	33%
SFI	0%	33%	33%
Spin ability	33%	0%	0%

This information tied closely with analysis of average mill perceptions of key quality parameters used when making purchasing decisions (Figure 51):

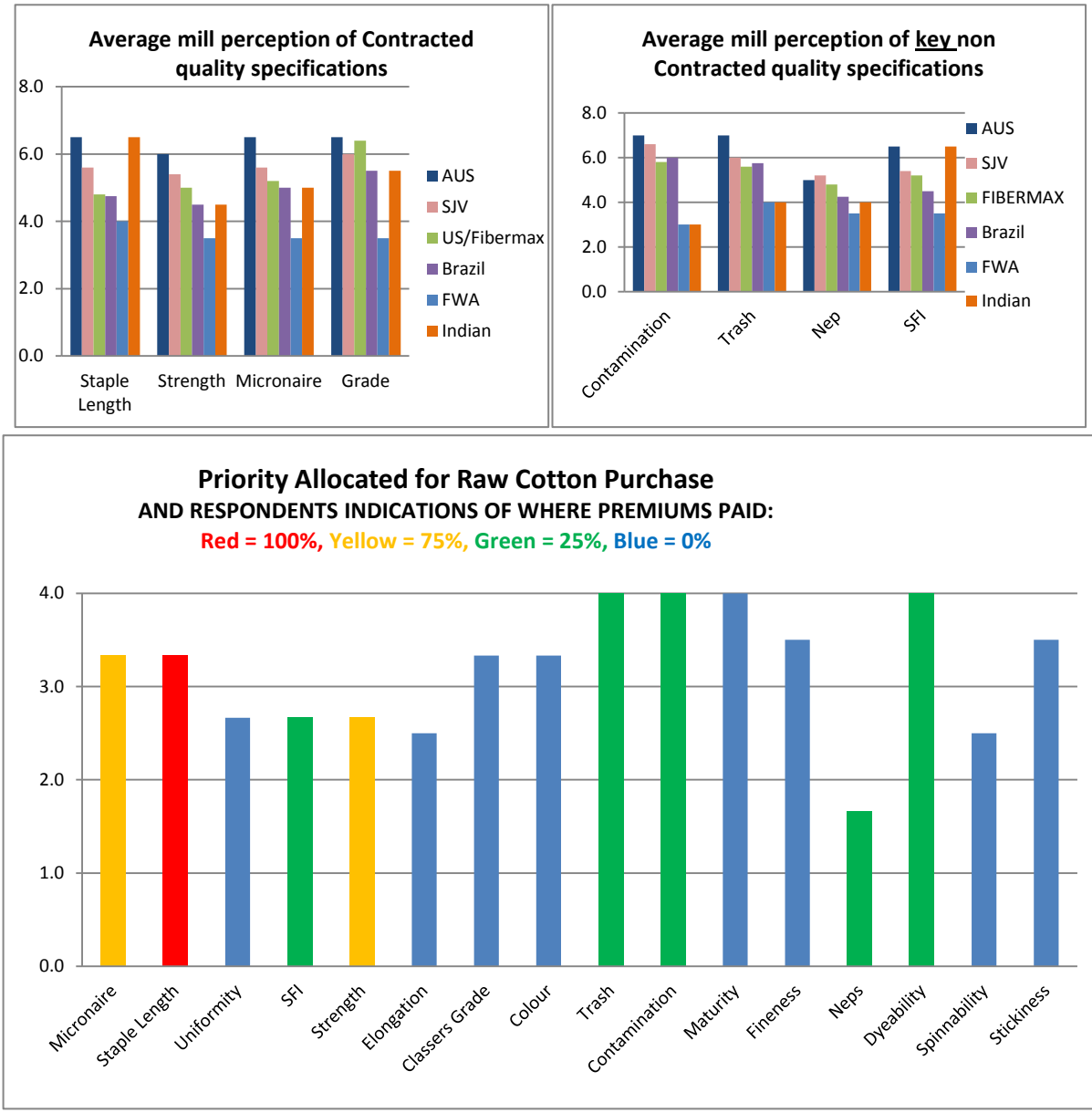


Figure 51 - Average mill perceptions of Australian cotton quality specifications and priority allocated for raw cotton purchase decisions

Indonesia

The mills surveyed in Indonesia believed that on average (Figure 52):
SJV cotton would receive a premium of 2.2 US c/lb
Fibermax cotton would receive a discount of -2.8 US c/lb
Brazilian cotton would receive a discount of -5.6 US c/lb

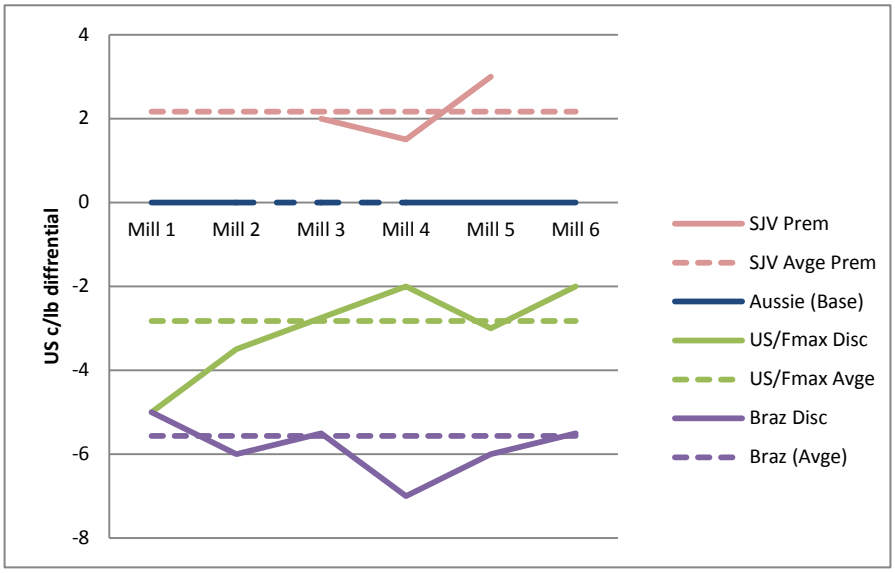


Figure 52 - Price differentials between key competing cotton growths

Without prompting for parameters, the responses in Table 18 were given for the price differentials:

Table 18 - Reasons for Competing Growth price differential compared to Australian cotton

	SJV Premium (2.2 US c/lb average) (% of respondents)	Fibermax Discount (-2.1 US c/lb average) (% of respondents)	Brazil Discount (-4.9 US c/lb average) (% of respondents)
Strength	100%	0%	13%
Length	33%	33%	0%
Colour/Grade	0%	50%	13%
Trash	0%	17%	13%
Nep	0%	33%	0%
Reliability	0%	50%	63%
Micronaire	0%	17%	25%
Honeydew	0%	17%	0%
Contamination	0%	0%	50%
Uniformity	0%	0%	50%
SFI	0%	17%	13%

This information tied closely with analysis of average mill perceptions of key quality parameters used when making purchasing decisions (Figure 53):

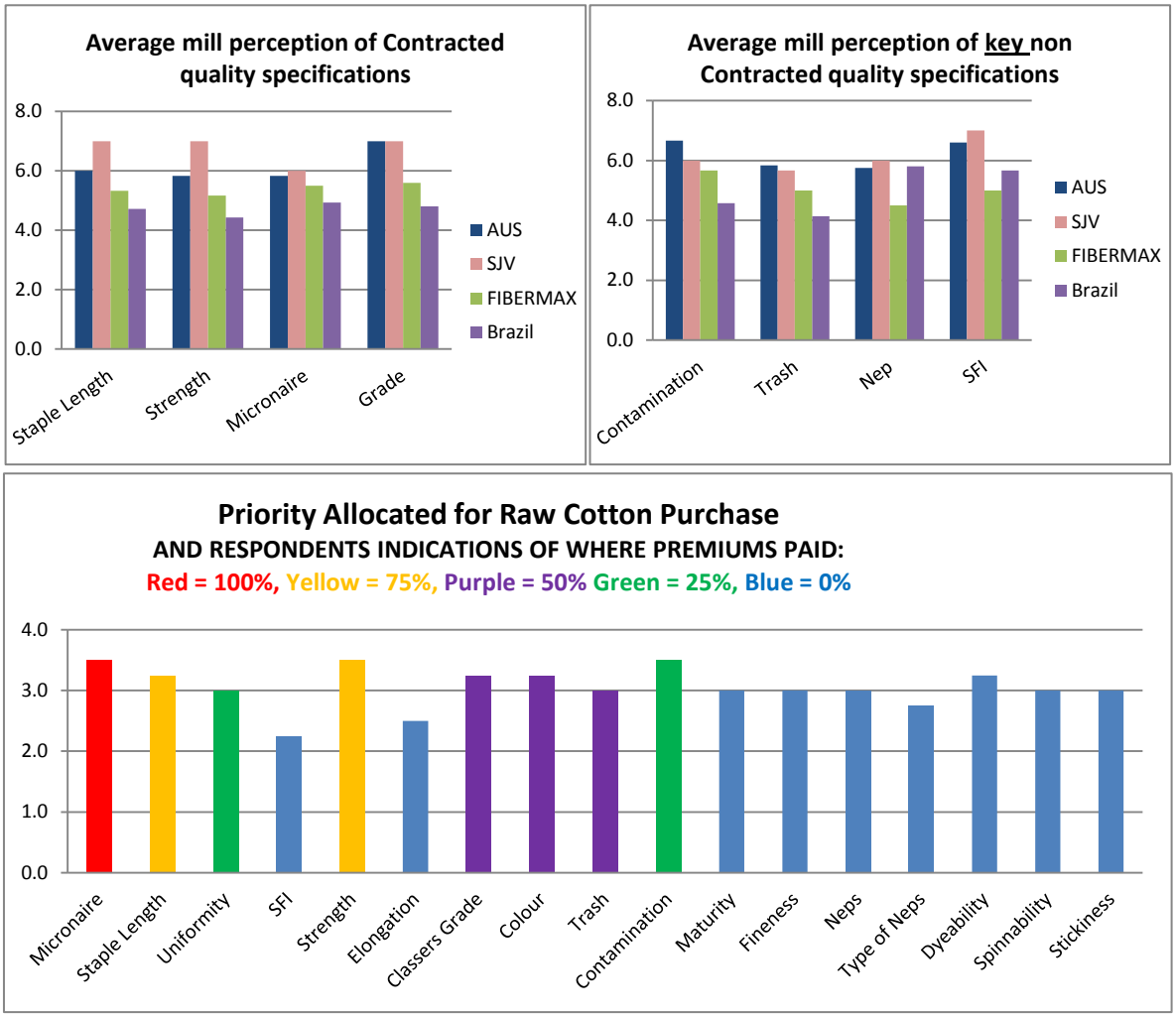


Figure 53 - Average mill perceptions of Australian cotton quality specifications and priority allocated for raw cotton purchase decisions

Australia

Although the mill only uses Australian cotton, they are part of a major textile group with mills in various countries and believed that compared to Australian cotton, on average:
SJV cotton would receive a premium of 3.0 US c/lb
Fibermax cotton would receive a discount of -3.0 US c/lb
Brazilian cotton would receive a discount of -3.0 US c/lb

Without prompting for parameters, the responses in Table 19 were given for the price differentials:

Table 19 - Reasons for Competing Growth price differential compared to Australian cotton

	SJV Premium (3.5 US c/lb average) (% of respondents)	Fibermax Discount (-4.0 US c/lb average) (% of respondents)	Brazil Discount (-7.0 US c/lb average) (% of respondents)
Strength	100%	0%	0%
Consistency	0%	100%	100%
Colour	0%	0%	0%
Contamination	0%	0%	0%

This information tied closely with analysis of average mill perceptions of key quality parameters used when making purchasing decisions (Figure 54):

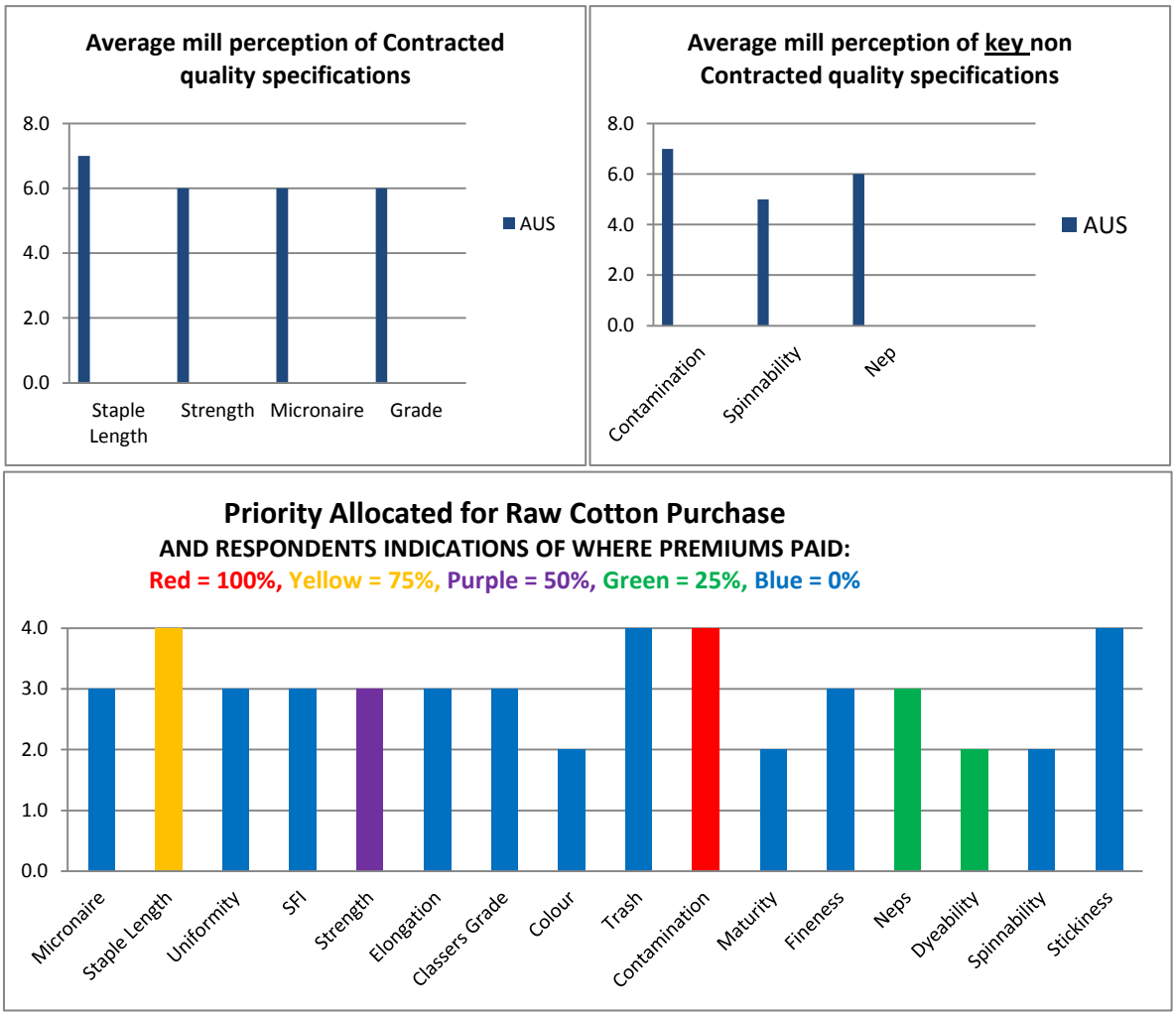


Figure 54 - Average mill perceptions of Australian cotton quality specifications and priority allocated for raw cotton purchase decisions

Measurement of Bale Laydown samples

During interviews spinners indicated their preferred, minimum or optimum, values for the fibre properties specified on their sales contracts. Table 20 summarizes the minimum fibre values for Micronaire, length, length uniformity, strength and grade as required by spinning companies to spin high quality yarn consistently. The Table also lists the performance of Australian cotton in reaching these values against recent ACSA data. For further detail on HVI quality of the Australian cotton crop readers are referred to the ACSA website at: http://www.austcottonshippers.com.au.

Table 20 – Spinner's cotton fibre property requirements

Fibre Properties	Preferred Value	Performance of Australian Cotton
Micronaire	3.9 - 4.5	78% of 2009/10 crop in 3.8 – 4.5 range
Length	≥1.12 inches	The entire 2009/10 crop ≥1.13 inch
Uniformity	≥ 82%	94% of 2009/10 crop ≥ 81%
Strength	≥ 29 g/tex	80% of 2009/10 crop ≥ 29 g/tex
Grade	≥ 31-3	97% of 2009/10 crop graded ≥31-3

For fibre properties not specified on sales contracts such as nep content, short fibre content, maturity and fineness we used the 2007 Uster Statistics[9] to benchmark the various growths. The Uster Statistics has been published by Uster Technologies Incorporated for close on sixty years and is widely used in the Textile Industry as a quality reference which allows for the classification and benchmarking of fibres and yarns produced worldwide.
The Table below gives the current statistics for neps and seed coat neps (SCN), percent short fibre content by weight (SFC w), maturity ratio (MR) and fineness as determined by the AFIS instrument.

Table 21- Uster Statistics for Raw Cotton Lint

%	Neps Cnt/g	SCN Cnt/g	SFC (w) %	Dust Cnt/g	Trash Cnt/g	Fineness mtex	Maturity MR
5	110	8	4	200	25	145	0.95
25	190	15	6	400	70	155	0.93
50	270	22	7.8	600	100	163	0.90
75	370	28	9.8	800	150	173	0.87

For each measured property by definition half of the measurements lie either side of the 50 percentile and so can be considered to be a representative value. The other percentile values give specific information on the range or distribution of the observed values. For example the 25 percentile is where only 25% of the observed values are better than this value. Thus the 25 and 5

[9] Uster Statistics 2007 CD ROM from http://www.uster.com

percentile values can be considered to be the high and very high quality observed values respectively. Similarly the 75 and 95 percentile values represent the low quality values in the distribution.

Although fineness was measured using the Cottonscan™ instrument and maturity either by the Siromat™ instrument or calculated, we compared all the results from the bale lay-down exercise to the Uster Statistics to benchmark Australian cotton.

The above mentioned minimum values (Table 20) and maximum values (Table 21) are indicated graphically in the following figures along with the measured average results expressed with y-error bars of one standard deviation giving an indication of the variation as a benchmark for the particular growths used in lay-downs. The graphs depict the actual quality of Australian cotton and the growths with which it competes.

As mentioned before not all samples were tested on all instruments. Where samples received were too small to test on all instruments the samples were only tested by AFIS PRO, Cottonscan™ and Siromat™.

Staple Length

The average staple length of the bale lay-down samples generally matches the overall perceptions of the spinners (Figure 41). The longest fibre used in blends with Australian cotton was DCH 32, which is an Indian ELS variety; followed by MCU 5, which is an Indian long staple Upland cotton. Of the Upland cottons used in the various bale lay downs, at an average of 1.183 (1.244-1.110) with a standard deviation of 0.033) inches the Australian and US cotton from California/Arizona were the longest fibre, followed by US SJV at 1.174 inches, followed by cotton from Chad at 1.171 inches and Shankar 6 cotton at 1.161 inches. The cotton from US Texas, US EMOT and Tanzania fall below the length required by spinners (see Figure 55).

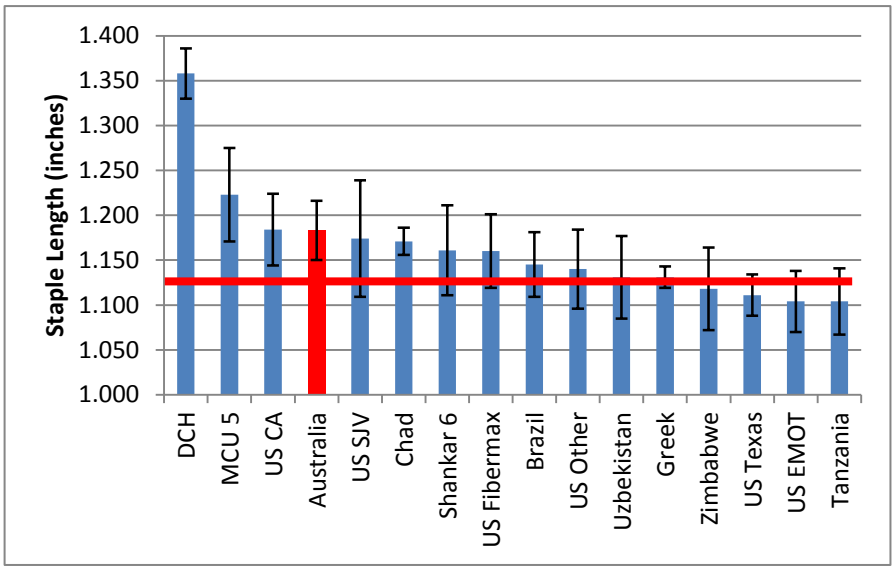


Figure 55-Average staple length of bale lay- down samples

The performance of Australian cotton is perhaps not surprising when one considers that the Australian base grade is 1.125 inches (1-1/8"), and since 2005 over 84% of the crop has achieved at least this base grade or better. In 2009/10; 90% of the crop was above this base length grade. Figure

56 gives a breakdown of the percentage of the crop that achieved the various length categories from the 2002/03 crop through to the 2009/10 crop.

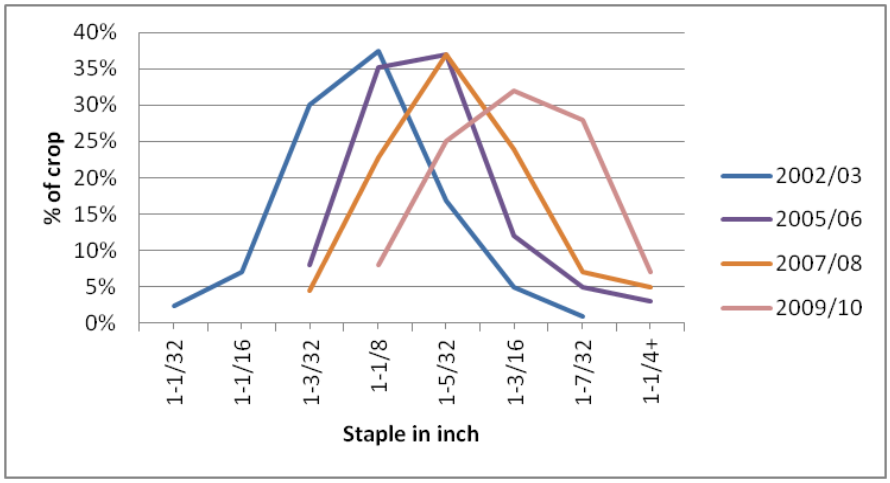


Figure 56 - length improvements (Source – ACSA Classing Statistics)

Length Uniformity

As with the average staple length of the bale lay-down samples; DCH 32 has the best length uniformity, followed by cotton from Greece. A number of cottons from various origins, including MCU 5, Australia, US SJV, US Fibermax, Uzbekistan and Zimbabwe had a length uniformity of 83%. All the other cottons, with the exception of US Texas, had a length uniformity of 82%. The cotton from US Texas fell below the length uniformity required by spinners (see Figure 57).

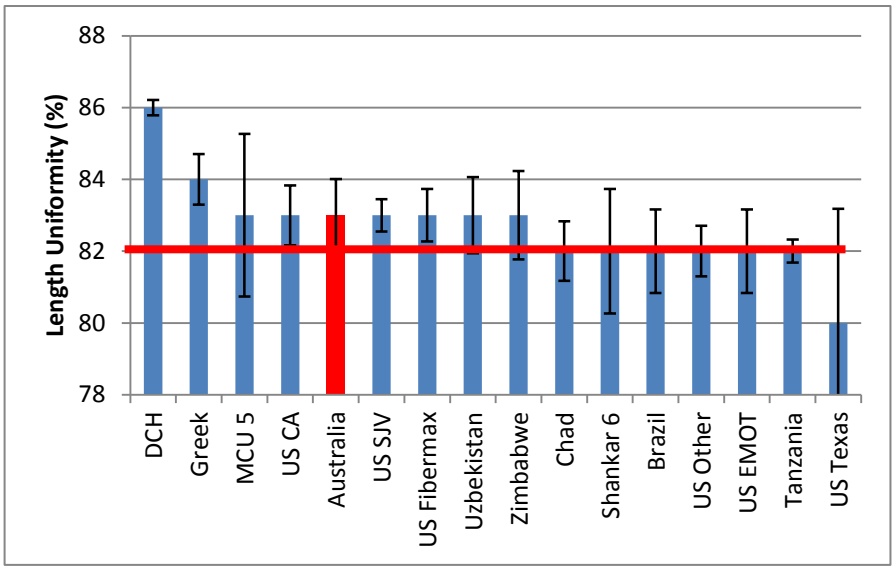


Figure 57 –Average length uniformity of bale lay- down samples

Short Fibre Content

The average short fibre content, as measured by the AFIS PRO, of the bale lay-down samples generally matches the overall perceptions of the spinners (Figure 42). The cotton with the lowest SFC is China Xinjiang cotton followed by US SJV and Greek cotton. With a SFC of 8.1%, Australian cotton falls virtually in the middle of all the cotton samples from the different origins. The SFC is however above the 50 percentile line of the Uster Statistics which can be considered to be below

average. A number of the cottons from the US, Tanzania and from India have higher SFC's and fall above the SFC required by spinners [1] (see Figure 58).

