

The Fiber Year 2002

Issue 3
May 2003

Foreword

The information in this report is mainly based on Saurer's global network and experience. Additionally, the companies and institutions below mentioned have made a major contribution to this survey.

We would like to express our particular thanks to the following:

Acordis Industrial Fibers
Cotton Outlook
Dralon GmbH
Food and Agriculture Organization of the United Nations
German Association of the Automotive Industry
International Cotton Advisory Committee
International Textile Manufacturers Federation
International Wool Textile Organisation
Lenzing AG
Ministry of Textiles (India)
Montefibre SpA
National Cotton Council
Nylstar S.P.A.
Rhodia SA
Tire Business
Trevira GmbH & Co KG
United States Department of Agriculture
Wendler Marketing Information
Woolmark Business Intelligence

© All information contained in this report is subject to copyright. Although all information within this report has been carefully obtained, Saurer gives no guarantees for any purpose.

For further information:
Andreas Engelhardt
Saurer Management AG,
Bahnhofplatz 12,
CH-8401 Winterthur
a.engelhardt@sgm.saurer.com
Phone ++41 - 52 - 264 09 38

Table of contents	Page
1. Economic environment 2002 and critical view on the world textile industry	1
2. Selected raw materials	2
a) Production of raw cotton	
b) Genetically modified cotton	
c) Polyester fiber intermediates	
3. Worldwide fiber supply in 2002	5
4. Development of the individual fiber types	7
a) Cotton	
b) Wool	
c) Polyester	
d) Polyamide	
e) Polypropylene	
f) Acrylic	
g) Cellulosics	
h) Other manmade fibers – elastane, aramid, carbon	
5. Filament yarn	14
a) Textile yarn	
b) Industrial yarn	
c) Carpet yarn	
6. Spun yarn	17
a) Short staple	
b) Long staple	
c) Winding	
7. Nonwovens	21
8. World yarn production	22
9. Textile chain	23
10. Statistical appendix	24

1. Economic environment 2002 and critical view on the world textile industry

In the aftermath of the terrorist attacks of September 11, 2001 global growth did better than expected. It even improved from the 2.2% in 2001 to more than 2.5%. Asia weathered the unfavorable conditions better than other regions, emerging as a clear winner in the regional race. Growth among the Asian industrialized countries - outside of Japan - is estimated to have been above 4.5% in 2002. The sluggishness in the world economy is seen in a reduction in capital flows to developing countries, which had remained stable during the crisis years of 1997/98. Foreign direct investment has fallen back to the \$160 billion range, despite increases to such countries as PR China, Mexico and South Africa.

In the face of major uncertainties in the global environment, any forecasts on the future prospects are extremely difficult. Though global GDP is expected to rise, the dangers of the world economy sliding toward recession are real.

As for the textile industry's performance, no fundamental changes occurred.

The U.S. and the EU are still the most important regions in terms of consumption. Last year's textile and clothing imports accounted for about \$200 billion. Asia, with PR China taking the unquestioned lead, has gained further market shares in terms of production. As a result, the gap between supply and demand further widened.

The U.S. and PR China, representatively of the developed and developing countries, each stand for an extreme position in this industry.

The U.S. textile industry is suffering from its worst economic crisis. Although the U.S. consumers spend \$600 billion annually on apparel and home textiles, textile employment further declined by 10% to 425,000 workers in December, 2002. Capital expenditure in the textile industry is significantly lower than the \$3.5 billion in 1997. Since the textile crisis began in 1997, about 200,000 jobs were lost and more than 250 textile plants closed.

PR China's textile industry exports reached \$61.8 billion in 2002 and the country is supposed to have generated a combined production value of \$121 billion, +15% on the previous year, while the industry's profit rose by 23%. It is estimated that the state-owned enterprises, having a 60% share of the installed spindles, posted combined profits of roughly \$400 million in 2002. The textile and apparel industry will increasingly center on PR China in the years to come. Due to the great restructuring of state-owned spun textile enterprises, the rates of expansion were comparatively small in this sector. Nevertheless, PR China has continued increasing production, being protected by high tariffs and an import license system.