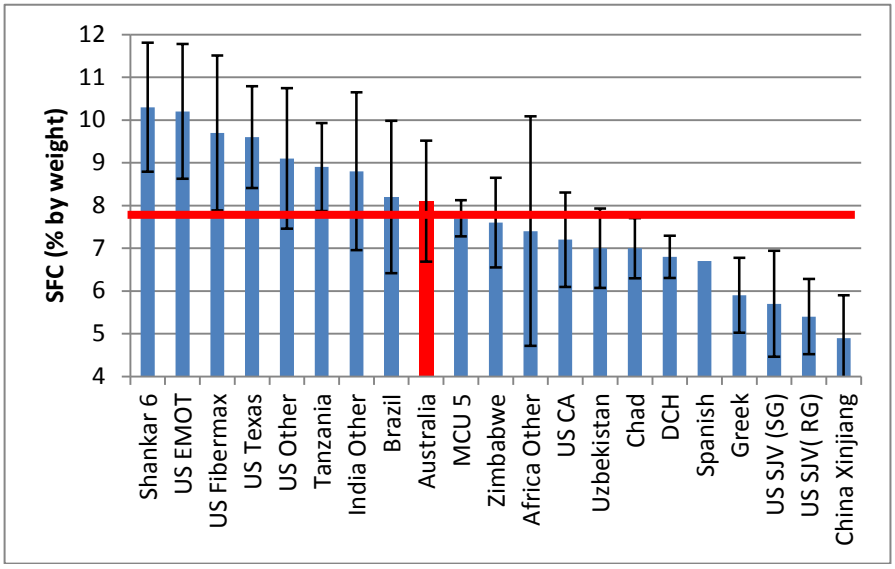


Figure 58 – Average short fibre content of bale lay- down samples

Micronaire

The average Micronaire of the bale lay-down samples generally matches the overall perceptions of the spinners (Figure 41). The majority of the samples fall within the requirements stipulated by the spinners. The exceptions being US Texas and the cotton from Greece whose Micronaire values were slightly above 4.5. The Indian samples from Shankar 6 were below the minimum with DCH also below the minimum, which was expected as it is an ELS fibre which is generally finer than Upland cotton (see Figure 59).

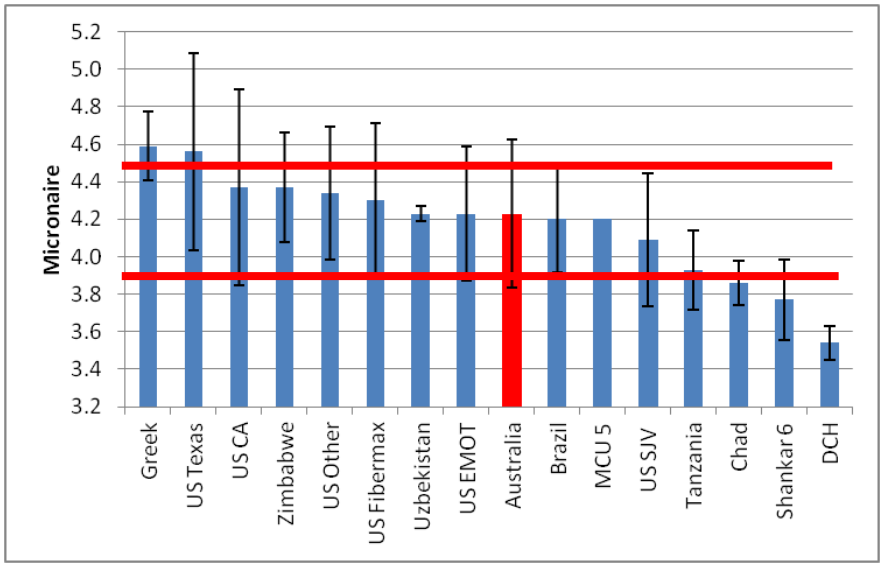


Figure 59 – Average Micronaire values of bale lay-down samples

Australia has battled with high Micronaire values between 2001 and 2006 (Figure 60), mainly due to higher temperatures experienced during the season and drought conditions. The average results from the bale lay down samples show that the Micronaire values have again stabilised to values achieved prior to 2001, with the majority of the 2008/09 and 2009/10 crop producing fibre in the

Micronaire range of 3.8-4.5. Of concern is that, Australian cotton, as can be seen by the error bars, had the third highest variability in Micronaire, slightly worse than Brazil and Zimbabwe, but better than most of the US growths.

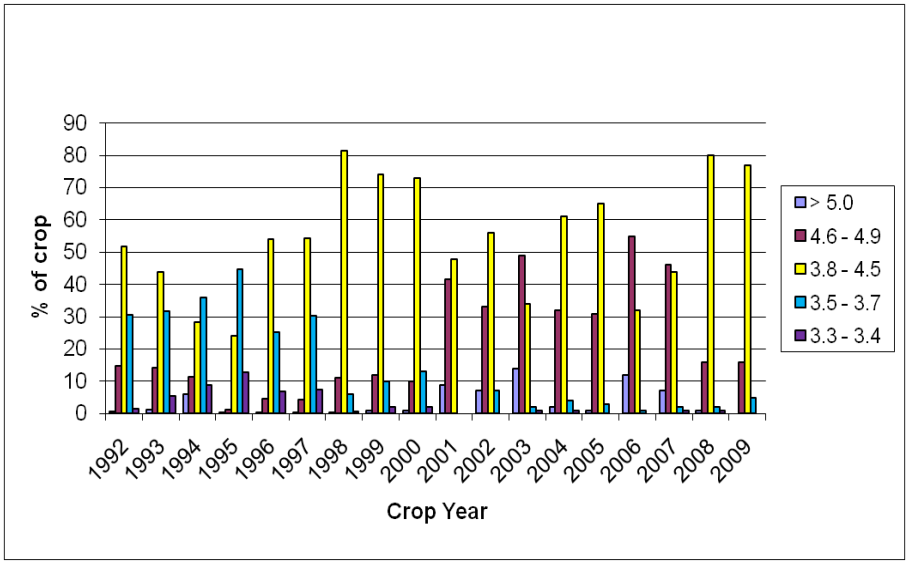


Figure 60 – Micronaire values for Australian cotton crop 1992/93 – 2009/10 (Source – ACSA Classing Statistics)

It is well known and documented that Micronaire is a combination of maturity and fineness, and that by itself the Micronaire value is unable to properly distinguish premium fine mature cotton from immature, coarser cotton. Whilst there are already a number of methods for measuring fibre maturity and fineness no one method is able to do so accurately and with the speed required for classing purposes. The development of the Cottonscan™ and SiroMat™ instruments by CMSE is aimed at creating fast and accurate instrument test methods for breeders, merchants and spinners alike to manage fibre fineness and maturity. These two instruments have now been combined into the Cottonscope™ instrument.

Maturity

The average maturity of the bale lay-down samples is shown in Figure 61. The majority of the samples, with the exception of cotton from Australia, US Texas and MCU 5, fall below the 50 percentile line of the Uster Statistics which can be considered to be below average and hence immature. As can be seen there are large variations within the samples, which makes interpretation difficult.

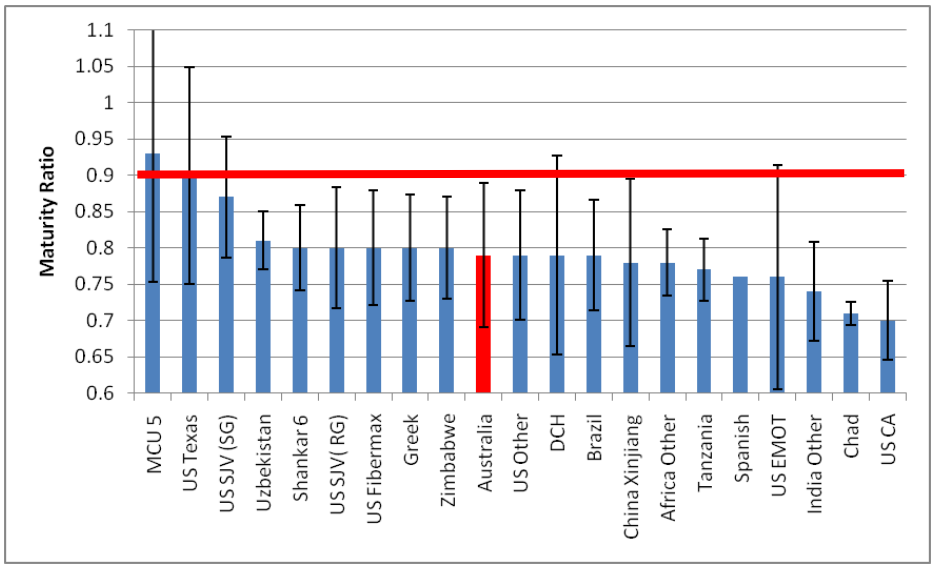


Figure 61 – Average Maturity of bale lay-down samples

Fineness

The average fineness of the bale lay-down samples is shown in Figure 62. According to the Uster Statistics the majority of the samples, with the exception of DCH, which is an ELS variety, fall above the 50 percentile line of the Uster Statistics and hence coarser than required. At 208 mtex, Australian cotton is similar to cotton from Brazil, US Fibermax and Zimbabwe and finer than most other cotton from the US.

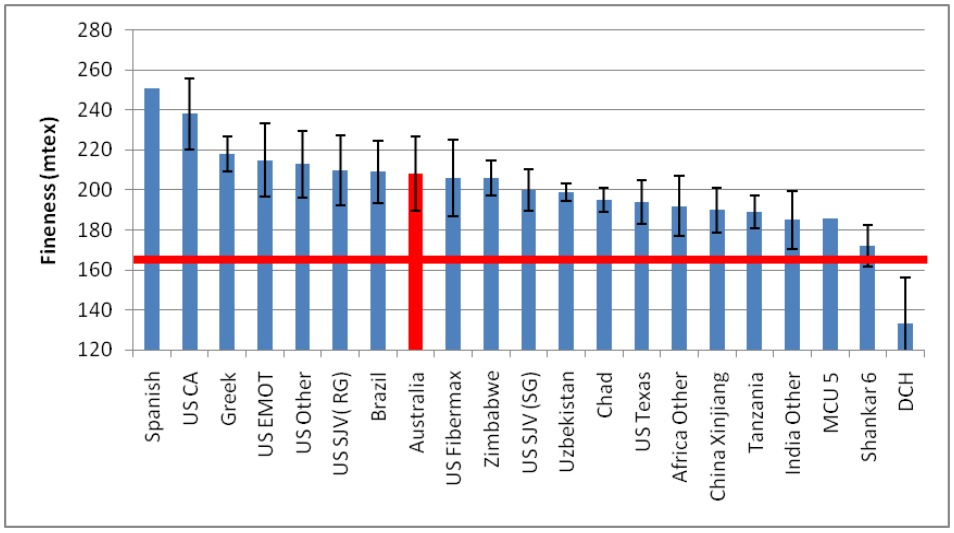


Figure 62 – Average fineness of bale lay-down samples

Strength

The average fibre strength of the bale lay-down samples generally matches the overall perceptions of the spinners (Figure 41). The strongest Upland cotton fibre used in blends with Australian cotton is US SJV, followed by cotton from Chad, Uzbekistan and Greece. At 30.4 g/tex Australian cotton is stronger than Brazilian and Zimbabwean cotton and US Fibermax, easily meeting spinner's requirements. The cotton from US Texas and Tanzania fall below the strength required by spinners (see Figure 63).

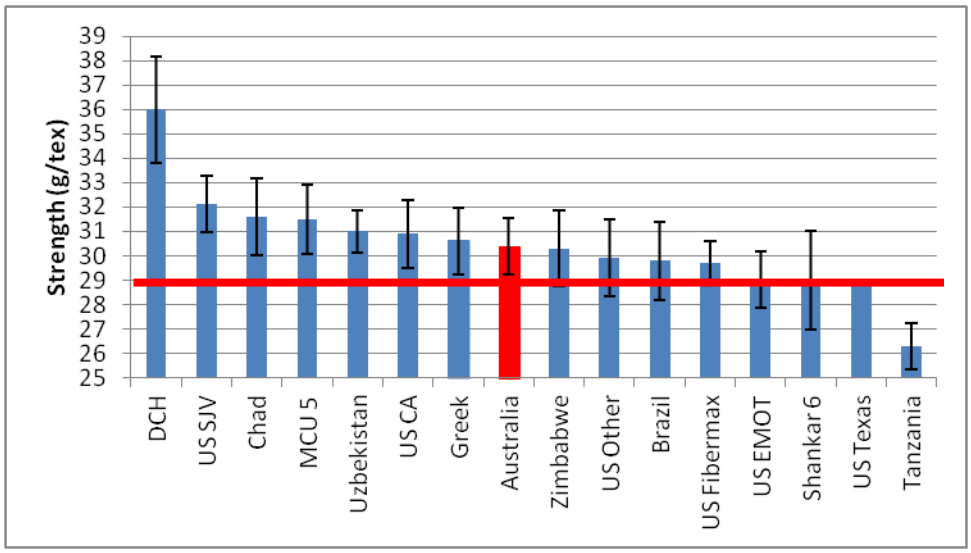


Figure 63 – Average fibre strength of bale lay-down samples

Fibre elongation did not seem to be an issue that the participants were concerned about or in most cases considered important in fibre selection.

Neps

The average nep content of the bale lay-down samples generally matches the overall perceptions of the spinners (Figure 42). As expected cotton that is handpicked has lower nep content than cottons that are machine picked. Thus cotton from India and Africa had the lowest nep counts, with some cotton from the US, Australia and Brazil having the highest nep content. With a nep count of 308 neps/gram, Australian cotton falls above the 50 percentile line of the Uster Statistics which can be considered to be below average. This is slightly higher than the average nep content of 276 neps/gram found in the previous survey, but does compare favourably with a recent industry study [48]. A number of the cottons from the US had higher nep counts and fall above the nep count required by spinners [1]. The results for Australian cotton also compares favourably with a recent industry study [47] (see Figure 64).

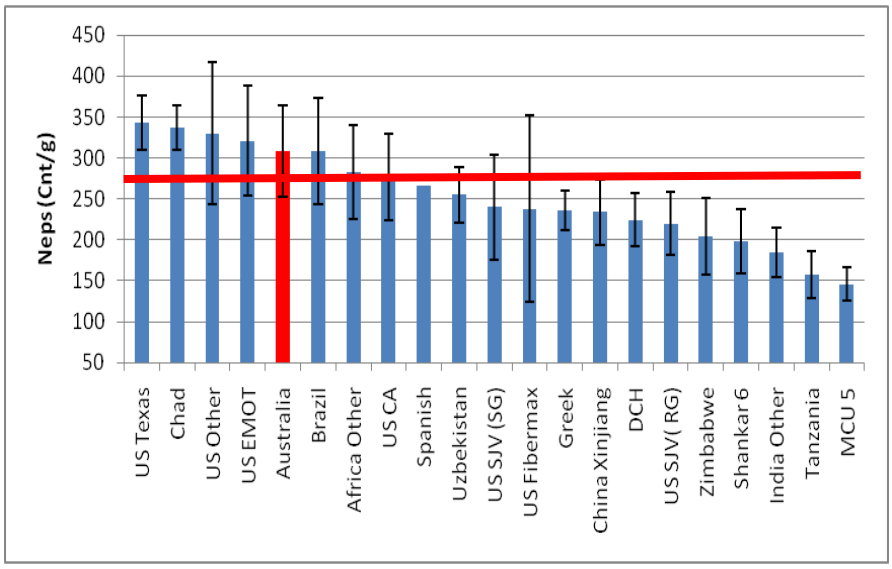


Figure 64 – Average nep count of bale lay- down samples

Most mills have stated that the level of nep and short fibre content in Australian cotton is of concern. A number of mills have stated that the removal of neps and short fibre content during the combing process is 1- 4.5% higher when compared to the processing of cotton from other parts of the world.

Seed coat neps

In general the majority of the bale lay-down samples average seed coat nep content falls above the 50 percentile line of the Uster Statistics which can be considered to be below average. Australian cotton as well as cotton from Zimbabwe, MCU 5, US Texas and Tanzania contain seed coat neps which are average or below the 50 percentile line of the Uster Statistics which can be considered to be average and above average. The results for Australian cotton also compares favourably with a recent industry study [47] (see Figure 65).

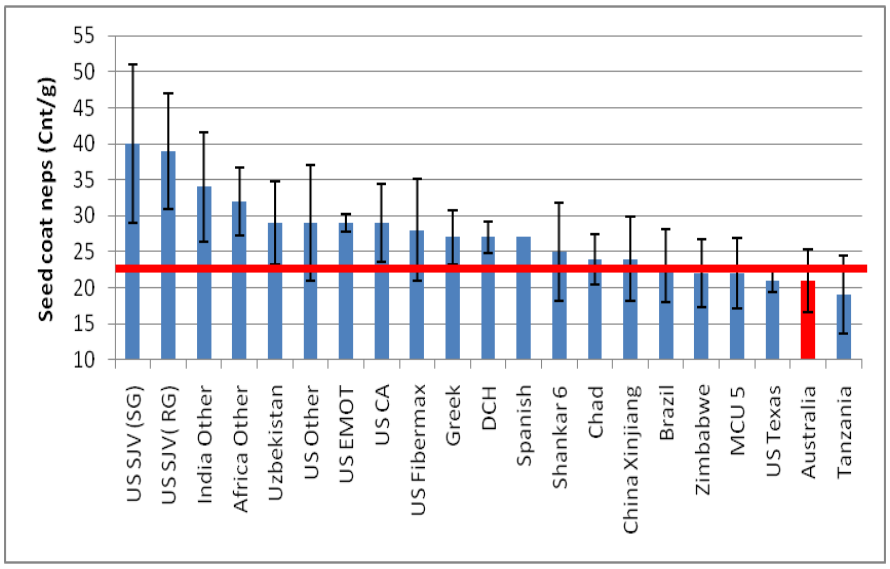


Figure 65 – Average seed coat nep count of bale lay-down samples

Seed coat fragments are a major concern to the mills as they are attached to the fibres and hence very difficult to remove. According to the ITMF Contamination Survey [40] the perception is that around 30% of the cotton produced worldwide is contaminated with seed coat fragments. In 2009 Australian cotton was seen as the least affected county, with cotton from Zimbabwe, US CA, US Texas, with some Indian and some Brazilian cotton also in the top 15 least affected countries. Figure 66 shows the trend of seed coat fragments since 1991.

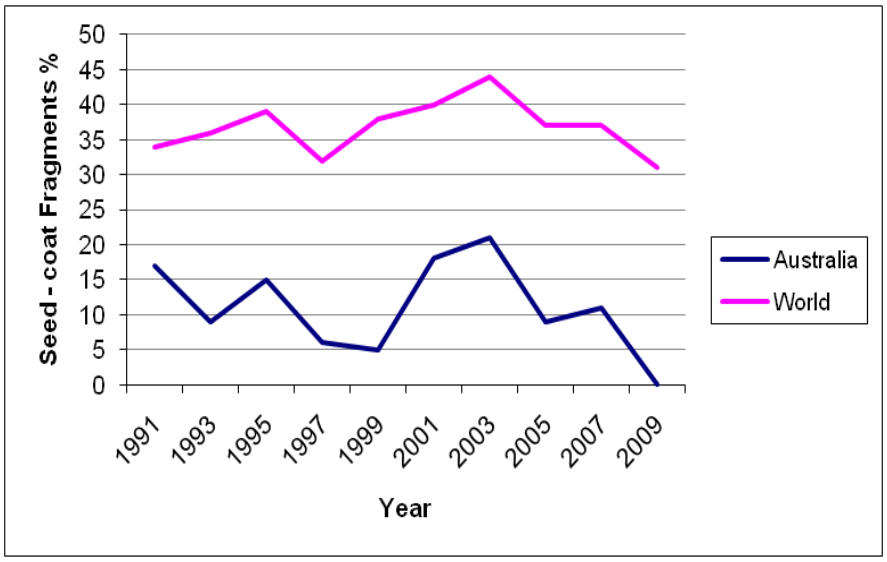


Figure 66 – ITMF seed coat fragments 1991-2009[40]

Dust and Trash

The majority of the cotton had a trash count of below 100 per gram which falls below the 50 percentile line of the Uster Statistics and can be considered to be on or above average. The majority of the mills surveyed had no issues with trash content and preferred trash grades of 2-3, mainly to keep their wastage to a minimum. Interesting enough three Japanese mills mentioned that the trash levels in Australian cotton were increasing with a resultant increase in yarn clearer cuts during winding as well as an increase in fabric defects (see Figure 67 and 68).

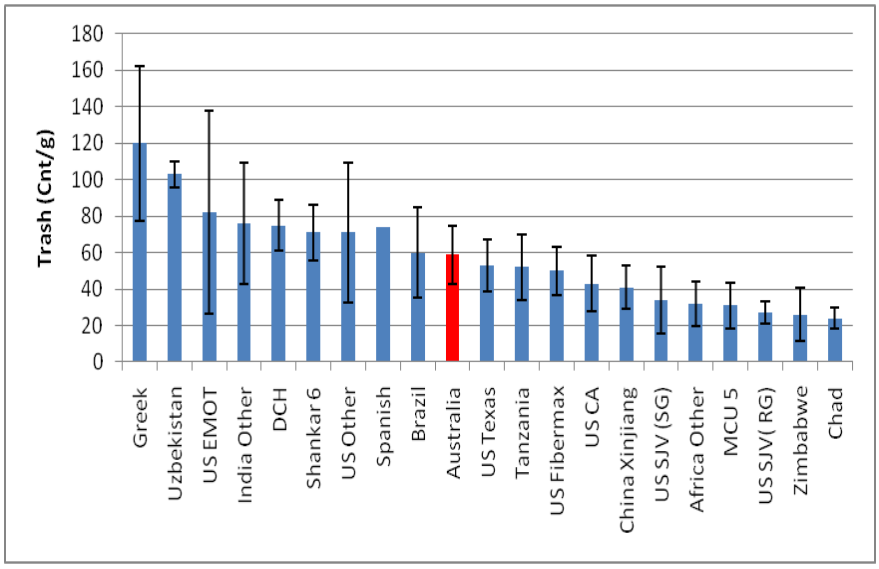


Figure 67 – Average trash count of bale lay-down samples

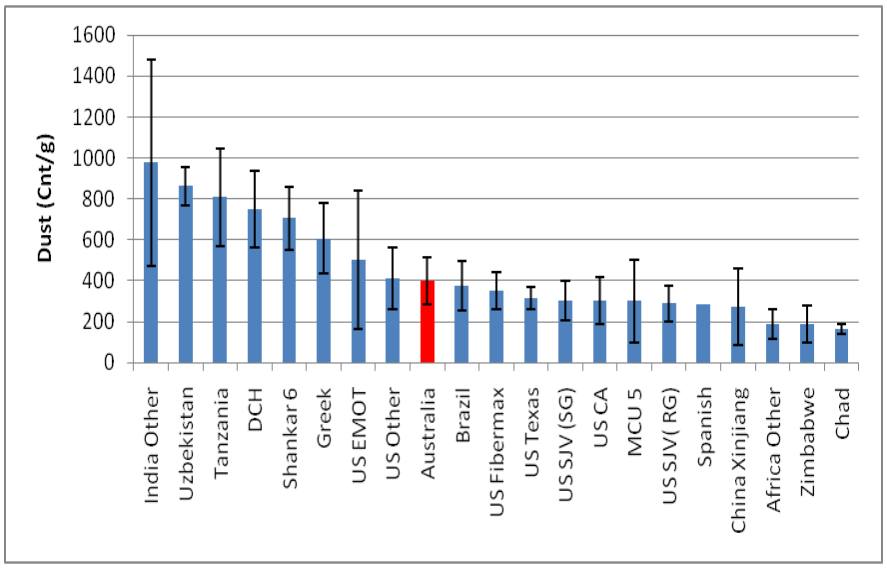


Figure 68 – Average dust count of bale lay-down samples

Contamination

Contamination, even if it is a single foreign fibre, can lead to the downgrading of yarn, fabric or garments or even the total rejection of an entire batch and can cause irreparable harm to the relationship between growers, ginners, merchants and textile and clothing mills. An ITMF study in 2001 [45] reported that claims due to contamination amounted to between 1.4-3.2% of total sales of 100% cotton and cotton blended yarns. The survey conducted in 2002/03 found that contamination was the most favourable fibre property of Australian cotton. This survey has once again shown that the most favourable fibre property of Australian cotton is contamination.

These results are supported by ITMF Contamination Surveys, with the latest survey (2009) rating Australian cotton in the Top 5 countries least affected by contamination (Figure 69).

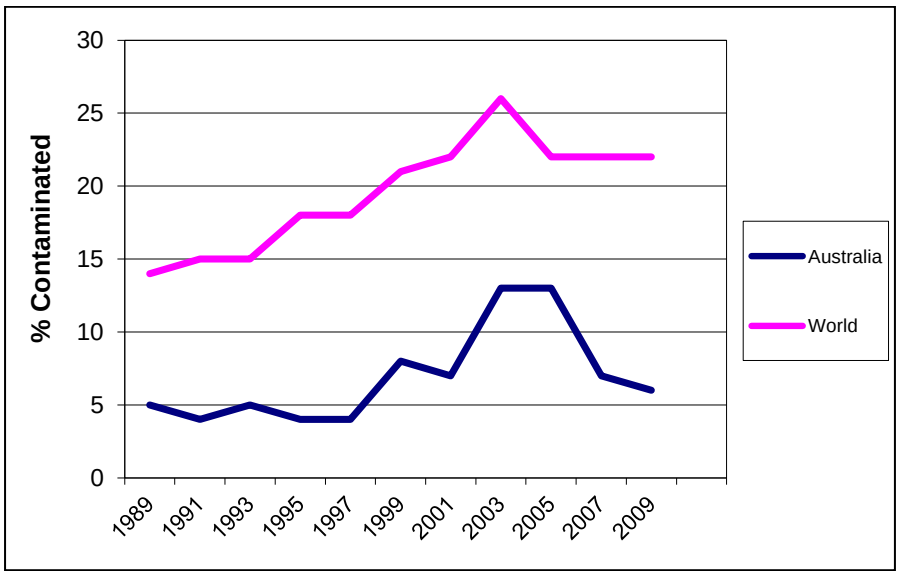


Figure 69 – ITMF contamination 1989-2009[40]

A comprehensive survey was conducted by the Australian cotton industry in conjunction with a major spinning company situated in Indonesia for the 2004/05; 2005/06 and 2006/07 crop years.

This study found that Australian cotton had the least amount of contaminants found in bales. Table 22 provides a breakdown of the results [39].

Table 22 – Contaminants by country of origin in grams/ton

Country	1999/2000	2004/2005	2006/2007
Australia	1.4	1.9	0.6
China	2.2	3.0	*
Brazil	3.2	2.7	2.4
US	2.8	2.0	1.4
Uzbekistan	*	9.1	2.4
West Africa	3.7	7.0	2.5

*No results available

Some mills have indicated that they will not purchase hand picked cotton due to the high incidence of contamination in these cottons. There are a number of spinning mills producing 100 % Australian yarns for light/pale shades. Some mills claim to attract premiums of between 2 Usc to 20 Usc/kg for yarns produced from 100% Australian cotton.

Stickiness

There were no issues with stickiness of Australian cotton. This is supported by ITMF Contamination Surveys, with the latest survey (2009) rating Australian cotton in the Top 5 countries least affected by stickiness (see Figure 70).

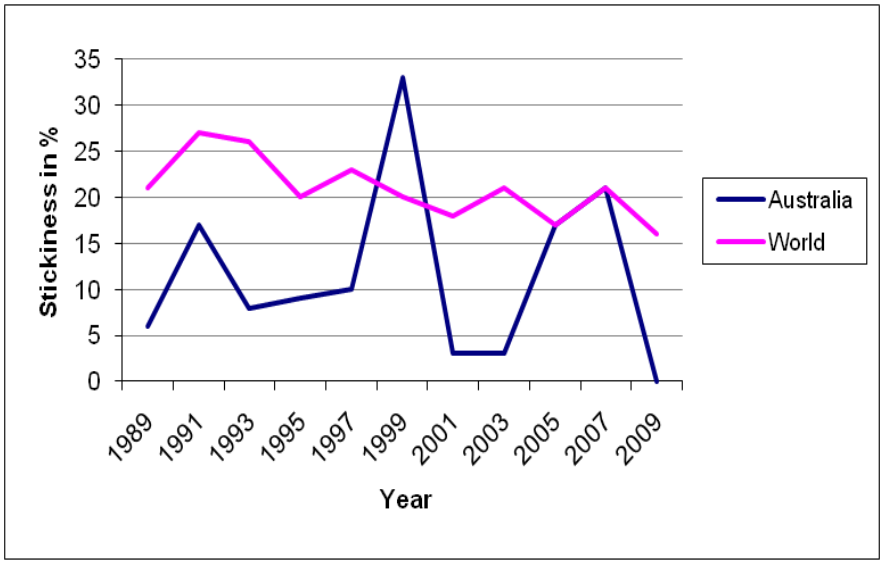


Figure 70 – ITMF stickiness 1991-2009[40]

Other Issues

As was highlighted in the previous survey; a small number of the participants still have the perception that when dyed, fabrics produced from Australian cotton are not as bright as or duller than fabrics produced from other cottons. This occurs even though Australian cotton is a lot whiter and brighter than other cottons. Even after mercerising; US cotton appears shiny whereas Australian cotton appears duller.

One of the participants felt that Australian cotton had lost its softness.

DETERMINING THE VALUE OF LICENCING AND BRANDING ARRANGEMENTS

In order to gain some information about the value of licensing and branding arrangements the mills were asked to indicate their experience and perception of branded/licensed raw cotton products. In particular about their experiences with Cotton USA and Supima® licensing and also with three alternatives to conventional cotton, such as Organic cotton, Fair Trade (FT) cotton and Cotton Made in Africa (CMiA). We did not enquire about the newly developed Better Cotton Initiative (BCI); the mills were however asked whether they had any knowledge of the Australian BMP program, both of which are referred to as reduced impact cotton [52].

The Cotton USA Mark Licensing Program was launched in 1989 by the Cotton Council International (promotional arm of the National Cotton Council of America) to create cotton quality awareness in key global markets and to increase the demand for US cotton and cotton products at both trade and consumer levels. To qualify to become a Cotton USA Licensee, which is at no cost to the manufacturer, retailer or brand but licensees must meet the following criteria:

- The product line must be of good quality and consist of at least 95% cotton fibre (exclusive of decoration, lining and trim). The cotton fibre must contain at least 50% US grown cotton if sold outside the US and if sold at retail in the US it must be 100% U.S. cotton fibre.
- Socks to be sold at retail both within and outside the US must consist of at least 70% cotton fibre which must be 100% US cotton fibre.
- The manufacturer should have a solid corporate reputation and market quality brands retailed at mid-market price points and higher [16].

Supima® was founded in 1954 and is the promotional organization of the American Pima cotton growers. Supima® has operated a successful licensing program for a number of years and targets all participants in the home fashion and apparel supply chains; from spinners, weavers and knitters to manufacturers, consumer brands and retailers. By licensing the entire supply chain, Supima® provides added assurance to downstream customers that Supima® trademarked goods are made with 100% American Pima cotton which is associated with the highest quality textile and apparel goods, sold globally in better quality retail stores and catalogues. Over 300 fine count textile mills, manufacturers and retailers from around the world are licensed to use the Supima® brand. Licenses are given only to select, high-quality textile mills, apparel and textile manufacturers, and retailers. Supima® charges an annual licensing fee of US $5,000; however brands and retailers are not required to pay the fee [17].

Certified Organic cotton production started in the early 1990s and focuses mainly on the farming system and environmental sustainability. Organic cotton is grown mainly in India, Turkey, Syria, Tanzania and China and in 2009 the total crop was 175,000 MT, which is still below 1% of global cotton production [19, 52]. Of this crop around 12.4% was long and extra long staple cotton. Organic cotton is commonly priced at 20% above conventional cotton [20]. Some of the constraints to increasing the growth of organic cotton are; increased costs such as cost of labour, limited availability of non GM seed, verification and certification as well as lower yields, variable quality and time to market [48,52].

FT was started in the 1950s with FT cotton as a managed brand starting in 2004. FT cotton is mainly grown in West Africa, India, Pakistan and Central Africa. In 2009; 28,300 MT of cotton was produced. Buyers must pay producers a FT Minimum Price (which is 18-67% higher than normal conventional cotton), which is used to invest in social or economic development projects to protect the livelihood of small scale producers in developing countries [21].

Similarly to FT cotton, CMiA was established in 2005 to improve the competitiveness of African cotton and assist in the development of a sustainable cotton production in Africa [22]. It is estimated that 85,000 MT of CMiA cotton will be produced annually [23]. CMiA is traded at world market prices with a moderate licensing fee levied at the retail level which will be used for training and dividends to participating smallholders [22].

Product quality, marketability and traceability of product were the three most important characteristics of a branded and or licensed raw cotton product according to survey respondents (Figure 72). If these characteristics translated into consumer brand recognition it would subsequently generate demand pull for a licensed product. Barriers to participation include legal/compliance costs; increased paperwork and cost of raw material (Figure 71).

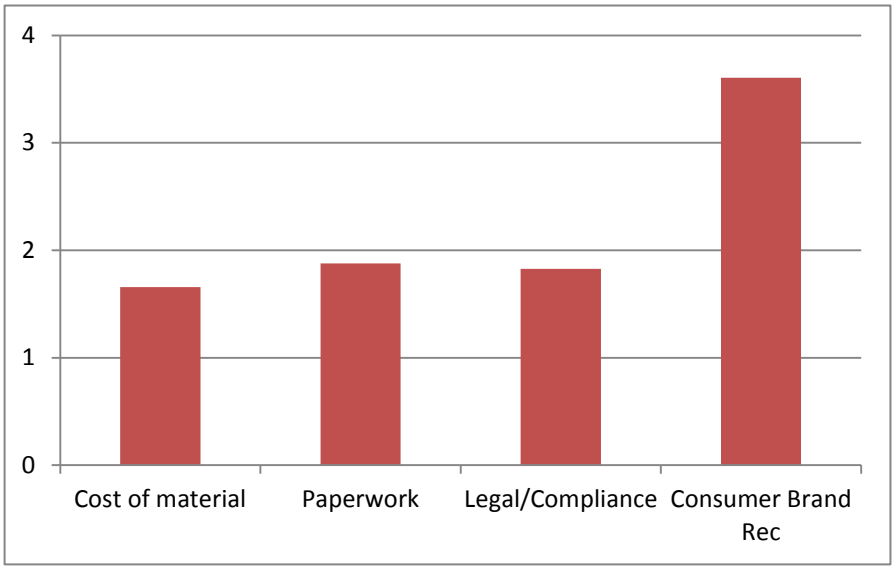


Figure 71 - Impacts on willingness to participate in licensing programmes

Note: in Figure 71, and subsequent similar figures, the y axis scale refers to survey responses where 0 = disincentive; 2 = no issue and; 4 = incentive.

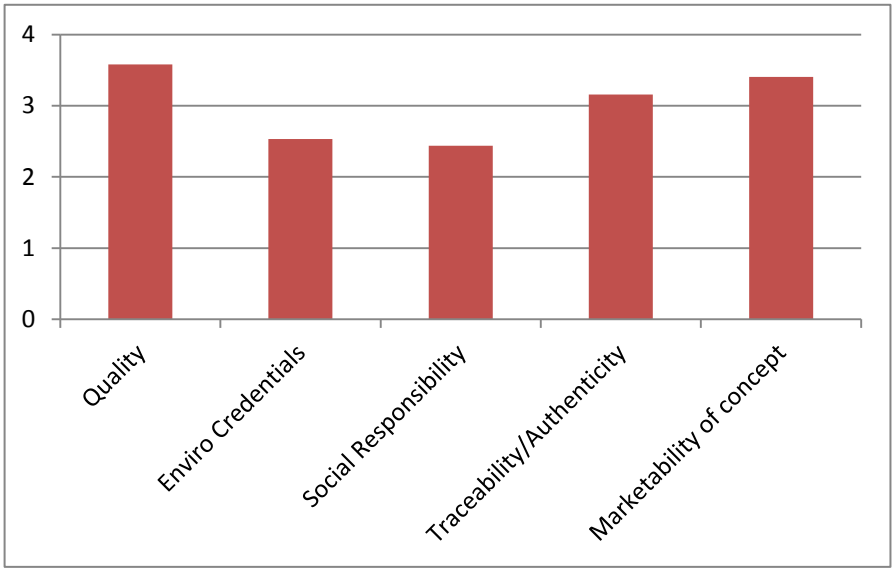


Figure 72 - Points of Differentiation Required for a Successful Brand

Note: in Figure 72, and subsequent similar figures, the y axis scale refers to survey responses where 0 = not important and; 4 = important.

Supima® was clearly identified by spinning mills as the most successful example of a branded / licensing programme for raw cotton. Ninety seven percent of survey respondents had heard of Supima® and 56% participated in the programme. Of the Supima® licensees, 81% said participation resulted in yarn premiums and therefore influenced their raw cotton purchasing decisions.
Other critical success factors of the Supima® programme included marketing support, regular updates, access to information, and the generation of supply chain linkages through the listing of licensed suppliers and customers on the Supima® website. Twenty percent of the mills have or do produce organic cotton with less than 5% aware of and have produced FT and CMiA cotton.

Japan

All mills surveyed in Japan were aware of the Supima® and Cotton USA License programmes, with an 80% participation rate in Cotton USA and 60% participation rate in Supima®. By comparison 67% of the mills surveyed were aware of the Australian BMP program with none of the mills using BMP. In all cases, mills indicated that their key reason for participation in any licensing programme was that it was a pre-requisite for the sale of their yarn, fabric and finished goods. There was also a belief that participation led to premiums for the yarn produced as in the case of Supima®.

Table 23 - Influence of licensing programmes on business and purchasing decisions

	Increased Yarn Demand	Improved Premiums for Yarn	Influences raw cotton sourcing
Cotton USA	50%	50%	50%
Supima®	75%	75%	75%

A number of other advantages of participation in licensing programmes were also noted, including traceability, quality, improving their own corporate image with consumers, and leveraging the brand's marketing efforts to their own company's advantage although this was more at the garment and retail market than the yarn market. Some mills thought that the demand for branding cotton was diminishing, with some mills discontinuing their licensing/branding arrangements due to the cost of the raw material.

Figure 73 demonstrates that downstream brand recognition from consumers, was important to the success of the brand. Mills felt that an increase in paperwork and costs (raw material and legal/compliance) would be a moderate disincentive to participation.

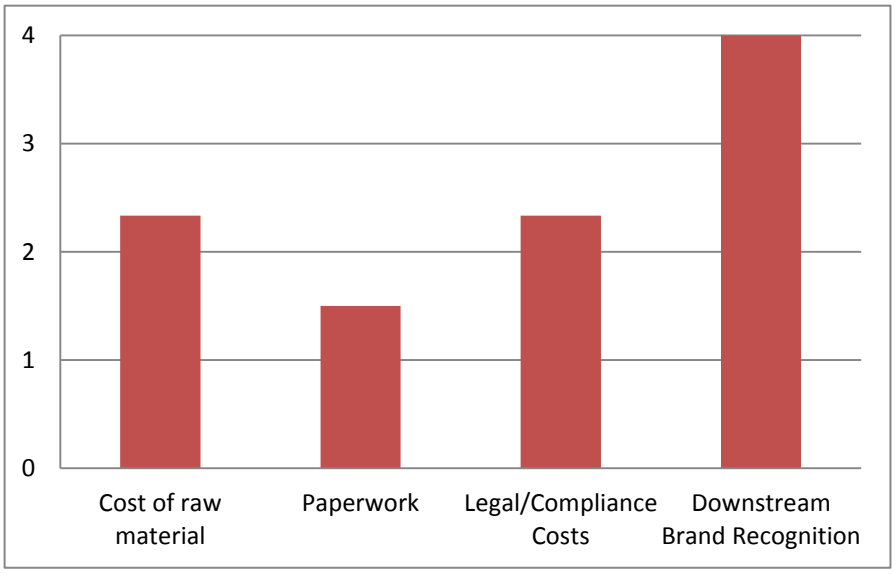


Figure 73 - Impacts on willingness to participate in licensing programmes – Japan

Figure 74 demonstrates that mills were ambivalent to social responsibility and environmental credentials of a raw cotton product; believing the key point of differentiation required hinged on the quality of the raw cotton. It was also important that the product be authentic and marketable.

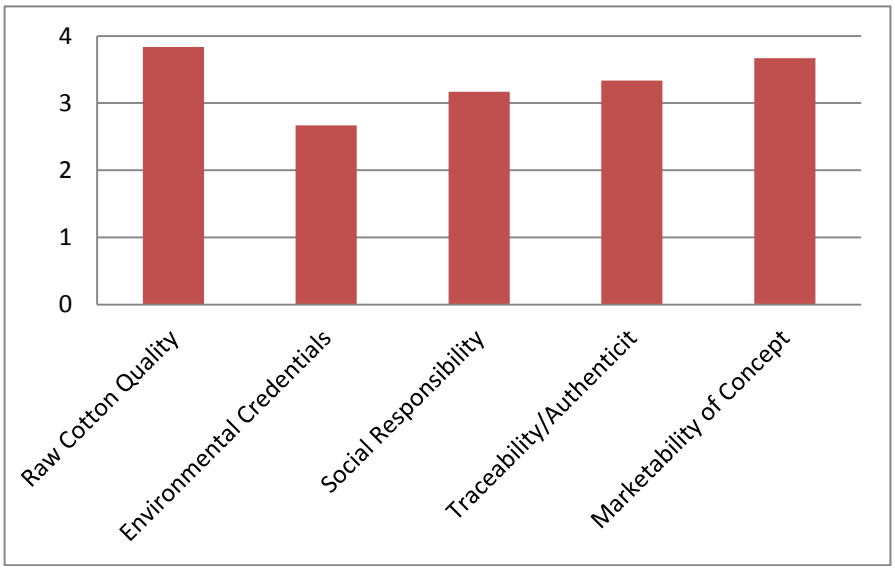


Figure 74 - Points of differentiation required for a successful brand– Japan

Image of Australia

In terms of determining a branding concept for Australia, mills surveyed were asked what the first image was when they thought of Australia. In total, 13 responses were recorded, with natural themes (including the Koala and Kangaroo) dominating the responses (see Figure 75)**.**

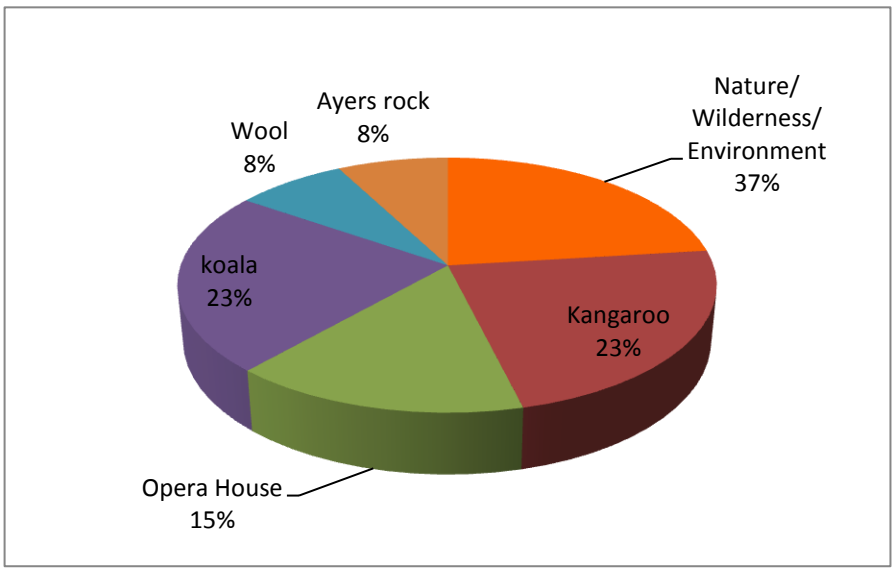


Figure 75 - Images of Australia

Thailand

All mills surveyed in Thailand were aware of the Cotton USA License programmes, with 83% aware of Supima®, and 50% awareness of Australian BMP. There was an 83% participation rate in Cotton USA, and a 67% participation rate in Supima®. None of the mills participated in the Australian BMP

licensing programme. Interestingly, 50% of the mills surveyed purchased organic cotton, predominately from India and Turkey. They were also aware of the CMiA and FT programmes.

The dominant reason for participation in any licensing programme was that it was a pre-requisite for the sale of their yarn, fabric and finished goods. Mills also commented that participation allowed them to leverage into the licensees marketing and networking programmes with customers. Depending on the licensing programme, participation could also help enhance corporate image and meet their corporate social responsibility.

Table 24 - Influence of licensing programmes on business and purchasing decisions

	Increased Yarn Demand	Improved Premiums for Yarn	Influences raw cotton sourcing
Cotton USA	30%	30%	10%
Supima®	63%	63%	38%

- Note 1 – the proportions noted do not take into account mills who did not participate in the licensing programmes.
- Note 2 – some mills gave 50/50 responses to the lines of questioning, and this was taken into account when calculating the percentages.

Figures 76 and 77 demonstrate that downstream brand recognition from consumers, combined with raw cotton quality was important to the success of the brand. Mills felt that an increase in raw material cost and legal/compliance costs would be a moderate disincentive to participation; while paperwork and administration was not a major issue.

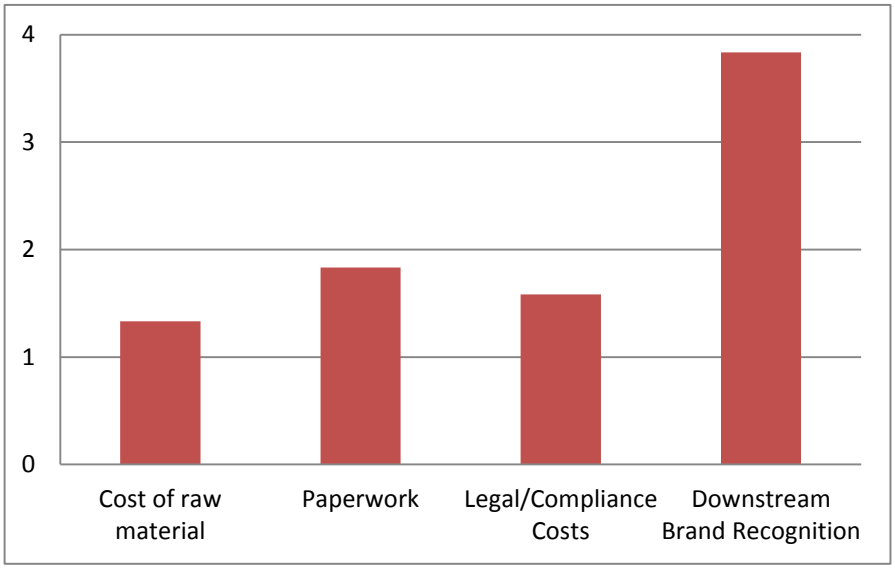


Figure 76 - Impacts on willingness to participate in licensing programmes– Thailand

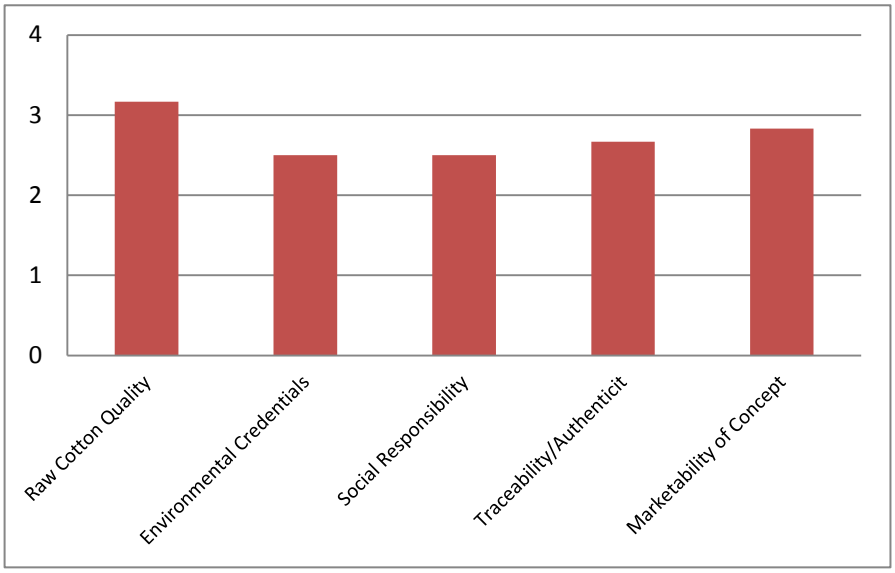


Figure 77 - Points of differentiation required for a successful brand - Thailand

Mills were ambivalent to social responsibility and environmental credentials of a raw cotton product, believing the key point of differentiation required hinged on the quality of the raw cotton. It was also important that the product is authentic and marketable.

Image of Australia

In terms of determining a branding concept for Australia, mills surveyed were asked what the first image was when they thought of Australia. In total, 12 responses were recorded, with themes centred on our people being friendly and efficient, as well as delivery of high quality products and services dominating (see Figure 78).

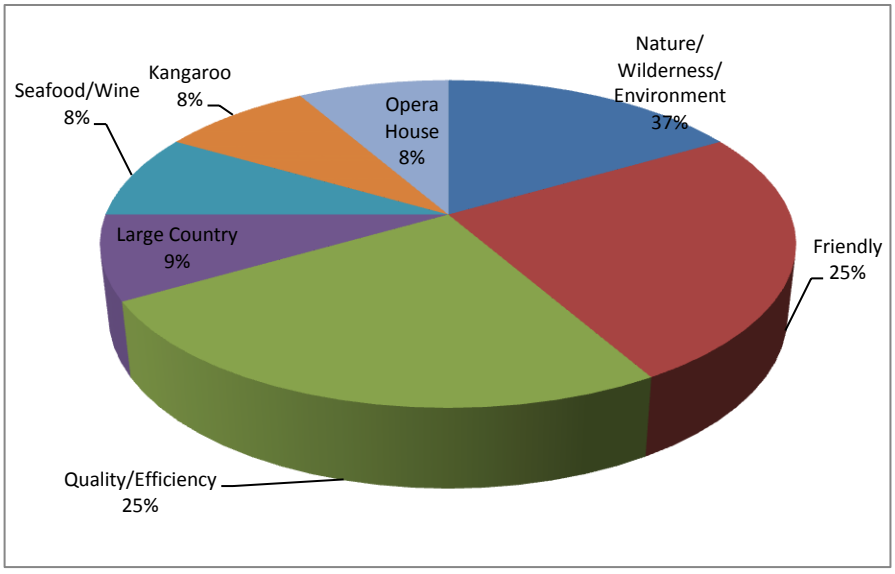


Figure 78 - Images of Australia - Thailand

Korea

All mills surveyed in Korea were aware of the Supima® and Cotton USA License programmes, with a 75% participation rate in each. By comparison, there was no awareness or participation in the Australian BMP licensing programme. In all cases, mills indicated that their key reason for

participation in any licensing programme was that it was a pre-requisite for the sale of their yarn, fabric and finished goods. This was particularly the case with regards the Supima® programme.

Table 25 - Influence of licensing programmes on business and purchasing decisions

	Increased Yarn Demand	Improved Premiums for Yarn	Influences raw cotton sourcing
Cotton USA	67%	67%	67%
Supima®	100%	100%	100%

- Note – the proportions noted do not take into account mills who did not participate in the licensing programmes.

A number of other advantages of participation in licensing programmes were also noted, including improving their own corporate image with consumers, and leveraging the brand's marketing efforts to their own company's advantage. Given the fact the USA is the major consuming market for finished textile goods; this was noted by some survey participants as a potential risk for an Australian brand.

Figures 79 and 80 demonstrate that downstream brand recognition from consumers, combined with raw cotton quality was important to the success of the brand. Mills felt that an increase in raw material cost would be a moderate disincentive to participation; while costs associated with compliance and administration were not a major issue.