Several circumstances in 1997 initiated this development and have been favoring it since, but will they be stable and remain unchanged for the years to come?

The decline of the U.S. textile production has been caused by an average 40% devaluation in Asian currencies against the U.S. Dollar. A reasonable level of the U.S. Dollar is vitally necessary for the U.S. textile industry's recovery.

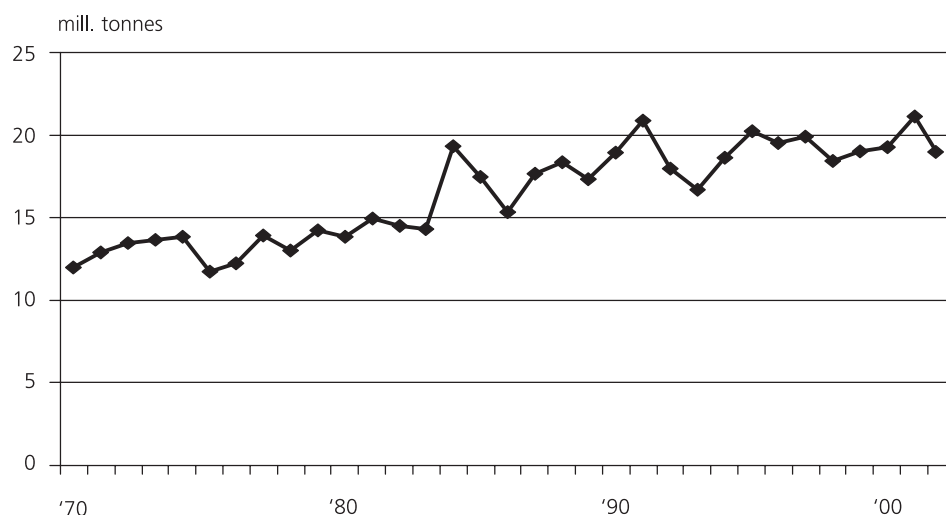
Further on, investments have been fuelled by massive Chinese subsidies in various forms. Forced to lend in large amounts to unprofitable state-owned enterprises, China's banking sector has accumulated at least a 40 to 50% ratio of non-performing loans to assets. This means that the Chinese government has about \$400-500 billion of bad loans that must be resolved.

Furthermore, intellectual property rights infringements are increasingly causing concerns. A recent estimate by the U.S. Department of Commerce assumes lost sales of more than \$100 million annually.

The Chinese synthetic fiber industry is highly dependent on imported synthetic fiber raw materials. Reductions of import tariffs are advantageous for local synthetic fiber producers. However, particular concerns may arise for the polyester fiber intermediates sector. Previous year's foreign supplies of the crucial raw materials for the polyester fiber production PTA and MEG amounted to about 4.2 million tonnes and 2.3 million tonnes respectively. These imports ensure more than half of domestic polyester production. Taking into consideration the average period of commissioning such facilities, shipments from abroad will increase even further in the long run.

The phasing-out of the multi fiber agreement in 2005, too soon to examine its impacts yet, will present an enormous challenge to the developed world. Distribution flows will be subject to fundamental changes. Bilateral free trade arrangements may work against this new understanding of quota-free trade. In this sense, a remarkable increase in bilateral negotiations has already occurred.

Cotton harvest quantity



2. Selected raw materials

a) Production of raw cotton

As already indicated in last year's issue, the actual global cotton production was significantly lower at about 19.07 million tonnes.