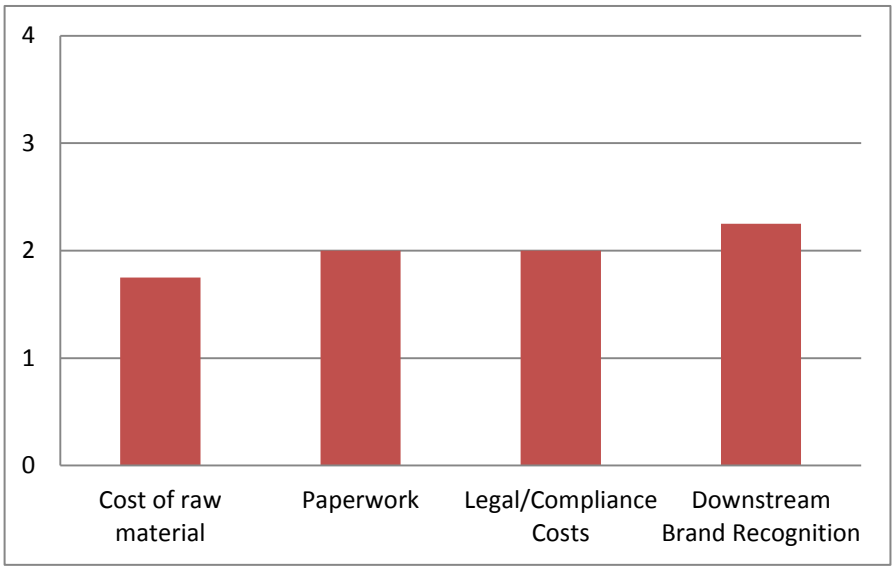


Figure 79 - Impacts on willingness to participate in licensing programmes - Korea

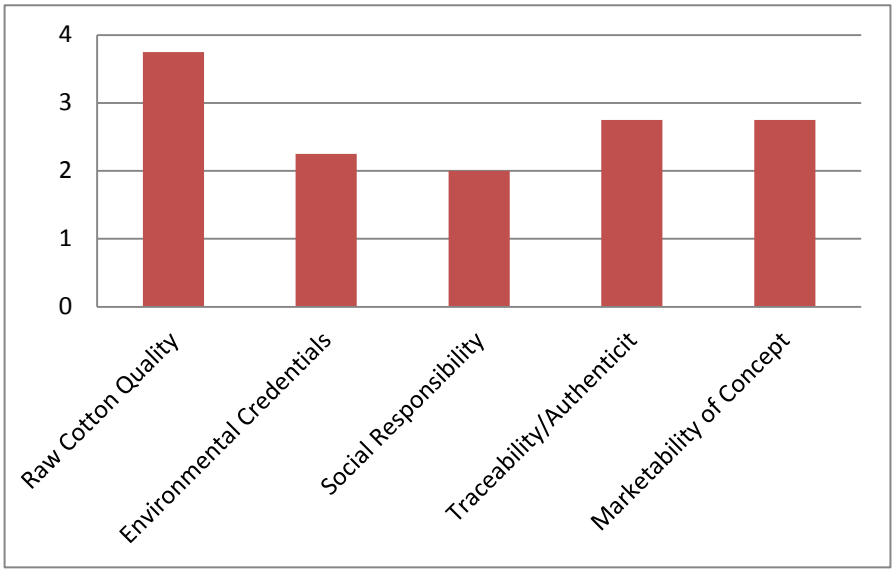


Figure 80 - Points of differentiation required for a successful brand - Korea

Mills were ambivalent to social responsibility and environmental credentials of a raw cotton product believing the key point of differentiation required hinged on the quality of the raw cotton. It was also important that the product is authentic and marketable.

Image of Australia

In terms of determining a branding concept for Australia, mills surveyed were asked what the first image was when they thought of Australia. In total, eight responses were recorded, with natural themes (including the Kangaroo) dominating the responses (see Figure 81).

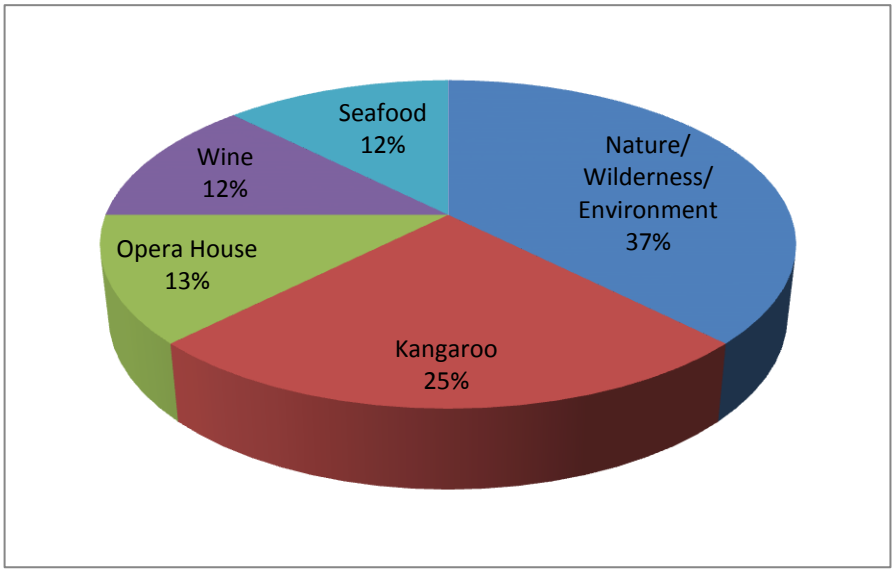


Figure 81 - Images of Australia - Korea

Hong Kong

The mills surveyed in Hong Kong were aware of the Cotton USA License, Supima® and Australian BMP programmes. In actual fact one of the mills owns a cotton farm on the Darling Downs in Queensland. Both the Groups participate in Supima®, but only one participates in Cotton USA. None

of the mills participated in the Australian BMP licensing programme. It was however mentioned that Supima® is not in demand with only a few buyers requesting hangtags.

The dominant reason for participation in licensing programmes was that it leads to increased demand for their yarns and that these yarns can be sold at a premium. It was also good for product image and marketing strategy.

Table 26 - Influence of licensing programmes on business and purchasing decisions

	Increased Yarn Demand	Improved Premiums for Yarn	Influences raw cotton sourcing
Cotton USA	50%	50%	50%
Supima®	100%	100%	50%

Figures 82 and 83 demonstrate that downstream brand recognition from consumers, combined with raw cotton quality was important to the success of the brand. Mills felt that an increase in raw material cost would be a moderate disincentive to participation, while legal compliance and paperwork and administration were not a major issue.

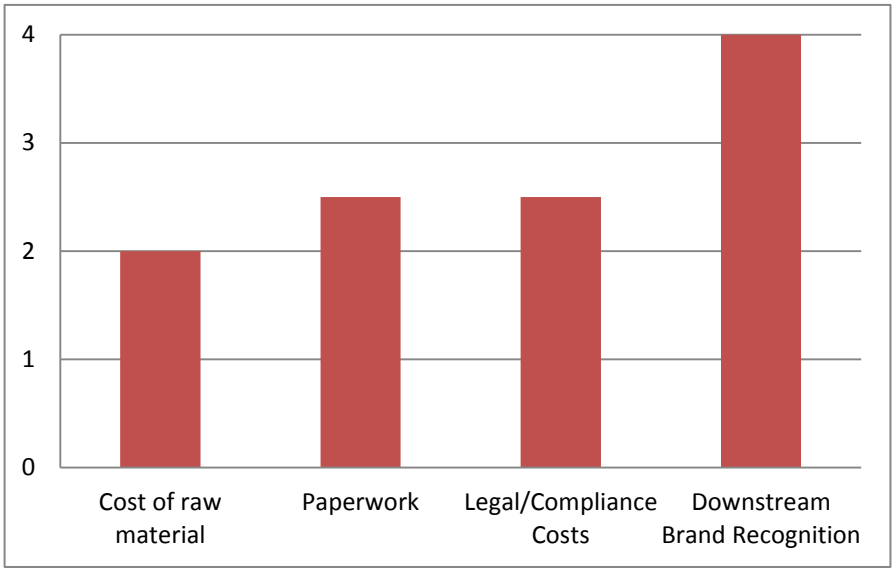


Figure 82 - Impacts on willingness to participate in licensing programmes – Hong Kong

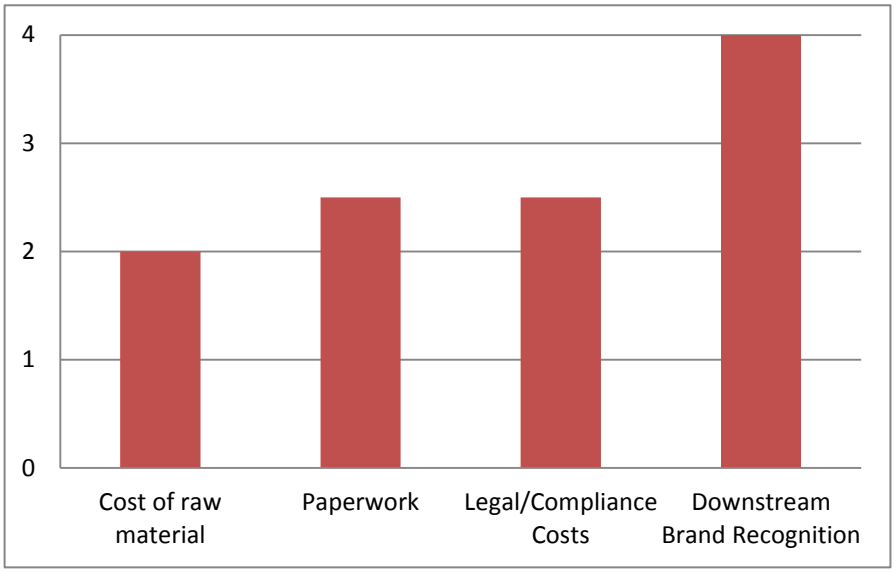


Figure 83 - Points of differentiation required for a successful brand – Hong Kong

Mills were ambivalent to social responsibility and environmental credentials of a raw cotton product, with traceability and raw material quality being more important but the key point of differentiation required hinged on the marketability of the cotton.

India

The mills surveyed in India were all aware of the Cotton USA License and Supima® brand with only two of the mills familiar with Australian BMP. Five of the mills participate in the Cotton USA and 6 of the companies participate in Supima®.

The dominant reason for participation in licensing programmes was that it leads to increased demand for their yarns, with the yarns produced from Supima® able to be sold at a premium.

Table 27 - Influence of licensing programmes on business and purchasing decisions

	Increased Yarn Demand	Improved Premiums for Yarn	Influences raw cotton sourcing
Cotton USA	33%	17%	33%
Supima®	67%	50%	67%

Figures 84 and 85 demonstrate that downstream brand recognition from consumers was important to the success of the brand. Mills felt that an increase in raw material cost would be a moderate disincentive to participation, while legal compliance and paperwork and administration were not a major issue.

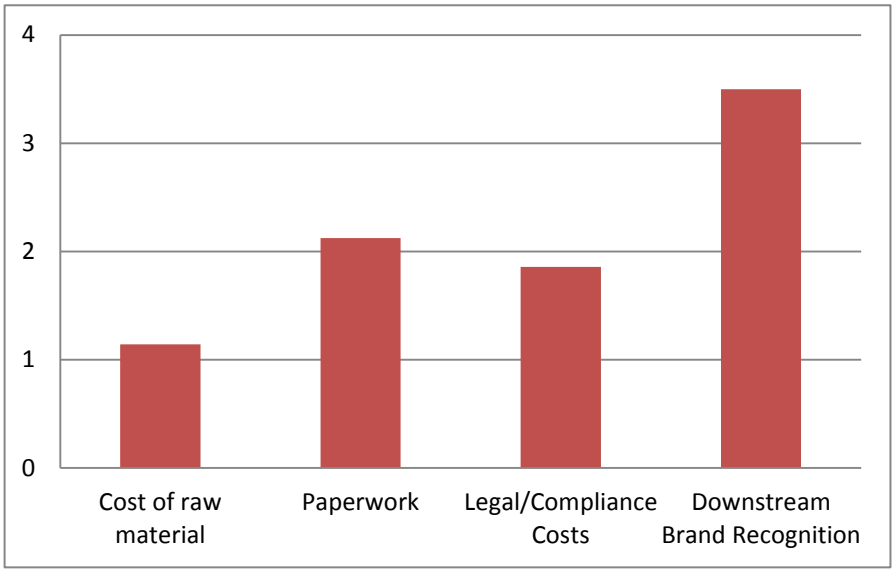


Figure 84 - Impacts on willingness to participate in licensing programmes - India

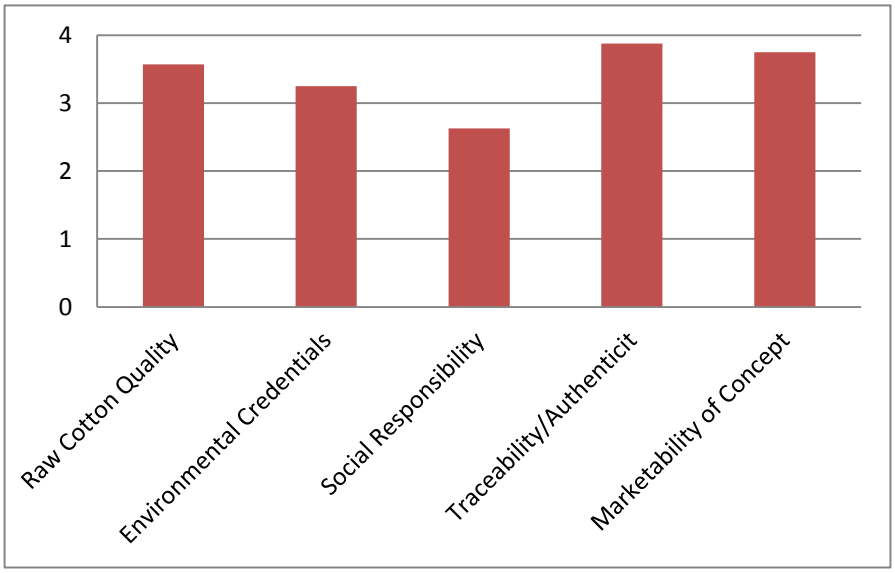


Figure 85 - Points of differentiation required for a successful brand - India

The key points of differentiation hinged on marketability of concept, traceability and raw cotton quality with social responsibility and environmental credentials becoming more important

Image of Australia

In terms of determining a branding concept for Australia, mills surveyed were asked what the first image was when they thought of Australia. The Kangaroo dominated the responses.

Indonesia

The mills surveyed in Indonesia were all aware of the Cotton USA and Supima® licensing programmes, while 50% were aware of Australian BMP. Thirty eight percent of the mills participated in the Cotton USA programme, with 25% participating in Supima®. None of the mills surveyed participated in the Australian BMP programme.

Of the mills who did participate in a licensing programme, the dominate reason for participating was that it leads to increased demand for their yarns, which sometimes lead to improved premiums.

Importantly, it was clear that mills preferred the Supima® model, and mentioned the benefits of leveraging from the overall promotional efforts of the third party brand. Contact with the licensor and updates on technical and marketing information were also seen as beneficial, as was the listing of different supply chain participants on the Supima® website in particular.

Table 28 - Influence of licensing programmes on business and purchasing decisions

	Increased Yarn Demand	Improved Premiums for Yarn	Influences raw cotton sourcing
Cotton USA	42%	33%	33%
Supima®	60%	60%	60%

Figures 86 and 87 demonstrate that downstream brand recognition combined with raw cotton quality and marketability of the brand were important to success. Legal and compliance costs were seen as a slight disincentive to participating in branding programmes.

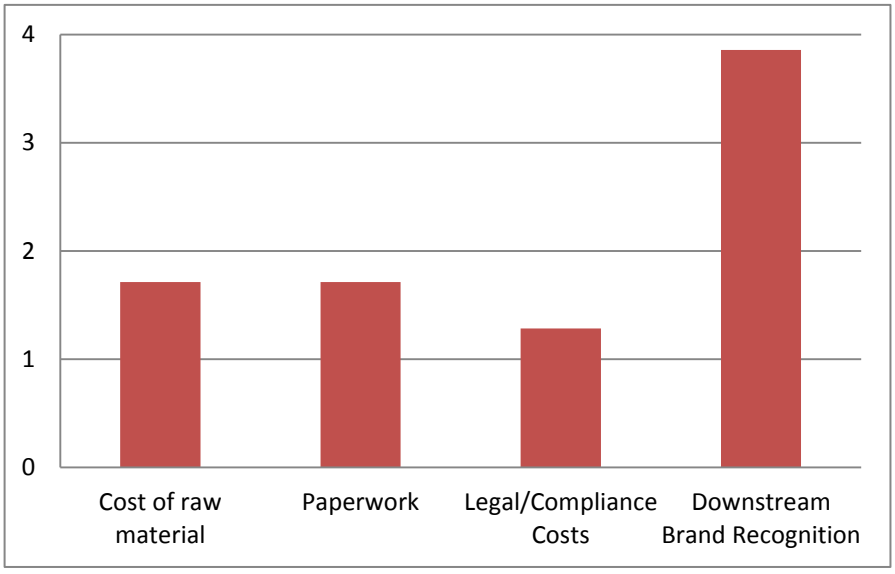


Figure 86 - Impacts on willingness to participate in licensing programmes - Indonesia

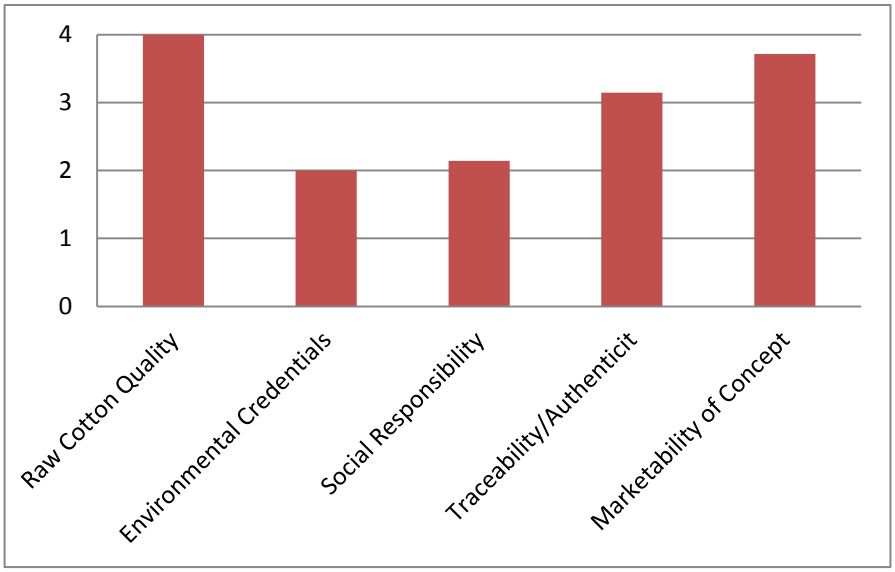


Figure 87 - Points of differentiation required for a successful brand – Indonesia

Mills did not feel that environmental credentials or social responsibility were major issues but felt raw cotton quality and the marketability of the concept were the key points of differentiation required for a successful brand.

Image of Australia

In terms of determining a branding concept for Australia, mills surveyed were asked what the first image was when they thought of Australia. The Kangaroo dominated the responses.

Australia

The mill surveyed was aware of the Cotton USA License, Supima® and Australian BMP programmes. The mill has recently started to participate in the Australian BMP licensing programme.

The dominant reason for participation in the licensing programmes is that it leads to increased demand for their yarn and that they can sell their yarn at a premium. It was also good for product image and marketing strategy.

Figures 88 and 89 demonstrate that downstream brand recognition from consumers, combined with raw cotton quality and traceability was important to the success of the brand. An increase in raw material cost, legal compliance and paperwork and administration were not a major issue.

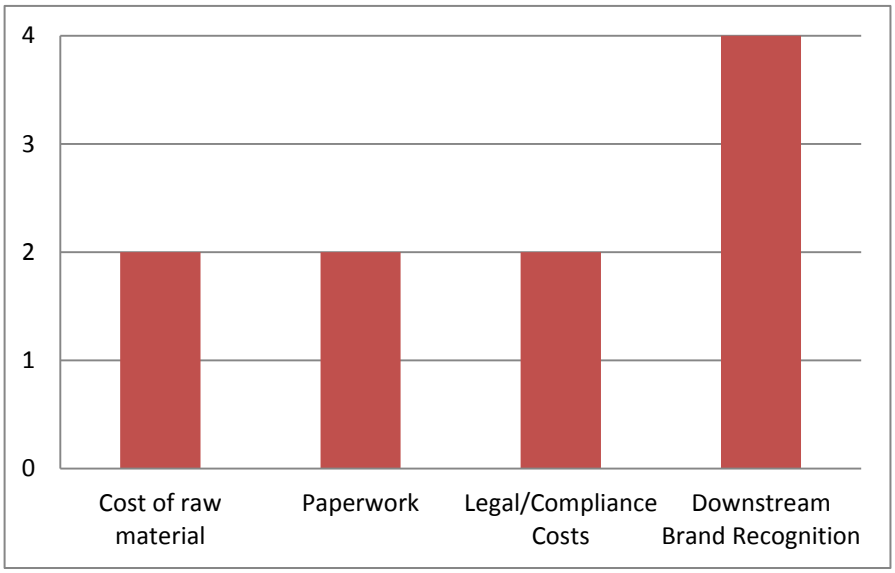


Figure 88 - Impacts on willingness to participate in licensing programmes - Australia

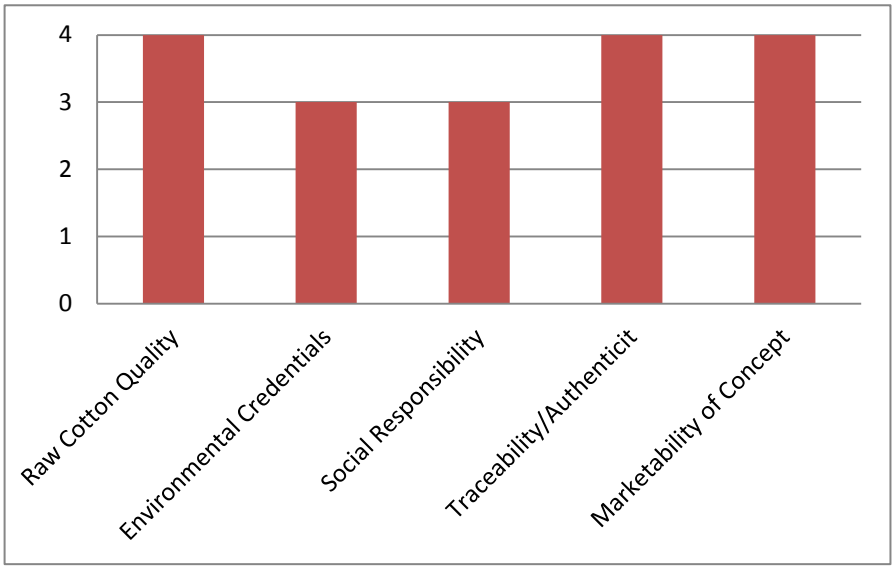


Figure 89 - Points of differentiation required for a successful brand - Australia

Social responsibility and environmental credentials of a raw cotton product was important, with the key points of differentiation being traceability, raw material quality and the marketability of the cotton.

LONG STAPLE AND EXTRA LONG STAPLE CONSUMPTION

The production of Extra Long Staple (ELS) cotton as compared to Upland cotton is relatively small making up just 3% of the world supply, is eratic and has been steadily decreasing since 1986. Current production is estimated to be 504 000 MT in 2010 [30] (see Figure 90). As opposed to Upland cotton which is grown in more than 66 countries, the bulk of ELS cotton is mainly grown in four countries, namely China, US, India and Egypt. China is the largest consumer of ELS cotton followed by India [30]. This decrease in ELS production is mainly attributed to a reduction in US Pima acreage, a drop in Egyptian cotton production and a move in China from ELS cotton to Long Staple (LS) cotton [27]. Long Staple cotton is mostly made up of lower quality ELS cotton and accounts for about a third of ELS production and consumption. Regular ELS cotton which is generally roller ginned is acknowledged as having a minimum staple of 1-7/16th inch (46), a minimum strength of 38 g/tex and Micronaire values at the lower end of the 3.7-4.5 range [2,36].

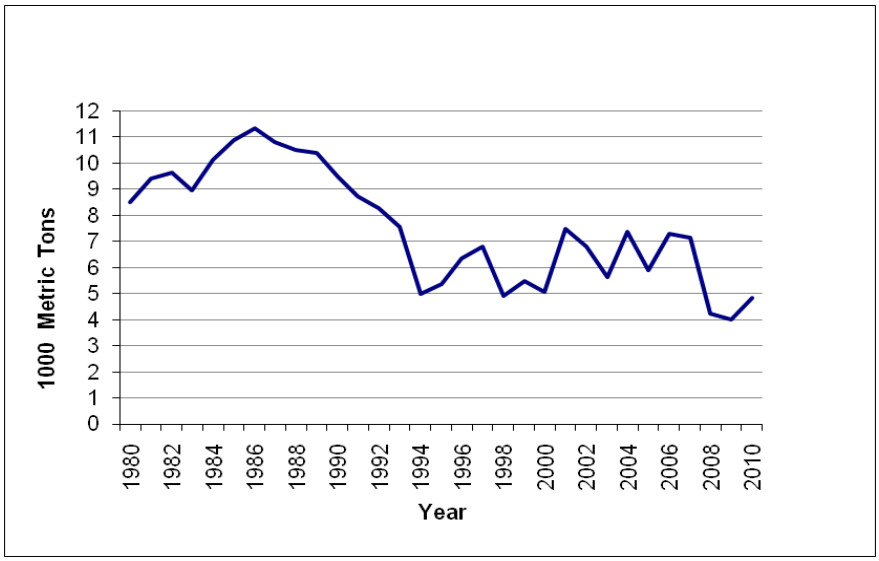


Figure 90 – World Production of ELS cotton [30]

ELS cotton is generally used for producing high quality yarns and fabrics. The most common yarns produced from ELS cottons are in the range of 50 Ne to +105 Ne, which are used for fine knit such as Polo's, woven apparel fabric for formal wear and shirts and woven fabric for home furnishing such as bed sheets and towels. In recent years there has been a move to coarser Pima yarns up to 30 Ne and even coarser for fabrics such as denim [2, 27, 35]. Substituting or blending ELS in various blending ratios, with less expensive LS cotton to reduce manufacturing costs, without jeopardising processing performance and product quality, is a growing and attractive trend to the spinning industry. This trend has been boosted with the advent of compact spinning which has allowed mills to spin yarn counts with LS cotton normally associated exclusively with ELS cotton [27, 35, 36].

Twenty of the mills surveyed consumed either LS or ELS cotton, with individual mill consumption ranging from 3,000 MT of 100% ELS to 28,000 MT comprising ELS and LS. In total, the survey respondents consumed just under 28,500 MT ELS per annum, and just under 59,000 MT of LS per annum.

In our survey the Indian mills were by far the most dominant member of the survey group in these categories, particularly regarding LS consumption, where consumption in other markets was minimal (see Table 28).

Table 28 - Long Staple and Extra Long Staple Consumption (MT pa and % of Survey Group)

Country	Korea		Thailand		Indonesia		India		Japan		China	
Consumption	**1000 MT**	**%**	**1000 MT**	**%**	**1000 MT**	**%**	**1000 MT**	**%**	**1000 MT**	**%**	**1000 MT**	**%**
ELS	4,7	16.5	2,6	9.2	4,3	15	12,0	42	1,6	5.5	3,3	11.6
LS	1,6	2.7	,860	1.5	5,035	8.6	49,6	84.2	,650	1.1	1,1	1.9

PERCEPTIONS OF LONG STAPLE COTTON AND ITS USES

A recent survey found that the six most important parameters when purchasing LS were; length (> 32 mm), strength, micronaire, price, availiability of supply and reliability of supplier [27]. LS cotton is predominately used for the production of 40 – 80 Ne yarns and the cotton should preferably be roller ginned to achieve acceptable fibre properties, most notably length [27,36].

Blending Long Staple with Extra Long Staple Cotton

Several of the mills surveyed expressed concerns with regards blending of LS cotton with ELS cotton – predominately due to potential barre issues when dyeing of yarns and fabrics. On average, however, survey respondents believed LS cotton with staple length 31 mm (1-7/32") and strength of 33 GPT could be successfully blended with ELS (see Table 29).

Table 29 - Minimum LS parameters required to successfully blend with ELS

	Korea	Thailand	Indonesia	India	Japan	China	Overall
Staple	29.3 mm 1-3/16"	30.3 mm 1-7/32"	28 mm 1-1/8"	32.4 mm 1-9/32"	31 mm 1-1/4"	32.4 mm 1-3/16"	30.9 mm 1-7/32"
Strength	33 GPT	33 GPT	28 GPT	32.3 GPT	32.7 GPT	34.5 GPT	32.6 GPT

Additional weight should probably be attributed to the responses of Indian mills, due to their higher proportional weighting of useage in the L S and E L S categories.

Yarn Count Forecasts

Mills were also asked their expectation with regard the yarn count range that could be produced when using an LS (nominally described as SM, 1-1/4", 3.7-4.2NCL, 34GPT, 82% UI) in various blends and as a standalone raw fibre.

On average, respondents believed stand alone LS was suitable for the production of 60 Ne yarns, ranging from 40 to 70 Ne. When blended with Pima, an average yarn count of just over 72 Ne is achievable ranging from 50 to 80 Ne.

In general, there was limited enthusiasm for blending LS with regular Upland cotton product, predominately due to limited chance of price recovery.

Table 30 - Average yarn count when blending LS

BLEND	Korea	Thailand	Indonesia	India	Japan	China	Overall
Stand Alone	58 Ne	60 Ne	58Ne	53 Ne	65 Ne	55 Ne	59 Ne
With Pima	68 Ne	70 Ne	72 Ne	70 Ne	76 Ne	75 Ne	72 Ne
With 1-1/8"	48 Ne	53 Ne	58 Ne	53 Ne	62 Ne	45 Ne	54 Ne

Medium-Fine Count Market Dynamics

In order to identify the best performing LS cotton markets, mills were asked to categorise different yarn market segments as either contracting, stabilising or expanding. Each response received a score (contracting = -1; stabilising = 0; expanding = +1). These scores were averaged to provide a growth index for each consuming market and overall.

In total 15 mills responded to this part of the survey, with overall data suggesting the 50-60 Ne market was seen as exhibiting moderate growth, while the 40-50 Ne and 60-80 Ne markets were thought to show slight growth or more probable as a stable market.

Table 31 - Growth Index of different yarn market segments (Max score = +1; Min score = -1)

BLEND	Korea	Thailand	Indonesia	India	Japan	China	Overall
40-50 Ne	-0.5	-0.67	1	0.67	-0.33	1	0.13
50-60 Ne	-0.5	1	0	1	-0.33	1	0.33
60-80 Ne	-1	0	0.33	1	-0.33	1	0.13

In contrast to the average perception the Japanese and Korean mills were of the opinion that all three market segments were contracting as far as the usage of LS cotton is concerned.

In particular, mills surveyed made mention that post GFC, a lot of demand had swung toward compact spun single 60 Ne yarns, away from traditional 120/2 Ne for high end shirting.

Price Response

Within the medium to fine count market number of mills surveyed made comment that typical raw cotton price increases were modest for material that could be used for production of 50-70 Ne yarns. This perception of value, however, increased dramatically for raw cotton that could be used for the production of 80 Ne yarns and finer.

Key components seen by mills as important to expansion of the LS market segment were(Figure 91):

- Price relative to ELS (ie, potential to expand the market by securing reduced input costs).
- Shrinking ELS production. Mills noted the permanent reduction in Californian cotton acreage – which was impacting Pima production (despite a proportional increase in Pima area).

Both of these points were also highlighted in previous studies/papers [2,36].

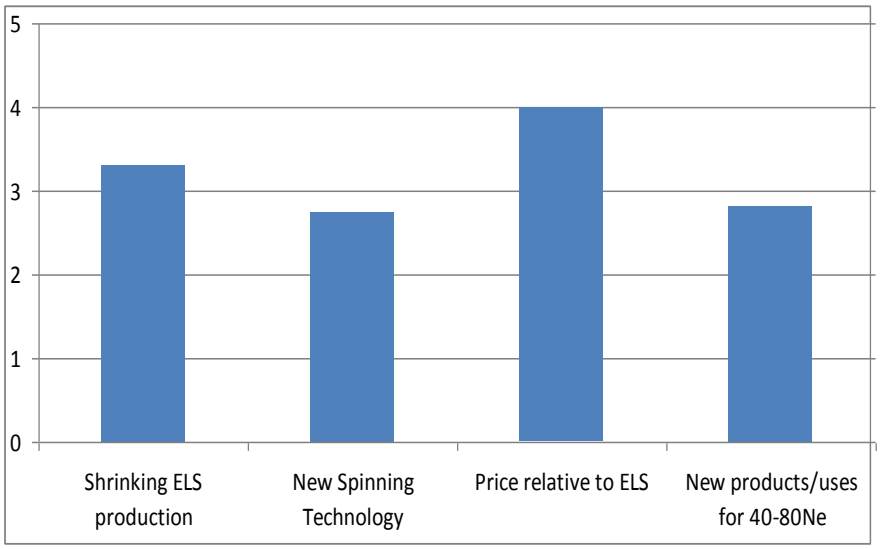


Figure 91 - Key factors impacting LS cotton consumption

POTENTIAL POSITIONING OF AUSTRALIAN LONG STAPLE (ALS) COTTON

There is considerable interest within the Australian cotton industry for new varieties with improved fibre quality that attract a price premium. One option is Upland varieties that approach the long and fine quality attributes of ELS. Currently only 1% of the Australian crop falls into the ELS category and development of new LS Upland cotton varieties by CSIRO Plant Industry are aimed at increasing this proportion of the market to gain the high premiums paid for fine long and strong staple fibre.

In 2005, Australia produced its first commercial volumes of LS cotton, which is loosely referred to as Australian Long Staple cotton (ALS), which is a specialist high quality Bollgard II variety, exhibiting extremely long fibre lengths (>1¼ inches) compared with regular Upland cotton varieties. Fibres were also typically finer and had excellent breaking tenacity (> 32 grams per tex).

The Premium Cotton Initiative (PCI) was formed to identify and create markets for these LS Upland variety types, by better understanding textile performance and developing predictive textile performance technologies tailored to high quality Australian raw cotton fibre. The PCI is a collaboration between ACSA, Cotton Australia (CA), CSIRO, Cotton Seed Distributors (CSD) and the CRDC who provide coordination for the Initiative.

Spinning trials conducted at CMSE showed that this LS cotton can produce fine count combed ring-spun yarns in the range of Ne 60 to 70). In blends with ELS cotton results found that a 70/30 blend of ELS/LS did not result in a practical deterioration in yarn quality and processing efficiency compared with yarn spun from 100% ELS [35].

These trials were followed up by conducting commercial trials in India, China, Thailand and Vietnam. Current mill perceptions of potential ALS useage are broadly consistent with the commercial mill trials that have been conducted through the PCI.

There is general recognition that ALS fibre can be used to consistently produce 60 Ne yarns and depending on mill set up to 70 Ne in a stand-alone lay-down.

Whist blending with both Pima and standard 1-1/8" fibre is seen as sub-optimal due to possible barre issues, the ability to produce up to 80 Ne yarns was recognised by a number of the survey respondents and depending on the price differential between ALS and ELS raw fibre could be economically viable.

60 Ne Market: The 60 Ne market showed the highest growth potential of the medium/fine count markets surveyed and for this reason could be the core focus of immediate efforts with ALS cotton.

80 Ne Market: Potential blending techniques and/or spinning technologies – or a further improvement in raw cotton fibre parameters – will be required for ALS to meet parameters required for consistent production of high quality 80 Ne yarn. The higher price premium for product suitable for 80 Ne production needs to be considered as a potential incentive when investing in these technologies.

BALE PACKAGING

Once cotton lint has been removed from the seed, during the ginning process, it is baled and transported to spinning mills throughout the world for further processing.
When cotton is baled it is wrapped in a variety of packaging materials that are designed to protect the baled lint during transport, storage and delivery. The wrapping material should thus have sufficient strength to protect the lint from damage and contamination en-route to the final destination.

Around the world cotton bales are wrapped in a variety of packaging materials including fabric constructed from natural fibres such as cotton and jute/hessian, to manmade fibres such as polypropylene and plastic films such as polyethylene [37]. Due to different sizes and densities of bales they are tied differently. Not only does the number of ties holding the bale differ but also the type of materials used to tie the bale which includes steel wire, metal strap and plastic strap.
Each type of packaging has its own advantages and disadvantages to the grower, ginner and spinner.

In Australia, packaging methods utilised have largely evolved as a result of economic and practical issues at the gin level, some of which may not always gel with handling and/or customer preferences. There are opportunities to better align or standardise Australian bale packaging to meet the requirements of all stakeholders throughout the supply chain with minimal disruption to gin level efficiencies.

From a storage, handling and marketing perspective, uniformity of bale packaging will add value to the entire crop, creating efficiencies throughout the supply chain, and consistency via standardisation will create delivery confidence for our customers. Whilst there are clearly economic hurdles to the capital improvement during low production years for the implementation of standardised packaging methodologies – aspirational goals should be set so that ginning organisations have a set plan to work towards.

The challenge for the Australian cotton industry is to identify what the Best Practice for both bale tying and bale packaging and this section reports on our customers preferred packaging requirements.

A survey [38] conducted by the ICAC in 1995 found that the most commonly used wrapping material was jute/hessian, followed by polypropylene and plastic with only a few countries using cotton wrapping. Other countries use cotton on request. It was ironic that the most commonly used material to wrap bales was also the most commonly detected foreign matter in cotton during spinning [39]. The 1995 survey showed that 100% of Australian bales were covered in jute/hessian. At that time in Australia eight steel wire ties were used by all gins for strapping bales.

The follow up survey [37] conducted in 2008 found that the most commonly used wrapping worldwide was cotton which was the most preferred and recommended wrapping. However, many countries still used polypropylene, plastic and jute/hessian. The survey showed that 60% of the Australian crop at that time was still wrapped with jute/hessian with the rest of the crop wrapped in cotton. It is noticeable that the incidence of jute/hessian contamination of Australian cotton dropped in 2007 by 50% when compared to 2005. In all likelihood, this reduced contamination incidence is linked to the larger proportion of Australian bales wrapped in cotton in 2007 compared to 2005 due to the substantial reduction in crop size [40]. A previous study [41] conducted by CSIRO highlighted that none of the cotton bale packaging used in Australia at that time met the recommendations provided by the US cotton industry on cotton bale packaging materials [42,43].

The most common way to tie each bale is still using six or more steel bands or wires, although a number of countries are using plastic. Over the past 2 to 3 years a number of gins in Australia have changed to plastic ties and it is anticipated that this trend will continue [44].

In most instances all common packaging materials can be used inter-changeably without significant changes to bale bagging equipment.

Aim of survey – Spinners preferences

The aim of this study was to compare spinning mill customer's perceptions and preferences with regards to:

Bale Packaging Materials: Cotton; Woven Polypropylene; Jute/hessian; Polyethylene Film.
Bale Tie Methods: Plastic Ties; Metal Ties; Wire Ties.

From these results it is hoped that a set of recommendations can be derived to help standardise Australian cotton bale packaging and provide a clear direction for developing an industry best practice.

Mills were not surveyed over their preference for bale density. It is assumed from a storage and handling/efficiency perspective that High Density bales (HD) are preferable over Universal Density bales (UD) (There are currently 4 gins producing UD bales in Australia). However the high capital cost of replacing bale presses, combined with low volume production years, means the practicality of achieving this aspirational target for the entire Australian cotton crop should be considered over a longer time horizon than the more achievable targets of unifying bale packaging and tying methods.

Survey Method

Bale packaging methods were ranked from 1-4 (1 being best, and 4 being worst) and an average rank was established across the 16 respondents. This rank was then inverted to create a Preference Score by simply subtracting the average from 4.

i.e.: Preference Score = 4 – Average Ranking

Customers were asked their preference between cotton, jute/hessian, woven polypropylene and polyethylene film. Whilst it is acknowledged that Australian cotton is typically packaged in either jute/hessian or cotton, other packaging materials were included in the survey to facilitate benchmarking against competing markets.

Similarly, bale tying methods were ranked from 1-3, with the average ranks being subtracted from 3 to establish a preference score.

Overall, the preferred method of bale packaging was clearly cotton (see Table 32 and Figure 92), followed by polyethylene film, hessian and lastly woven polypropylene. This trend was consistent across Japanese, Thailand, Indonesian, Indian and Hong Kong/Chinese mills – with the only variation being a preference for polyethylene film over cotton by some Korean mills and jute/hessian receiving second preference over polyethylene film in Australia. In total, five of the 32 respondent mills preferred polyethylene film over cotton, two in Korea, two in India and one in Japan. Two of the eight Indonesian mills surveyed preferred jute/hessian over cotton bagging.

From an overall potential average score of '3' the following results were recorded:

Table 32 - Spinning mill preferences for Bale Packaging and Standard Deviations

Packaging Type	Average Preference Score	Standard Deviation
Cotton	2.75	0.51
Polyethylene Film	1.91	0.86
Jute/hessian	1.31	0.86
Woven Polypropylene	0.41	0.64

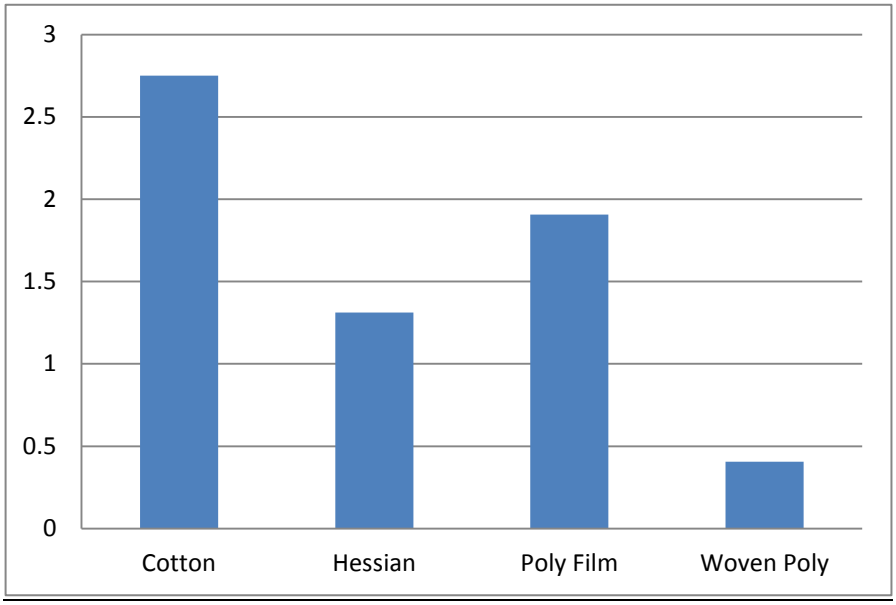


Figure 92 - Spinning mill preferences for Bale Packaging

The key comments recorded on the various packaging methods, which were also consistent with the CSIRO report [41] were:
Cotton: Less contamination and easily disposable, but not dirt proof.
Polyethylene Film: Less contamination but not disposable and difficult to dry if the cotton does get wet. Indian mills commented that it was easier to store bales outside when wrapped in polyethylene film, but that this could cause bleaching of the outer layers of cotton.
Jute/hessian: Reused to export comber noil, disposable, but a higher contamination risk – typically used in cotton originating from developed countries and a comment was made by a Japanese mill was that it was '*not suitable for Australia'.*
Woven polypropylene: High contamination risk during bale opening, creating significant risks during carding process where contaminated material could be torn apart. Not disposable.

There was a preference for plastic bale strapping amongst the spinning mills surveyed (see Table 33 and Figure 93), but this was not as clear cut as the bale wrapping preferences; particularly in India, where six of the eight mills surveyed preferred wire ties. Wire ties were preferred over metal straps; but this varied between markets (see Figure 94). In total, only 5 of the 24 respondent mills outside of India did not rank plastic ties as 'the best', one mill from Thailand, three from Indonesia and one from Korea.

From an overall potential average score of '2' the following results were recorded:

Table 33 - Spinning mill preferences for Bale Ties and Standard Deviations

Bale Tying Method	Average Preference Score	Standard Deviation
Plastic Straps	1.56	0.66
Metal Straps	0.94	0.88
Steel Wire	1.25	0.67

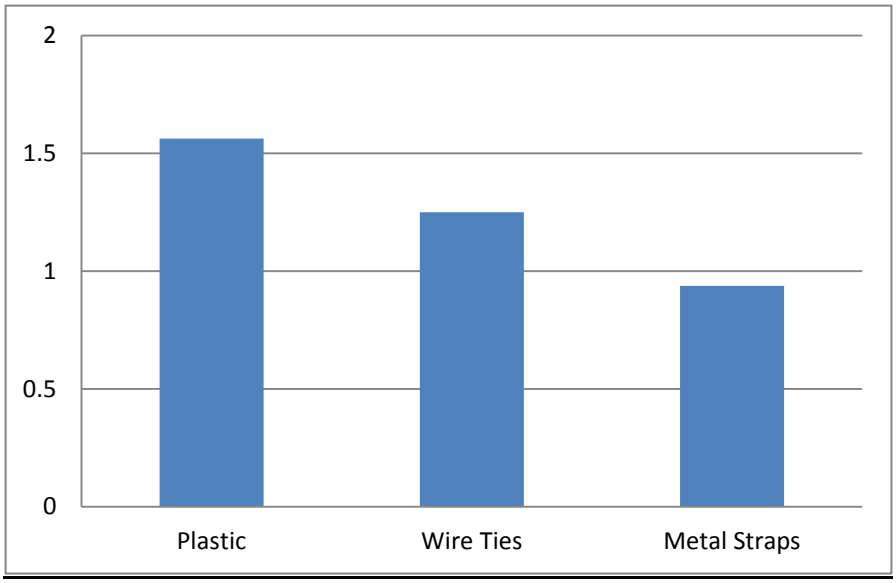
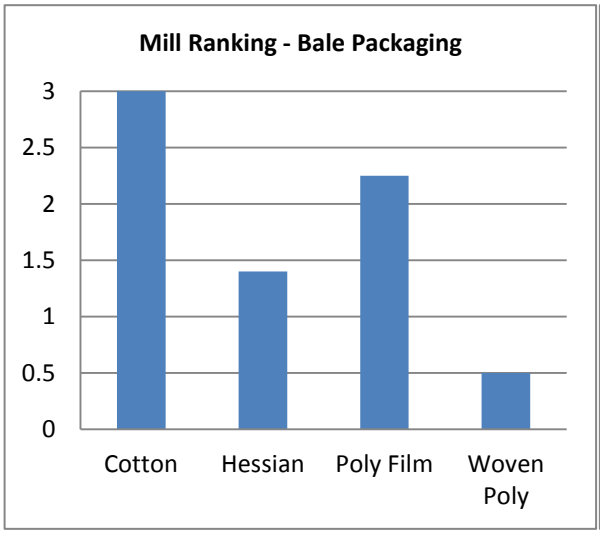


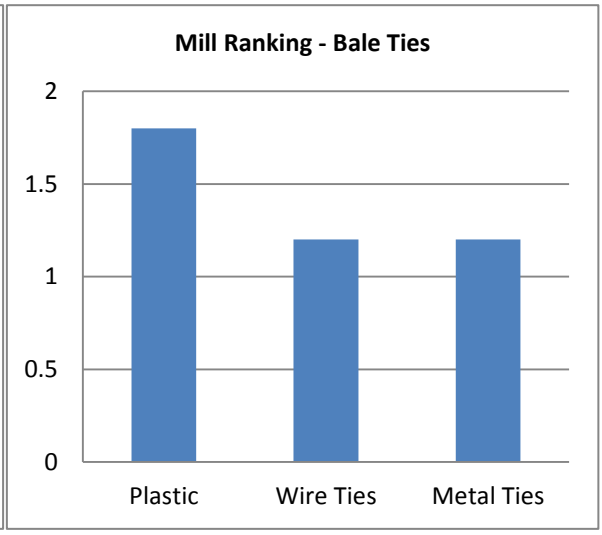
Figure 93 - Spinning mill preferences for Bale Ties

The key comments recorded on the various bale tie methods were:
Plastic Strapping: Not Recyclable, but easier to handle and becoming more common. One mill mentioned concern over staining of cotton from the plastic weld joint. A number of mills also commented that the reduced risk of rust with plastic straps was a benefit. It was mentioned that in China plastic strapping is becoming mandatory as trains will not transport bales with steel wire due to fire risk.
Metal Straps: Recyclable. Globally the most common bale ties used, which means mills are familiar with handling requirements. Straps tend to bind the bales more tightly than other methods.
Steel Wire: Recyclable. Common for Australian cotton, but knots tend to loosen which can create stacking issues, and an increased risk of bales bursting. There was also a perceived fire risk and also safety concerns during bale opening.