Plantings in the Southern Hemisphere have declined by about 4% due to drought and more attractive returns from alternative crops, the average yield is expected to drop from about 685 kg/ha to below 600 kg/ha. In the Northern Hemisphere cotton area increased by about 7%. Due to higher local prices in PR China, plantings are expected to increase by about 15% and production is projected to increase to about 5.4 million tonnes next year, the highest in 12 years. The US production will remain the same whilst increases are expected in India and Pakistan due to higher domestic prices. Northern Hemisphere production is estimated to increase by about 6% next year. The Southern Hemisphere's plantings are expected to respond to more positive price signals and production is estimated to increase significantly. World production for 2003 is estimated to increase by about 7.5%.

As world consumption is projected to further rise, ending stocks are supposed to decline nearly 20%. The cultivated area decreased by 9% to 31.0 million hectares.

The leading producing countries, representing three quarters of world production, are listed below:

Country	Production (mill. t)	± in % vs prev. year	Yield (kg/ha)
PR China	4.9	-7%	1,106
USA	3.7	-16%	727
India	2.4	-9%	325
Pakistan	1.7	-4%	631
Uzbekistan	1.0	-4%	727
Turkey	0.9	+3%	1,248
World	19.1	-11%	624

The Cotlook A Index, measuring international cotton prices, has fallen below the 40-cent level in May until it started steadily rising to the 60-cent level at year-end.

b) Genetically modified cotton

Biotechnology has already entered many parts of our life and large increases in acreage for genetically modified crops have been observed over the last five years coming close to 55 million hectares in 2002 from 1.7 million hectares in 1996. It is estimated that the global market for biotechnology applications will reach \$50 billion annually by 2005.

Fifteen countries have undertaken a commercial production of transgenic crops; of these countries Argentina, Canada, PR China and the U.S. grew 99% of the total transgenic crops area in the previous year. A total of 5.5 million farmers are engaged in genetically modified cultivation, over 75% of whom are small resource-poor farmers in developing countries.

Of the global 31.0 million hectares of cotton worth \$20 billion, approximately 70% is grown in developing countries. Asia has up to 60% of world cotton and Africa up to 15%. There are about 20 million cotton farmers globally, 97% of whom farm in developing countries - most are small resource-poor farmers growing 2 hectares or less of cotton.

Insect pests are a major problem in cotton and yield losses and insecticides cost cotton farmers \$5 billion p.a. - 20% of global insecticides are used on cotton. Countries that have introduced genetically modified cotton have derived significant and multiple benefits, including increased yield, decreased production costs, a reduction of at least 50% in insecticide applications, resulting in substantial environmental benefits to small producers, and significant economic and social benefits.

Yield increases for genetically modified cotton range from 5 to 10% in PR China, 10% or more in the U.S. and Mexico, 25% in South Africa. In the U.S. in 2001 economic gain for genetically modified cotton was \$50 per hectare coming to more than \$100 million nationally. In PR China, economic gain was \$500 per hectare with a national benefit of \$750 million.

Genetically modified cotton occupies about 7 million hectares today, accounting for a 20% share in world cultivated cotton crops area. It has the potential to deliver significant benefits on at least half of the world's 31.0 million hectares of cotton with medium to high insect

pest levels. Expanded use of genetically engineered varieties is lowering marginal costs and reducing risks. About one-third of world cotton production was accounted for by these varieties. This technology will continue to spread and is forecast to account for half of world production by 2005/06.

Country	GM's share in national cotton area
Argentina	5%
Australia	30%
PR China	45%
India	<1%
Indonesia	20%
Mexico	25%
South Africa	75%
U.S.	77%