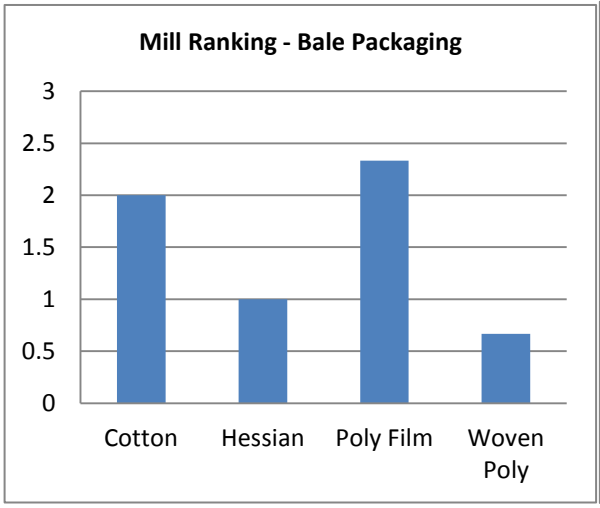
BREAKDOWN OF SURVEY RESPONSES BY MARKET

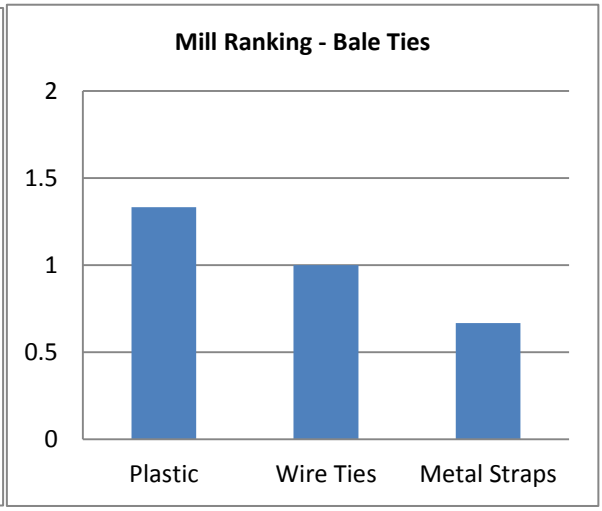
THAILAND



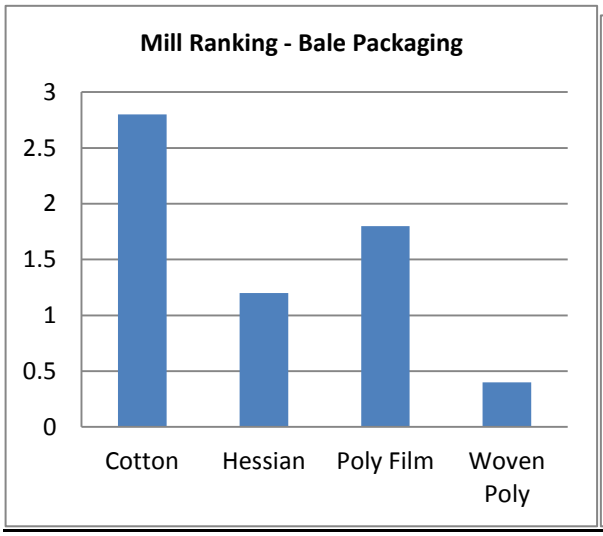


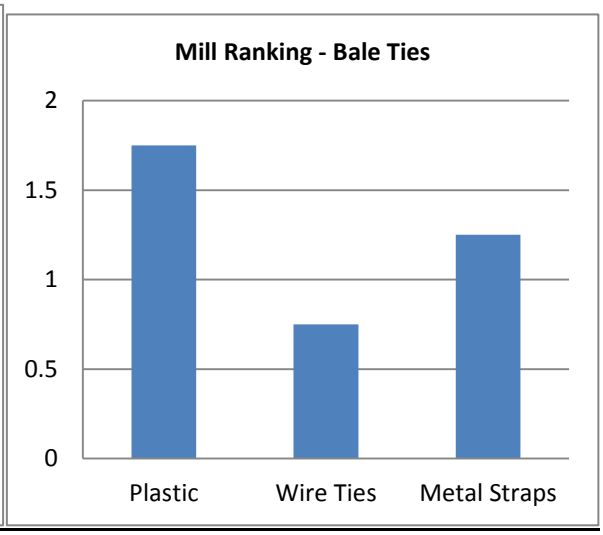
KOREA



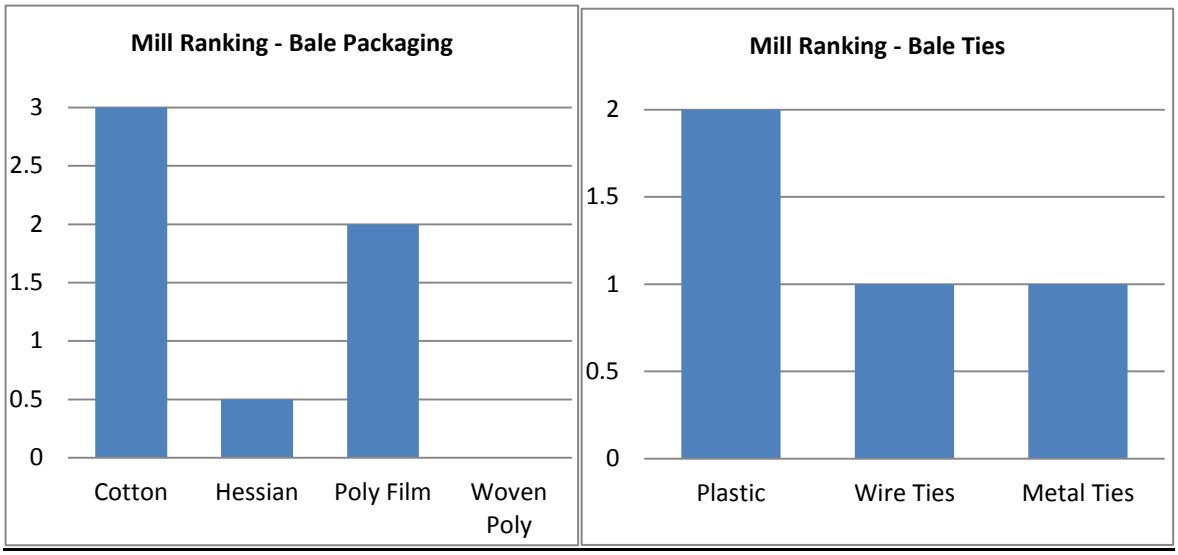


JAPAN

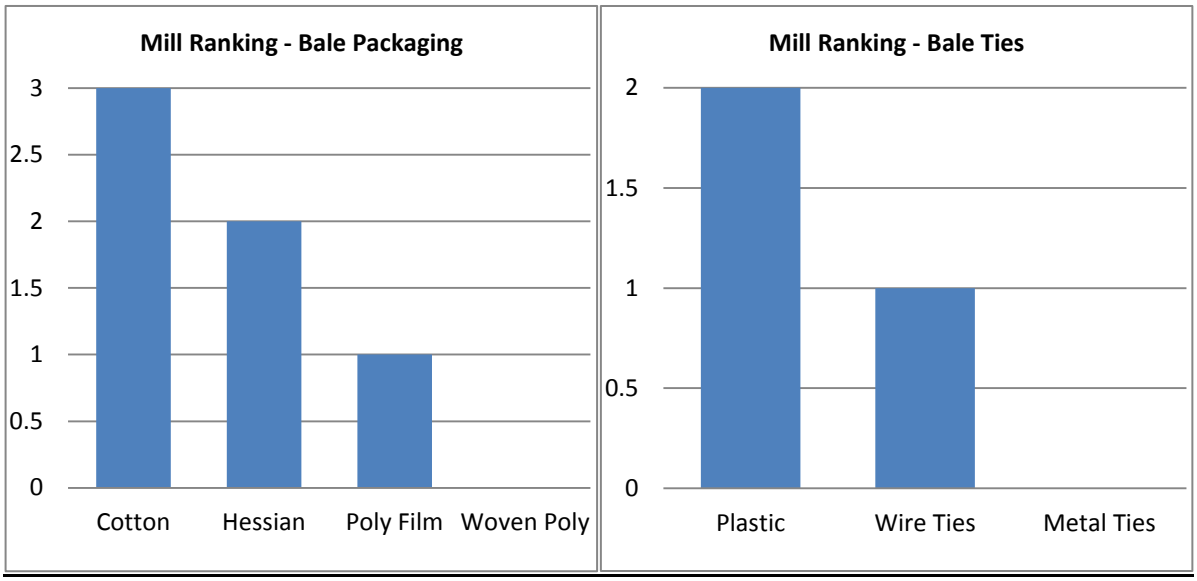




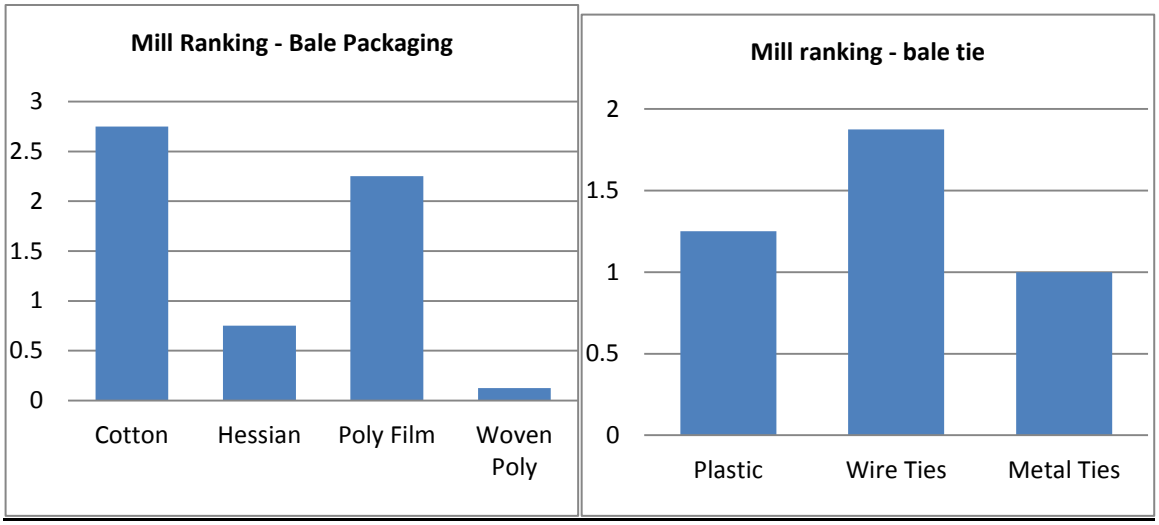
HONG KONG/CHINA



AUSTRALIA



INDIA



INDONESIA

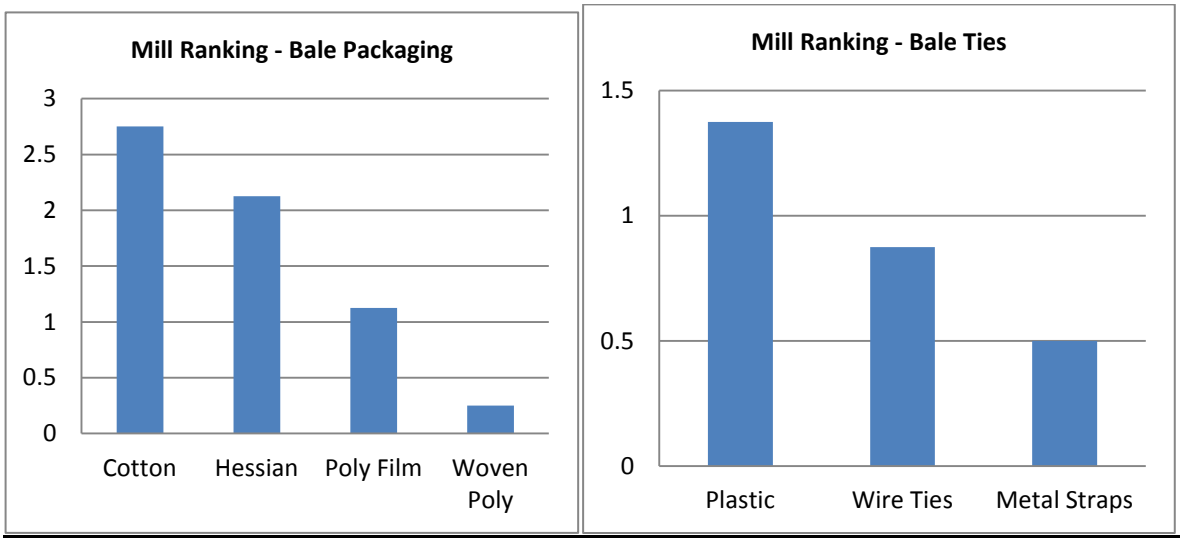


Figure 94 - Spinning mill preferences per country for Bale Packaging and Ties

Bales in Storage waiting to be shipped

DOWNSTREAM TEXTILE DEMAND TRENDS

In 2009, forty six percent of all fibres produced worldwide were used to produce apparel, 35% for industrial and other products, 10% in the Home textiles with 8% used for carpets [54].

To assess trends in Textile Demand questions were asked regarding fabric demands. Scores for Textile Demand and Raw Cotton Demand Trends were combined into a Cotton Usage Index (CUI).

This Index was created by combining the aggregate scores given for Downstream Textile Demand Ranking and Raw Cotton Demand Trend for each of the surveyed categories. (The highest attainable Textile Demand Ranking for each market was 7 (lowest 1), while Raw Cotton Demand Trend was given a score of +1 for growing, and -1 for shrinking. The CUI was calculated by averaging the Textile Demand Ranking for all mills surveyed and then adding the cumulative Raw Cotton Demand Trend Score.)

Across all markets Casual attire was clearly identified as the key product growth category for both downstream textile demand and raw cotton demand. Street attire and Home Textiles showed moderate demand growth (see Figure 95).

While Inner attire and Sports attire showed strong overall demand growth, their CUI scores were low, primarily due to replacement by manmade fibres due to their hydrophobic and performance properties [53]. Formal/business wear showed the lowest overall textile demand score with cotton being replaced by easy-care manmade fibres.

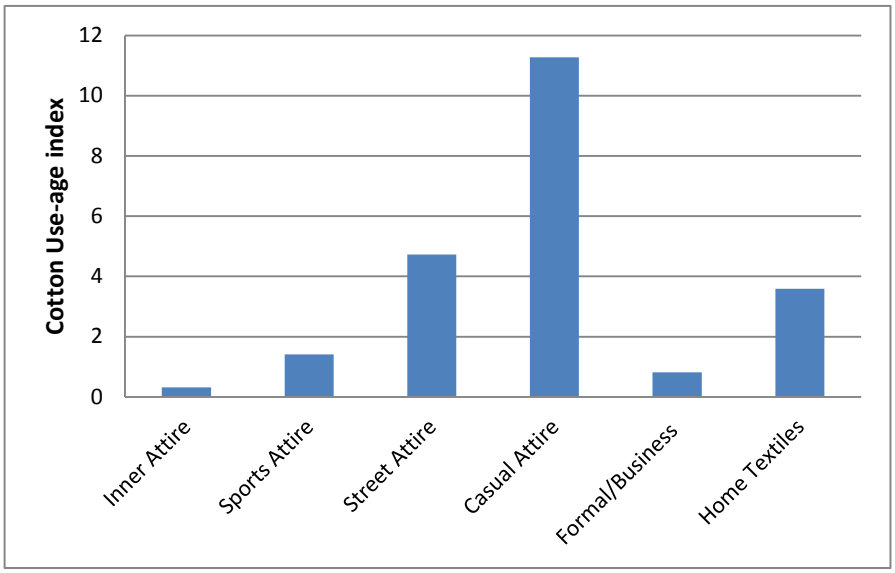


Figure 95 – Overall Cotton Usage Index

It has been stated that the three greatest attributes of cotton are its breathability, comfort and versatility [53]. Key textile properties demanded by consumers were accessed to determine those factors that affect why one fabric type is preferred over another. Across all product categories, and across all markets, comfort was clearly identified as the most important textile property by survey respondents (Figure 96). Handle and breathability were also considered important. Although there is an increased focus on sustainability, where natural fibres should have the advantage of being renewable and biodegradable [53], it was interesting to note that natural fibre and eco- credentials

were rated the lowest. Interestingly, within the Home Textiles segment, natural attributes and eco-credentials were seen as more important than in other market segments (see Figure 96).

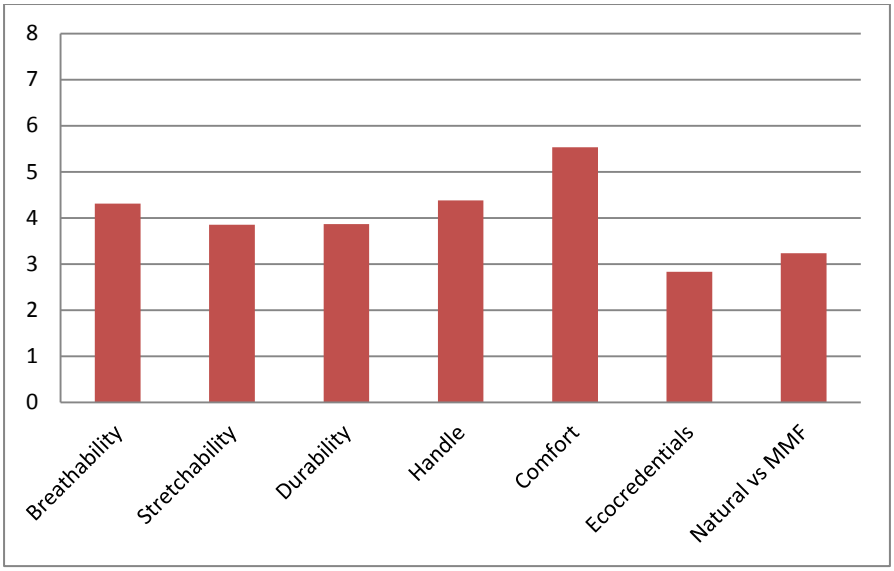


Figure 96 – Overall Textile property Performance

Japan

Inner attire was clearly identified as the key product growth category for both downstream textile demand and raw cotton demand by the Japanese mills surveyed (Figure 97). However some mills expressed that the older generation were staying loyal to cotton with the younger generation not too concerned what fibre it is. Figure 97 also shows Casual attire and Sports attire as key growth areas for textile demand.

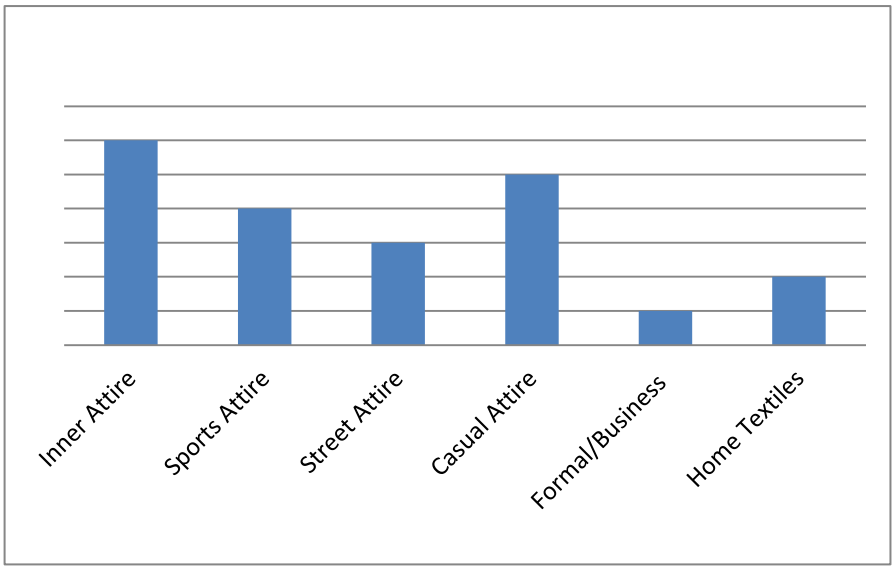


Figure 97 - Japanese mills ranking of downstream textile demand

Cotton appears to be increasing in Casual attire as there is a move to less formal dressing. Cotton is holding its own in Street attire mainly due to the continued interest in denim wear and Home Textiles. It has however lost ground in the Inner attire, Sports attire and Formal/ business categories.

Mills surveyed identified replacement by manmade functional fibres, predominantly polyester followed by viscose, acrylic and elastomeric fibres, as the key reason for cotton's loss in these markets as well as the shrinking Formal/business attire category (see Figure 98).

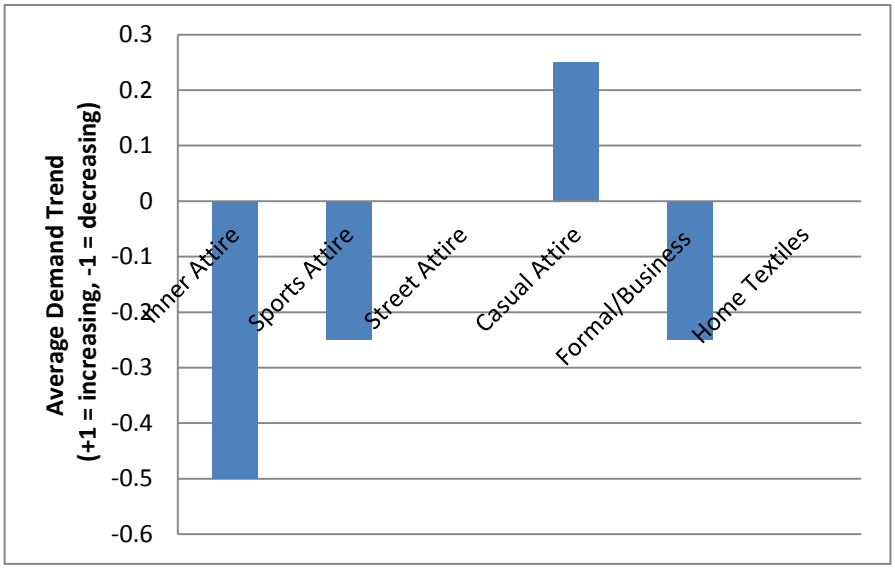


Figure 98 - Japanese mills perception of raw cotton demand trends

Textile Property Importance

Unfortunately this section of the survey was not as comprehensively answered as was the case with mills in other survey countries. We can however provide a general picture. Comfort was universally considered the most important textile property across all textile product categories, followed by durability, stretchability and breathability. Eco-credentials were seen as the least important property with natural fibres and handle rated as not so important (Figure 99).

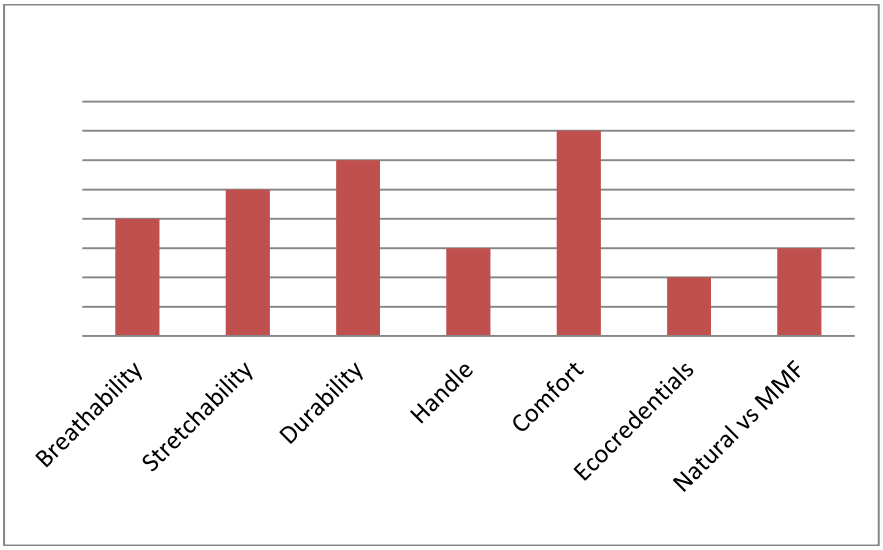


Figure 99 - Textile property importance – average across all product categories

Thailand

Casual attire was clearly identified as the key product growth category for both downstream textile demand and raw cotton demand but is very dependent on price. Figures 100 and 101 also show Sports attire as a strong area for overall textile demand, while Inner attire, Street attire and Home Textiles were showing moderate demand. Cotton demand growth was stagnant for Inner and Sports attire, due to functionality and cost of manmade fibres, with slow growth in Home Textiles, Street and Formal/business attire.

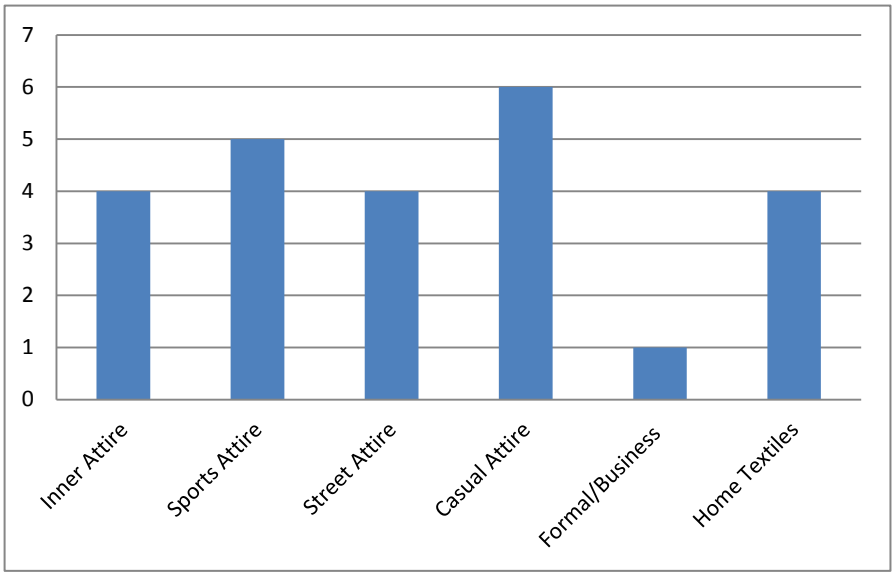


Figure 100 - Thailand mills ranking of downstream textile demand

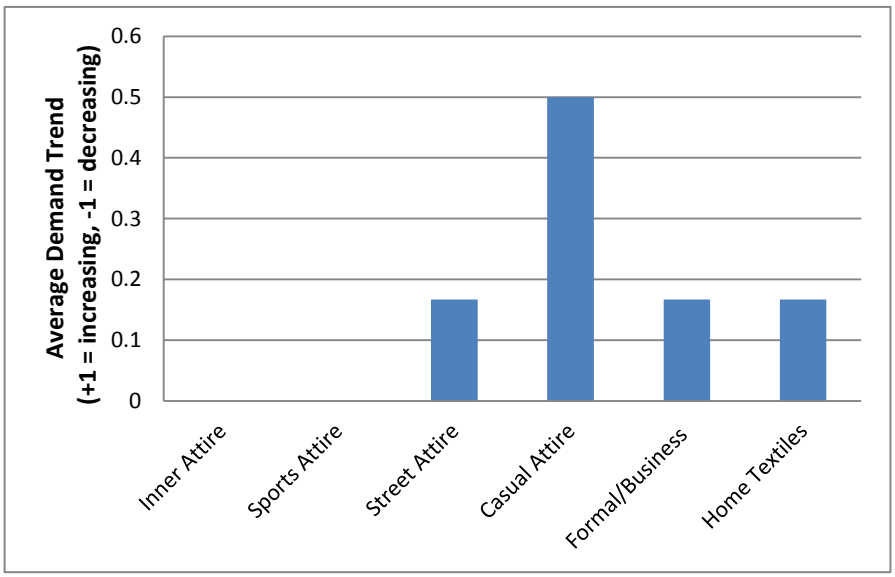


Figure 101 - Thailand mills perception of raw cotton demand trends

Textile Property Importance

Comfort was universally considered the most important textile property across all textile product categories, followed by breathability, stretchability and handle (Figure 102). The least important

property was identified as durability; with the comment made that the young consumer was moving more towards a disposable fashion. The '*Look*' was also important in Street, Casual and Sports attire.

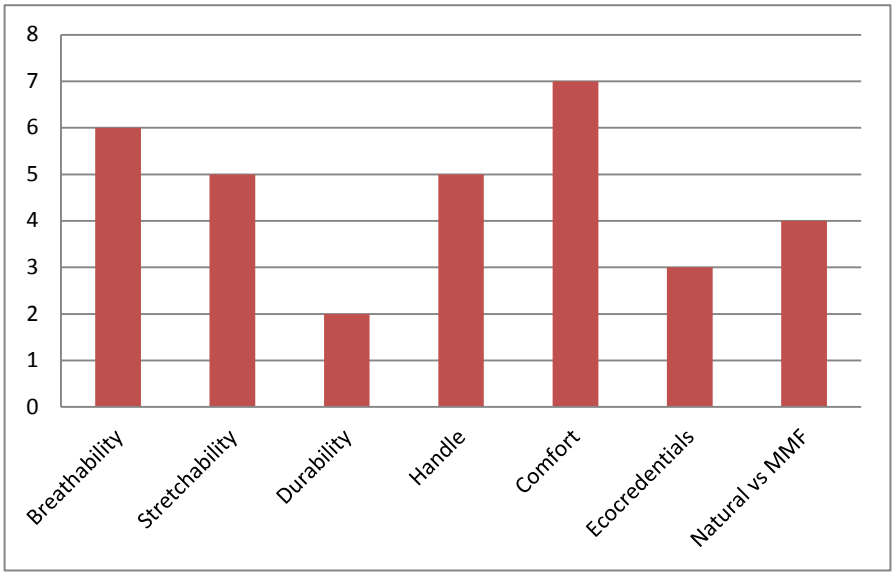


Figure 102 - Textile property importance – averages across all product categories

Given that both Casual attire and Sports attire have been identified as key areas for textile demand growth; but that only Casual attire is experiencing growth in demand for cotton these categories were broken out for further analysis in Figure 103.

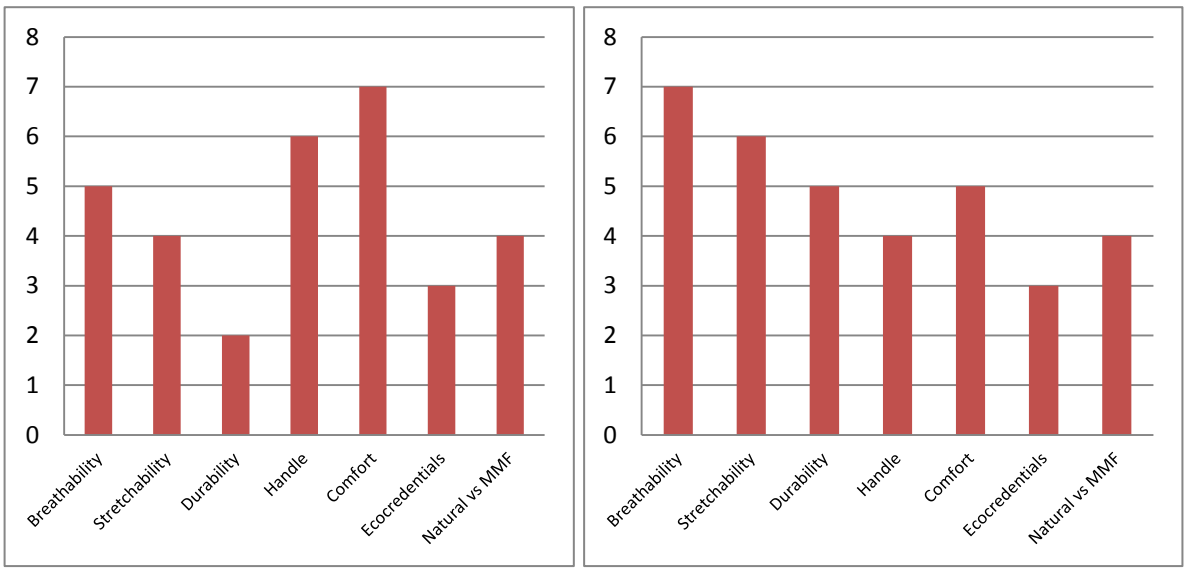


Figure 103a and 103b - Textile property importance – Casual attire (a) and Street attire (b)

The key differences shown in Figure 103 are that:
For Casual attire (Figure 103a): Comfort and handle are of primary importance, with breathability a secondary consideration. Durability is not a major consideration for Casual attire.
For Sports attire (Figure 103b): Breathability and stretchability are of primary importance, with durability and comfort secondary considerations.

Korea

Casual attire was clearly identified as the key product growth category for both downstream textile demand and cotton demand by the Korean mills surveyed. Figures 104 and 105 also show Sports attire and Street attire as key growth areas for textile demand. Cotton appears to be holding its own in the Street category, but has lost ground in the Sports category. Mills surveyed identified replacement by functional fibres as the key reason for cotton's loss of market in Sports attire. This was also the case for Inner attire.

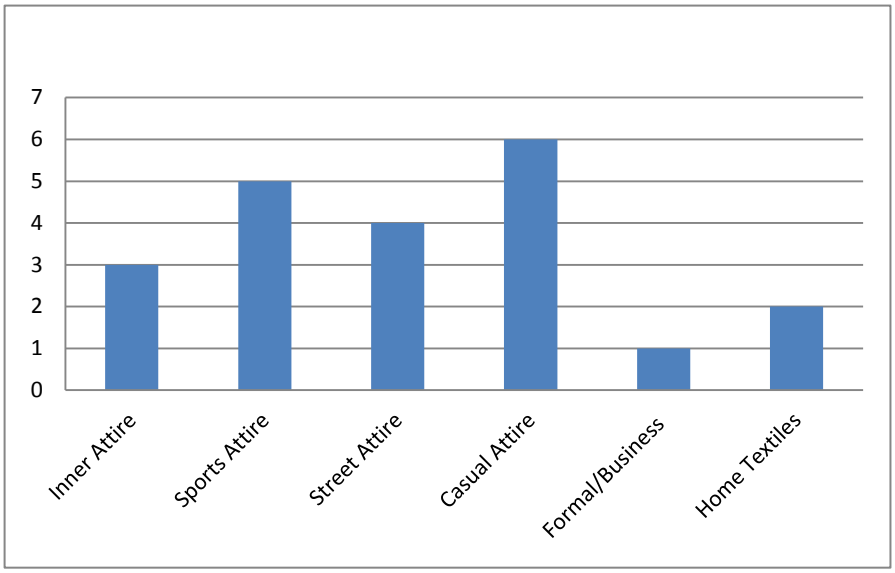


Figure 104- Korean mills ranking of downstream textile demand

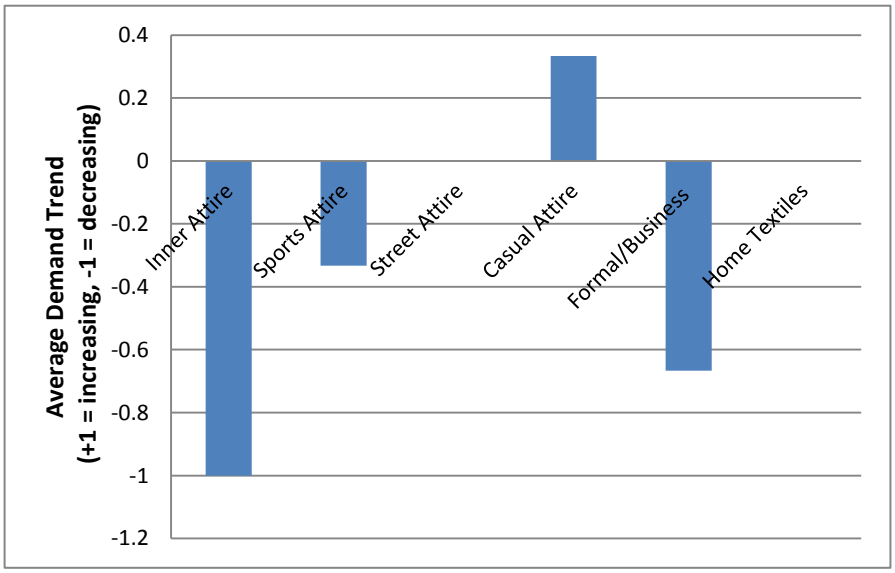


Figure 105 - Korean mills perception of raw cotton demand trends

Textile Property Importance

Comfort was universally considered the most important textile property across all textile product categories, followed by breathability and stretchability (Figure 106). The least important properties identified were eco-credentials and natural fibre vs. manmade fibre.

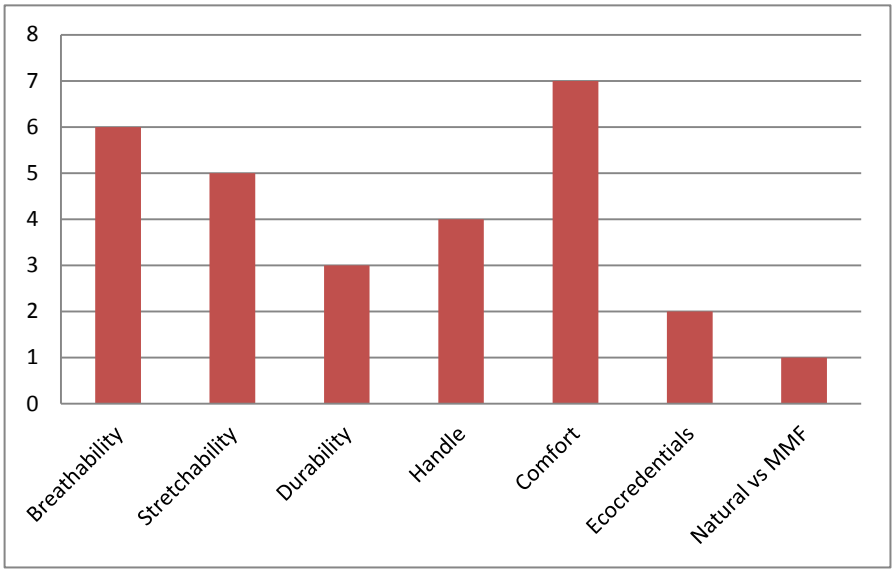


Figure 106 - Textile property importance – averages across all product categories

Given the identification of Casual attire and Street attire as the two key textile categories for the cotton fibre these categories were broken out for analysis in Figure 107.

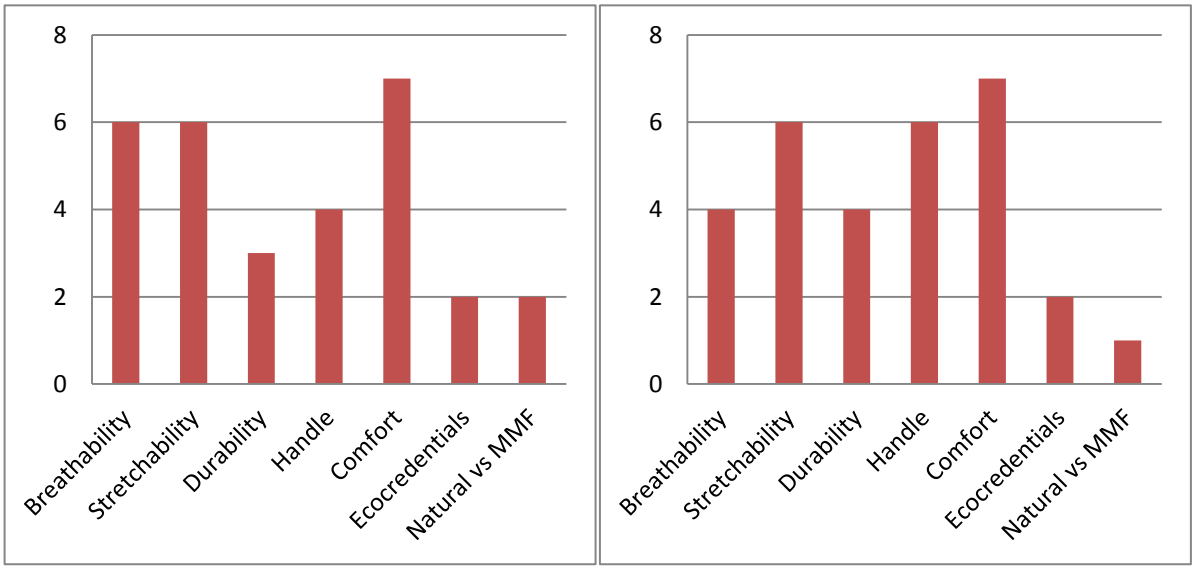


Figure 107a and 107b - Textile property importance – Casual attire (a) and Street attire (b)

Comfort was again identified as the key property across both categories, with breathability, stretchability and handle showing varying degrees in each of the categories.

Hong Kong

Since the GFC it has been noticed that ordering patterns from buyers have changed to smaller quantities and shorter lead times with pressure on prices. Nevertheless Casual attire and Sports attire were clearly identified as the key product growth categories for both downstream textile demand and raw cotton demand see Figures 108 and 109. This was followed by Inner attire and Street attire which showed moderate demand followed by Formal/business and Home Textiles

which showed low demand. Cotton demand growth was stagnant for Street and Formal attire while cotton demand in the Home Furnishing market was decreasing.

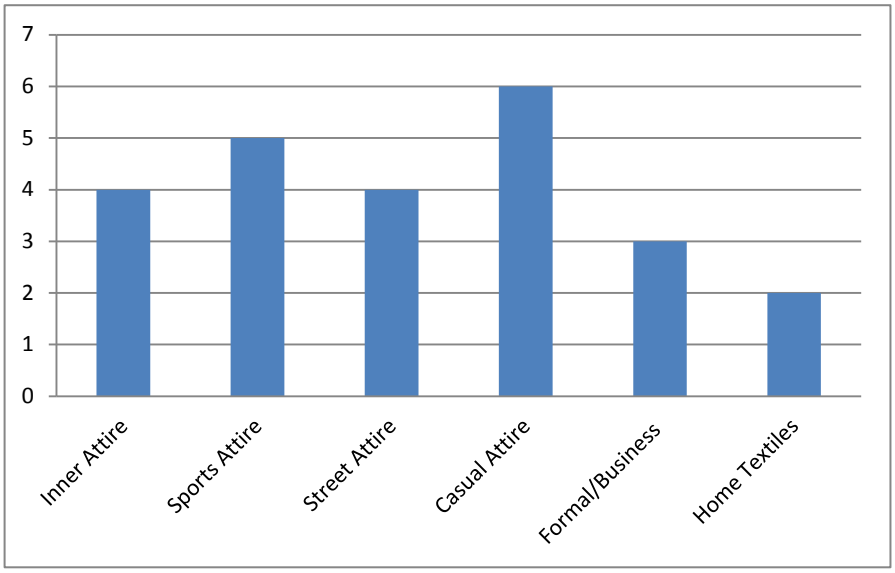


Figure 108 - Hong Kong mills ranking of downstream textile demand

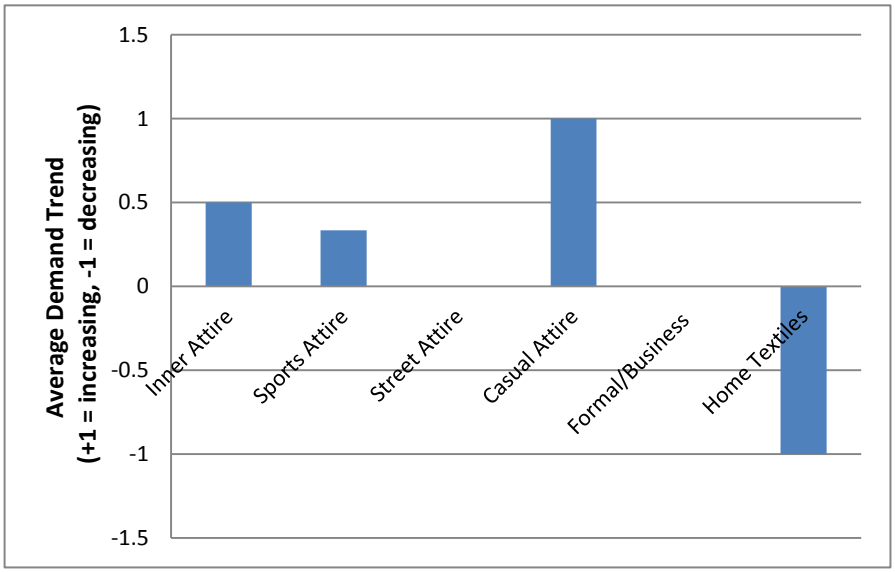


Figure 109 - Hong Kong mills perception of raw cotton demand trends

Textile Property Importance

Comfort was universally considered the most important textile property across all textile product categories, followed by handle and durability (Figure 110). It was also thought that the '*Look'* and the design were becoming increasingly important with eco-credentials also starting to become popular.

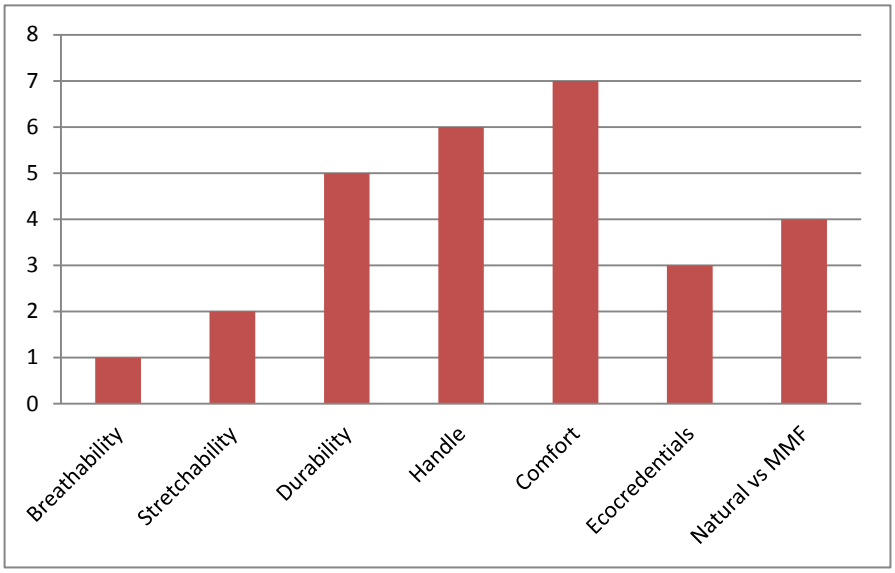


Figure 110 - Textile property importance – averages across all product categories

India

Casual attire and Sports attire were clearly identified as the key product growth categories for downstream textile demand see Figure 111. This was followed by Street attire and Inner attire which showed moderate demand followed by Home Textiles and Formal/business wear which showed low demand.

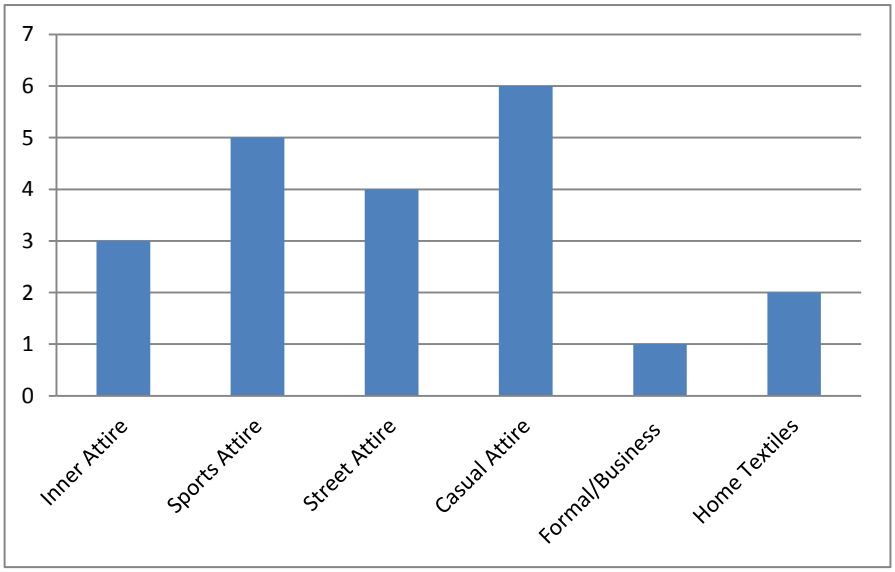


Figure 111 - Indian mills ranking of downstream textile demand

Cotton demand for all the categories was increasing with the exception of Street attire which was stagnant (see Figure 112).

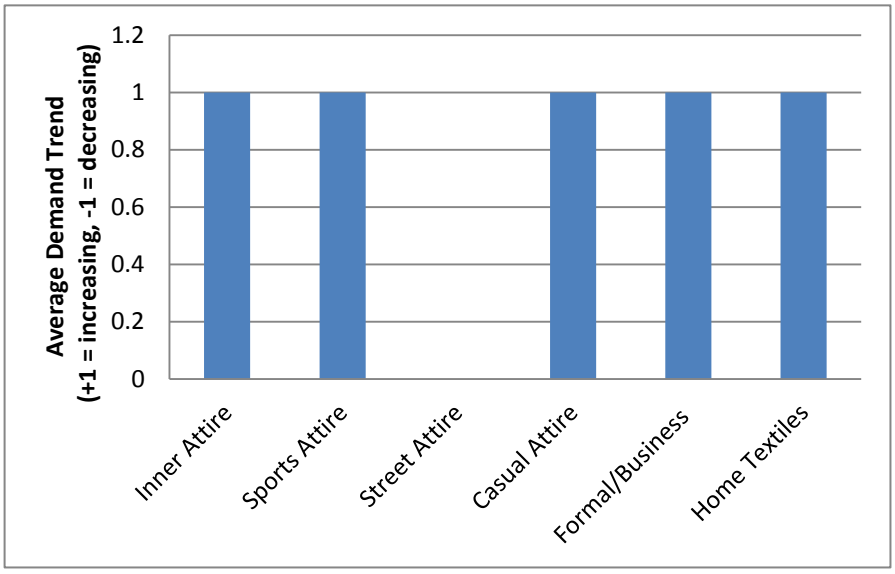


Figure 112 - Indian mills perception of raw cotton demand trends

Textile Property Importance

Comfort was universally considered the most important textile property across all textile product categories, followed by durability and natural fibres (Figure 113). This is followed by handle, stretchability and breathability with eco- credentials also starting to become popular.

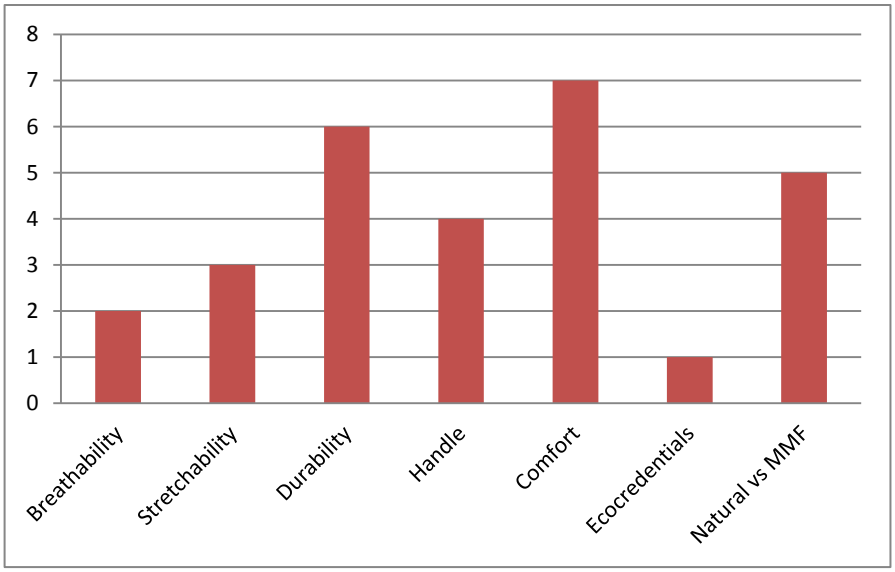


Figure 113 - Textile property importance – averages across all product categories

Indonesia

Casual attire was again identified as the key textile growth category, while Sports and Inner attire were also considered very important. Interestingly Home Textiles ranked the lowest in terms of overall textile demand, but was identified as having the strongest growth specific to cotton usage.

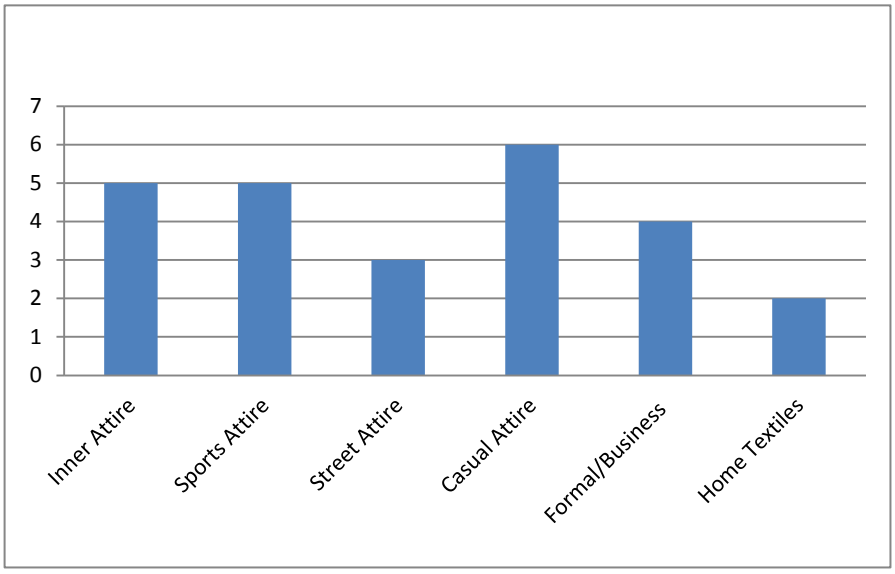


Figure 114 - Indonesian mills ranking of downstream textile demand

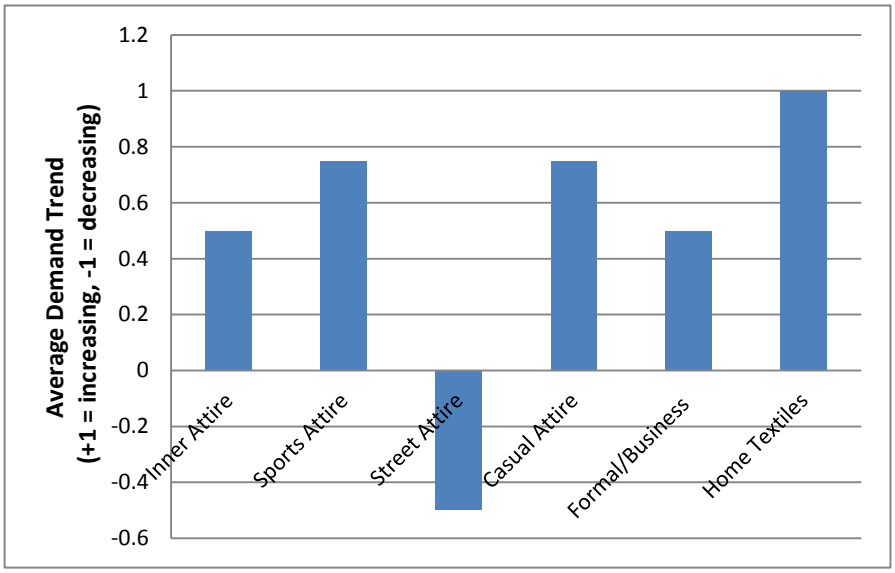


Figure 115 – Indonesian mills perception of raw cotton demand trends

Textile Property Importance

With the exception of Sports attire, comfort was considered the most important textile property over all textile product categories. For Sports attire, stretchability and breathability ranked the highest. Eco- credentials and natural vs. manmade fibre were considered less important (see Figure 116).

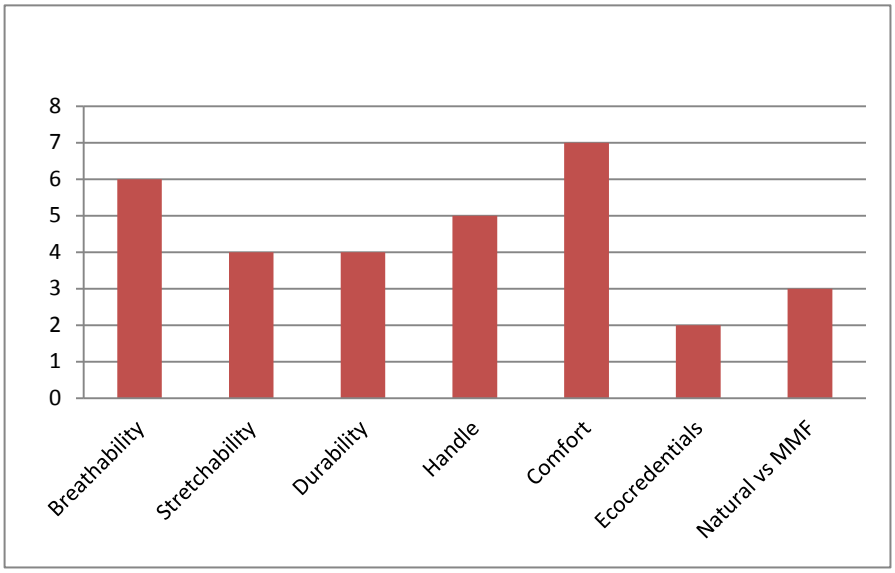


Figure 116 - Textile property importance – averages across all product categories

Australia

Inner attire and Street attire were clearly identified as the key product growth categories for downstream textile demand see Figure 117. This was followed by Casual attire and Sports attire which showed moderate demand followed by Home Textiles and Formal/business wear which showed low demand.

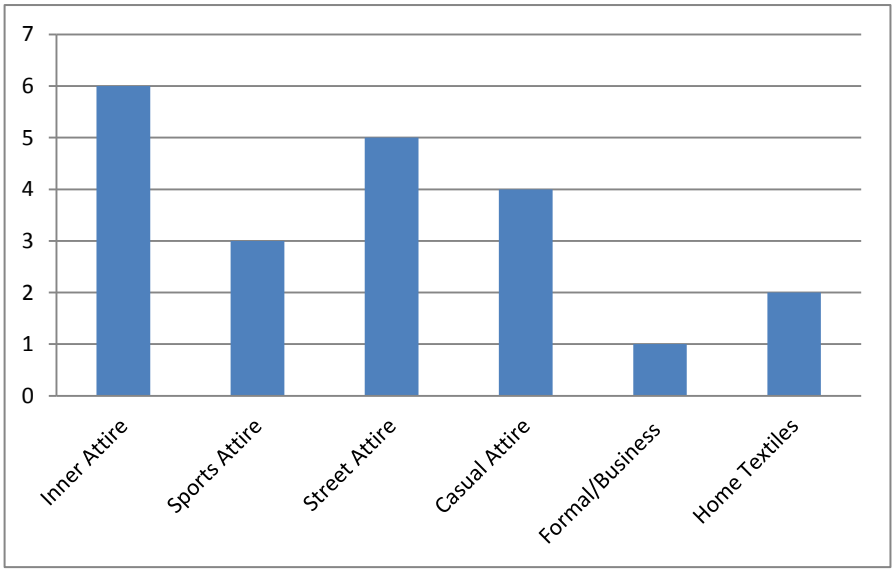


Figure 117 - Australian mill ranking of downstream textile demand

Cotton demand growth was stagnant for Inner, Street and Casual attire while cotton demand in the Sports, Formal attire and Home Textiles was decreasing (see Figure 118).

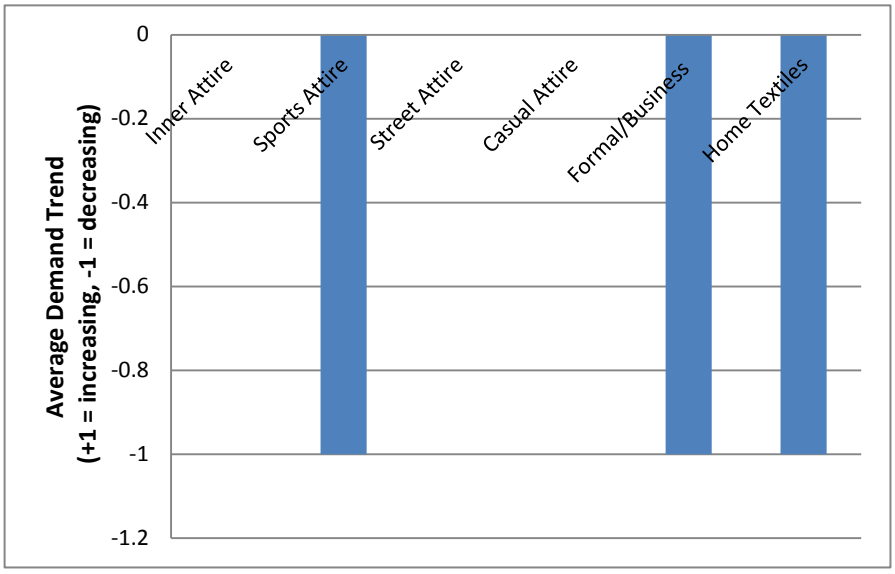


Figure 118 - Australian mill perception of raw cotton demand trends

The authors in a Japanese department store that was promoting Australian Cotton

CONCLUSIONS

Thirty five spinning companies from Japan, Korea, Thailand, Hong Kong/China, India, Indonesia and Australia as well as a management consulting firm from India were surveyed during 2009 and 2010. The main aims of the survey were to determine the perceptions of Australian cotton, to identify points of differentiation versus other cotton origins and fibres and to establish the demand potential for higher quality Australian cotton. The survey also aimed to identify potential emerging trends with regards to raw fibre / textile demand and to quantify mills' value perception of various licensing / branding programmes.

The 30-39 Ne yarn count range was the most important market for our survey participants, accounting for 42% of their production, followed by the <30 Ne yarn count, accounting for 39% of their production. The upper end of the medium count range, i.e. the 40-59 Ne yarn count, was also important, accounting for 15% of the production, but once into the genuine fine counts (>60 Ne) consumption was negligible at just 4%. Clearly, the fine count market is a niche market for the survey participants.

Australian cotton made up 32% of the blend in the 40-59 Ne range, 19% in the 30-39 Ne range and 5% in the <30 Ne range. There was negligible use of Australian cotton in yarn counts >60 Ne, with this market dominated by US Pima and Egyptian cotton. However with the price of Extra Long Staple (ELS) cotton and shrinking ELS production there is a potential for Long Staple Upland cottons to be used in greater quantities in the 50-70 Ne count range, providing they meet certain specifications. It is felt that this was an area where at least a portion of the Australian Long Staple Upland (ALS) crop could be used; supported by the fact that there is significant usage of the premium Upland from San Joaquin Valley (SJV) Ultima fibre in the 60-80 Ne market. This premium usage of ALS could help drive overall awareness of Australian cotton quality right through the value chain.

Despite the range of spinning systems and yarns produced in the spinning companies surveyed, the average impression of Australian cotton fibre properties was consistent. All countries rated neps and short fibre content as properties that needed improvement. The low level of contamination and stickiness, colour grade, spinning ability and staple length of Australian cotton created the best impressions. Mill concerns about neps and SFI were confirmed with the bale lay-down tests which showed that, in general, less than 50% of Australian cotton bales met spinner's preferences with regards to short fibre content and less than a third of Australian cotton bales in 2009/10 met spinner's preferences with regards to nep values. Australian cotton was better in regard to Micronaire, strength, length and uniformity.

As far as contracted specifications are concerned, SJV Upland cotton is still superior to competitive growths particularly in terms of strength and Micronaire, with Micronaire values typically lower and occurring in a narrower band of values. Australian cotton was ranked second after SJV with staple length and grade similar to SJV. Encouragingly, Australian cotton scored particularly well for key non-contracted specifications; particularly contamination, trash content and spinning ability where it was considered vastly superior to competing growths.

Overall, the preferred method of bale packaging was clearly cotton bags, followed by polyethylene film, jute/hessian and lastly woven polypropylene. Plastic bale strapping was considered the most suitable method to tie bales followed by wire ties and metal straps. It has been recommended that these findings are incorporated into the appropriate Best Management Practice Handbooks.

The surveys suggested that if the Australian cotton industry chooses to attempt a marketing or licensing programme beyond the spinning mill customer, three characteristics to ensure brand success were; product quality, marketability and traceability. Social responsibility and environmental credentials were also considered important. To ensure uptake and success of a licensed product, licensors were expected to invest in product specific research and technical marketing programmes to develop consumer brand recognition. The demand pull generated for the licensed product, would then remove barriers to participation such as legal/compliance costs, increased paperwork and cost of raw material.

Any licensing and marketing programme should be targeted at the largest cotton textile growth sectors to ensure maximum uptake. The surveys clearly identified Casual attire as the key product growth category for both downstream textile demand and raw cotton demand. Street attire and Home Textiles also showed moderate demand growth. While Inner attire and Sports attire showed strong overall demand growth, their cotton demand was low, primarily due to replacement by manmade performance fibres. Formal/Business wear showed the lowest overall textile demand and cotton demand as cotton was being replaced by easy care manmade fibres.

Across all product categories, and across all markets, comfort was clearly identified as the most important textile property by survey respondents. Handle and breathability were also considered important. Interestingly, within the Home Textiles segment, natural attributes and eco-credentials were seen as more important than in other market segments. These are attributes that could form the focus of ongoing product research and marketing campaigns.

If the industry chooses to pursue downstream licensing and marketing of Australian cotton, further research may be required to '*drill down'* into the key product opportunities within various textile sectors (e.g. men's trousers / ladies blouses) and their specific consumer requirements.

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APPENDICES

Appendix 1

2009 MILL SURVEY

SECTION 1. BACKGROUND QUESTIONS – RAW COTTON DEMAND TRENDS

1. Country?
   a) Indonesia Thailand Japan S. Korea China India
2. Please complete the following table – detailing recent expansion, current capacity and planned expansion:

	Current Capacity	**Details of Recent Expansion/ Investment**		**Details of Planned Expansion/ Investment**	
Spinning system	**# spindles (2009)**	**# Spindles installed in last 12 months**	**# Spindles installed in last 5 years**	**# planned installations next 12 months**	**# planned installations next 5 years.**
Open End					
Ring					
Air Jet					
Vortex					

3. Complete the following table detailing cotton yarn production and raw cotton consumption details:

Yarn Count	**Annual Yarn production (MT)**	**Annual Raw Cotton Consumption (MT)**	**Growths used & % breakdown**	**Production Trend**
105 Ne +				
80-105Ne				
60-80Ne				
40-60Ne				
30-40Ne				
Below 30Ne				

4. What is the annual volume of Australian cotton used? _____

5. How is the Australian cotton you buy described?
   a) Shipper Type Yes/No
   b) USDA Grade Yes/No
   c) Other – Please Specify _____

6. Do you require HVI data for Australian cotton? Yes / No

7. Is the HVI data you require supplied by your Shipper or measured at your mill? _____

8. How does the mill use the HVI results that are provided?
   a) To check against the sales contract Yes / No
   b) To help bale laydown management Yes / No
   c) To help predict yarn quality Yes / No
   d) To help predict yarn production Yes / No

9. Please complete the following table outlining which fibres you use, and the typical blend ratios produced. (e.g. in the Cotton base fibre/ Polyester blend fibre box, you might write 70% Cotton/30% Polyester)

		BASE FIBRES					
		Cotton	**Polyester**	**Viscose**	**Acrylic**	**Wool**	**Other**
BLEND FIBRES	**Cotton**						
	Polyester						
	Viscose						
	Acrylic						
	Wool						
	Other (please Specify) _____.						

10. Please complete the following table with regards various raw cotton fibre parameters.

Parameter	Specified on sales contract (Yes/No)	Ranking of Australian cotton (5 = good / 1 = bad)	Minimum Spec for 30-40 Ne Yarn production	Minimum Spec for 40-60 Ne Yarn Production	Minimum Spec for 60-80 Ne Yarn Production	Impact on Yarn Quality (or finished fabric)	Priority Allocated for raw cotton purchase (1 = high / 5 = low)
Micronaire							
Staple Length							
Length Uniformity							
Short Fibre Content							
Strength							
Extension							
Classers Grade							
Colour							
Trash							
Contamination							
Maturity							
Fineness							
No. of neps							
Dyeing ability							
Spinning Ability							
Stickiness							

11. Do you measure the following fibre parameters:
    a) Maturity Y/N
    b) Fineness Y/N
    c) Neps Y/N
    d) SFI Y/N
    e) Would a fineness/maturity measurement be relevant Y/N

12. What type of nep causes the most trouble in terms of yarn or fabric quality in your mill?

13. How important is grade/trash relative to physical fibre specifications?

14. Other properties of Australian cotton that interest or concern you?
    a) Are there any other fibre properties of Australian cotton that interest or concern you?

    b) How do these properties affect the quality of your yarn (or finished fabric)?

SECTION 2. IDENTIFICATION OF DOWNSTREAM TEXTILE DEMAND TRENDS

1. Complete the following table concerning raw end product demand, and demand for raw cotton in various textile product categories:

Textile Product Category	Rank demand growth for textile category (1 = highest / 6 = lowest)	Rank the textile properties below in terms of their importance for each product category (1-7)	Raw Cotton Demand Trend for production: (Increasing / Decreasing)	If raw cotton demand increasing – for what yarn specification?	If raw cotton demand decreasing, what are the replacement raw fibres and why?
Inner attire		Breathability Stretchability Durability Handle Comfort Ecocredentials Natural vs MMF			
Sports attire		Breathability Stretchability Durability Handle Comfort Ecocredentials Natural vs MMF			
Street Attire		Breathability Stretchability Durability Handle Comfort Ecocredentials Natural vs MMF			
Casual Attire		Breathability Stretchability Durability Handle Comfort Ecocredentials Natural vs MMF			
Formal /Business attire		Breathability Stretchability Durability Handle Comfort Ecocredentials Natural vs MMF			
Home textiles		Breathability Stretchability Durability Handle Comfort Ecocredentials Natural vs MMF			

2. Rank the following "developmental" textile properties in terms of greatest to least potential for demand growth:

Nanotechnology
Breathability
Stretchability
Dyeability
Low Twist Yarn

SECTION 3. DETERMINING THE "VALUE" OF LICENCING/BRANDING ARRANGEMENTS

1. Please circle Yes or No in the below table, indicating your experience with and perception of branded / licensed raw cotton products.

	Cotton USA	**Supima**	**Australian BMP**
Are you aware of the brands/licensing programmes listed	Yes / No	Yes / No	Yes / No
Do you participate in licensing programmes for the listed brands	Yes / No	Yes / No	Yes / No
Does participation lead to increased demand for yarn	Yes / No	Yes / No	Yes / No
Does participation lead to premiums for yarn produced	Yes / No	Yes / No	Yes / No
Does participation influence your raw cotton sourcing.	Yes / No	Yes / No	Yes / No

2. Are there other advantages of utilising a licensed/branded raw cotton product? If so, please describe.

3. In a scale from 1 to 5 (1 = incentive / 3 = no issue / 5 = disincentive) please rank the following in terms of their impact on your willingness to participate in the purchase of branded/licensed raw cotton products?

i. Cost of raw material 1 2 3 4 5
ii. Paperwork 1 2 3 4 5
iii. Legal/Compliance cost 1 2 3 4 5
iv. Downstream brand recognition 1 2 3 4 5

a.) How important are the following "product characteristics" for success with a licensed/branded raw cotton product (1 = very important, 5 = not important)

i. Point of differentiation:
Raw Cotton Quality; 1 2 3 4 5
Environment Credentials; 1 2 3 4 5
Social Responsibility 1 2 3 4 5
ii. Traceability/Authenticity: 1 2 3 4 5
iii. Marketability of "concept": 1 2 3 4 5

SECTION 4. POINTS OF DIFFERENTIATION: AUSTRALIAN VS OTHER GROWTHS

1.Rank the raw cotton properties of various growths 1 = best, 7 = worst.

Parameter	Australian	SJV	W.Texas Fibermax	Brazil	FWA	CIS	Zimbabwe
Micronaire							
Staple Length							
Length Uniformity							
Short Fibre Content							
Strength							
Extension							
Classers Grade							
Colour							
Trash							
Contamination							
Maturity							
Fineness							
No. of neps							
Types of neps							
Dyeing ability							
Spinning Ability							
Wax Content							

3. What are the key fibre parameters for which you pay raw cotton premiums?

4. What do you believe the price differential should be between the following growths, and what are the two key paramaters responsible for the price differentials:
   i. SJV and Aussie SM 1-1/8" Differential 1._____.

   Parameter: 1._____.

Parameter: 2. _____.

ii. Aussie SM 1-1/8" & Fibermax Differential 1._____.

Parameter: 1._____.

Parameter: 2. _____.

i. Aussie SM 1-1/8" & Brazil Differential 1._____.

Parameter: 1._____.

Parameter: 2. _____.

5. Is there a "confidence premium" applied to Australian shipments on the assumption they are more likely to meet contract quality specifications than other growths?

6. Ranking of yarn properties of cotton made with 100% (or near 100%) Australia cotton compared to other major growths (and/or fibres)

SECTION 5: LONG STAPLE & EXTRA LONG STAPLE CONSUMPTION

1. What is your current ELS cotton consumption (MT/annum) _____.MT/annum
2. What is your LS cotton consumption (eg Hazera/Ultima) _____.MT/annum
3. What is the minimum staple length you would consider blending with ELS? _____.
4. What is the minimum strength you would consider blending with ELS? _____.
5. What count yarn do you believe could be produced with:
   a. SM, 1-1/4", 3.7-4.2NCL, 34GPT, 82% unif (stand alone) _____Ne
   b. SM, 1-1/4", 3.7-4.2NCL, 34GPT, 82% unif (blended with Pima) _____Ne
   c. SM, 1-1/4", 3.7-4.2NCL, 34GPT, 82% unif (blended with SM 1-1/8")_____Ne
6. How big do you believe the market is for the following yarn counts, and is the market increasing or decreasing:
   i. 40-50Ne _____MT pa. Increasing/decreasing
   ii. 50-60Ne _____MT pa. Increasing/decreasing
   iii. 60-80Ne _____MT pa. Increasing/decreasing

7. Rank from 1-5 (1=small impact / 5 = large impact) how the following factors will affect the demand profiles for SM 1-1/4” raw cotton / 40-80Ne yarn market:

a.	Shrinking ELS production	1	2	3	4	5
b.	Implementation of new spinning technology	1	2	3	4	5
c.	Price relative to ELS.	1	2	3	4	5
d.	New product/uses for 40-80Ne yarns	1	2	3	4	5

CSIRO COTTON LAYDOWN SAMPLING PROCEDURE

Procedure to collect fibre samples from bale laydowns in spinning mills participating in Mill Survey

Background

Information gained from the questionnaire and interviews will be backed by data from testing fibre samples collected from each mill. It is envisaged that four sets of fibre over the (2009/10) crop year would be collected by mill personnel and forwarded to CMSE for testing.

Fibre testing at CSIRO will be undertaken using High Volume Instrument (HVI), AFIS PRO, Cottonscan and Siromat instruments.

Test results are confidential and will only be forwarded to the individual mill that submitted the samples.

Sampling Procedure

Before starting the sample collection, the following information is required.

1. Mill name and address
2. The total number of bales in the laydown.
3. The number of Australian bales in the laydown.
4. The proportions of cotton from other countries in the laydown.
5. The intended yarn counts to be spun using this laydown.

A separate sheet is provided to enter this information.

A minimum of 500 grams of cotton is required from the laydown being sampled. For example, for a twenty-bale laydown a big handful of at least 20 grams per bale should be collected and for a ten-bale laydown, 50 grams per bale should be collected.

All bales in the laydown should be sampled whether or not they come from Australia. Please keep cotton samples from different countries separate. A number of plastic bags are supplied in case the laydown should contain cotton from a number of different qualities and countries. Please place the cotton samples from each quality and country in a separate plastic bag and label the bag with the country of origin and variety or type of cotton.

The sample bags should be sealed and placed together with information sheet in the Post Pack supplied. Please ensure that the Shipment information on the Post Pack is filled out correctly. The charges for this will be to our account.

Our courier is FedEx. Please call the local office for pick up.

Thank you

Laydown Background Information

1. Mill name and address?

2. The total number of bales in the laydown?

3. The number of Australian bales in the laydown?

4. The proportions of cotton from other countries in the laydown?

5. The intended yarn counts to be spun using this laydown?

Appendix 2

SPINNING COMPANIES SURVEYED

Spinning Company Address	Phone	Fax
JAPAN		
Kurabo Ltd. Raw Materials Section 2-4-31 Kyutaro-machi, Chuo-ku, Osaka 541-8581	05 6266 5209	06 6266 5380
Fujibo Textile Inc. Merchandizing Division 1-8-12, Honmachi, Chuo-ku, Osaka 541-0053	06 6268 9831	06 6268 2532
Toyobo Co., Ltd. 2-2-8 Dojima Hama, Kita-ku, Osaka 530-0004	06 6348 4395	06 6348 3293
Shikibo Ltd. Raw Materials Section 3-2-6, Bingo-machi, Chuo-ku, Osaka 541-8516	06 6268 5505	06 6262 0945
Kondo Spinning Co., Ltd. 2-8-13, Sakae, Naka-ku, Nagoya 460-0008	05 2221 5107	05 2221 5100
SOUTH KOREA		
Dongil 8th floor, Dongil bldg, 944-1, Daechi 3-dong, Gangnam-gu, Seoul	02 2222 3145	02 2222 0966
Ilshin 10th floor, Ilshin bldg, 15-15, Yoido-dong, Youngdeungpo-gu, Seoul	02 3774 0257	02 786 5891~4
Kukil Rm#707, Sinsong bldg, 25-4 Yoido-dong, Youngdeungpo-gu, Seoul	02 3771 0521	02 784 2534

Kyungbang Kyungbang bldg, 441-10, Youngdeungpo-dong, Youngdeungpo-gu, Seoul	02 2639 6241	02 2639 6079
HONG KONG		
Central Textiles (Hong Kong) Ltd Sales & Account Office 3/F., 23 Chai Wan Kok Street, Tsuen Wan, New Territories	02 2611 5020	02 2417 2595
Esquel Group 12/F Harbour Centre, 25 Harbour Road, Wanchai	02 2960 6548	02 2960 2161
THAILAND		
Nan Yang Textile Group Nan Yang Textile Building 71 Moo 12 Petchkasem 71 Rd, Nongkham, Bangkok 10160	02 421 2150	02 421 1066
Chiem Patana Synthetic Fibers Co., Ltd Chiem Pattana Textiles Co., Ltd. 23/3 M. 3 Petchkasem Road, Km. 33 Yaicha, Sampram, Nakornpathom, 73110	02 311 273-4	02 322 559
Suwan Spinning and Weaving Co., Ltd. 4th Floor, Suwan Tower 14/1 Soi Sathorn 2 North Sathorn Road, Silom Bangrak Bangkok 10500		
K. Cotton & Gauze Co., Ltd 3rd Floor, 5 Suapa Road, Pomprab, Bangkok 10110	02 225 0060	02 224 0716
Thai Alliance Textile Co Ltd 140/24 ITF-Tower, 14th Floor, Silom road	02 231 6300	02 231 6188

Bangkok, 10500		
Thai Textile Industry 385 Soi Bang Maek Khao, Sukhumvit 30.5 K.M., Samutprakarn	02 703 8484	02 387 0894
INDIA		
Technopak Advisors Pvt Ltd 4th Floor, Tower A Building No.8, DLF Cyber City DLF Phase II Gurgaon-122002	124 454 1111	124 454 1198
Malwa Industries Limited 230, Industrial Area – A Ludhiana - 141 003, PUNJAB	161 2229146	161 2223603
Vardhman Textiles Limited Chandigarh Road Ludhiana 141 011	161 2228943-8	161 2601048
Aarti International Ltd Chandigarh Road Ludhiana	161 300 6300	161 3006350
Nahar Group of Companies Industrial Area – A Near Cheema Chowk Ludhiana - 141 003	161 2600701-5	161 2600709
Rana Polycot Ltd SCO 49-50, Sector 8 C Madhya Marg Chandigarh 160018	172 254 0007	172 254 6809
GTN Group 43, Mittal Chambers 228 Nariman Point Mumbai 400 021	22 2202 1013	22 2287 4144
Arvind Mills Ltd Naroda Road Ahmedabad – 380025	79 2220 3030	79 2220 2179

INDONESIA		
Argo Manunggal Textile, PT Wisma Argo Manunggal 9th Floor, Jl Gatot Subroto No.95 Kav. 22, Jakarta, 12930, Indonesia	21 252 0065	21 252 4949
APAC Inti Corpora, PT Jl. Jend. Gatot Subroto Kav. 23, Jakarta, 12930, Indonesia	21 522 8888	21 525 8300
Bhineka Karya Manunggal, **PT (Guna Group)** Business Park Kebon Jeruk Blok 1 No 5-6, , Jl Raya Meruya Ilir No. 88 Meruya Utara Jakarta, 11620, Indonesia	21 300 67863	21 300 67861
Sinar Central Sandang, PT Setia Building, 27. Jl. K.H. Hasyim Ashari Jakarta, 10130, Indonesia	21 6328071	21 6328371
Bapintri, PT Jl Leuwigajah No 00 Cimindi Cimahi, 40522, Indonesia	22 601 2868	22 603 0066
Indorama, PT Kembang Kuning, Ubrug, , Post Box 7, Jatiluhu Purwakarta, 41101, Indonesia	264 202311	264 210332
Kahatex, PT JL Raya Tancaekek KM. 23 No 25 Sumedang - Jawa Barat, Indonesia	22 779 8060	22 779 8063
Embee Plumbon Tekstil, PT Wisma SMR 8th Floor Unit 801, Jl. Yos Sudarso Kav. 89, Jakarta, 14350, Indonesia	21 6507792	21 652 0518
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