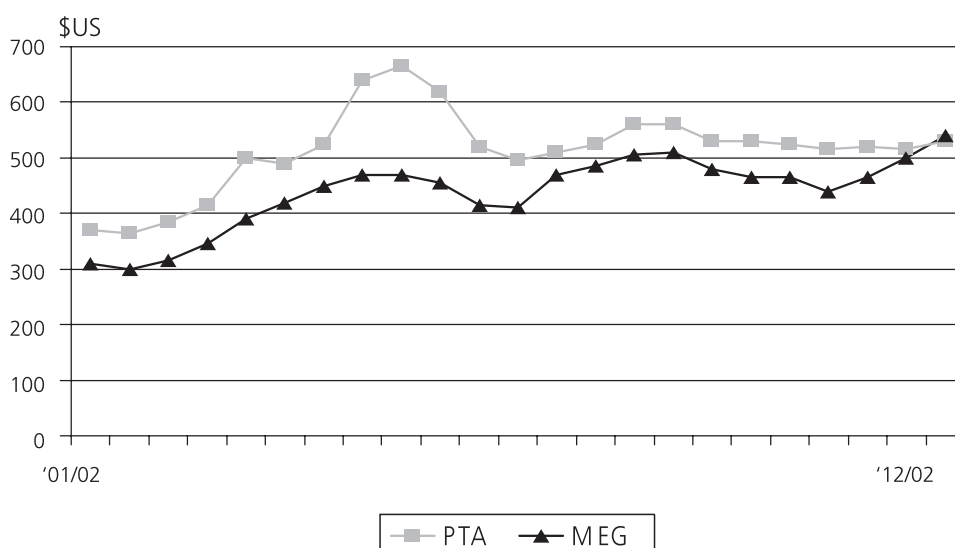
Since start-up of commercial production of transgenic cotton in 1996/97, it has been commercialized in eight countries – Argentina, Australia, PR China, India, Indonesia, Mexico, South Africa and the U.S. Indonesia planted only a few thousand hectares for the second year. Genetically modified cotton in India has been introduced on 40,000 hectares for the first time. The first genetically modified crop to be grown commercially in South Africa has proven a great success, boosting the yield per kilogram of seed up to 129% higher for the GM variety compared to conventional crops.

Further countries will follow to lift the ban on the cultivation of genetically modified crops. Amongst others, Brazil is currently reconsidering its provisional court decision from June 2000. As a result of the probable savings in production costs, the local cotton industry will improve its competitive ability.

c) Polyester fiber intermediates

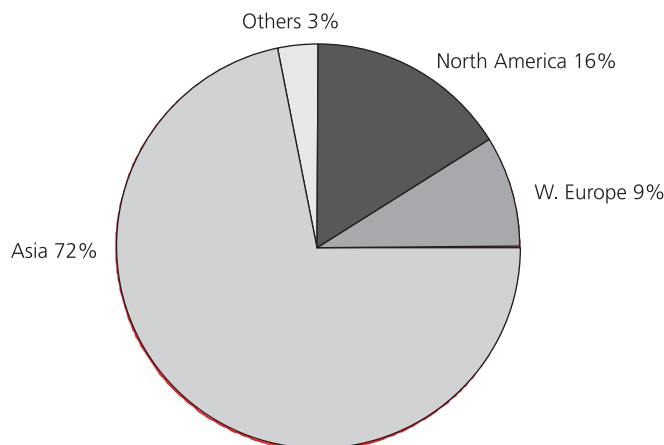
The production of polyester fibers is based on mono-ethylene glycol (MEG) and purified terephthalic acid (PTA) or dimethyl terephthalate (DMT).

Polyester fiber intermediates prices in 2002



On a world basis, very low MEG inventory levels going into 2003 and no capacity expansion in 2003 may cause some concerns. In 2003, there will be the first world capacity decline in history due to the exit of BASF. Due to shortages in MEG markets, the Taiwanese Nan Ya Plastics recently announced plans to advance the startup of its 340,000 t/y plant by three months to the beginning of the fourth quarter 2003. Nevertheless, world capacity is to decline slightly in 2003. As per the end of 2002, total capacity amounted 19.7 million tonnes.

PTA capacities increased by nearly 9% to 28.4 million tonnes. Major expansions were put into operation in PR China, Indonesia and Taiwan. For performance and environmental reasons, this material accounts for more than 80% of the polyester fiber production.



Regional PTA production in 2002

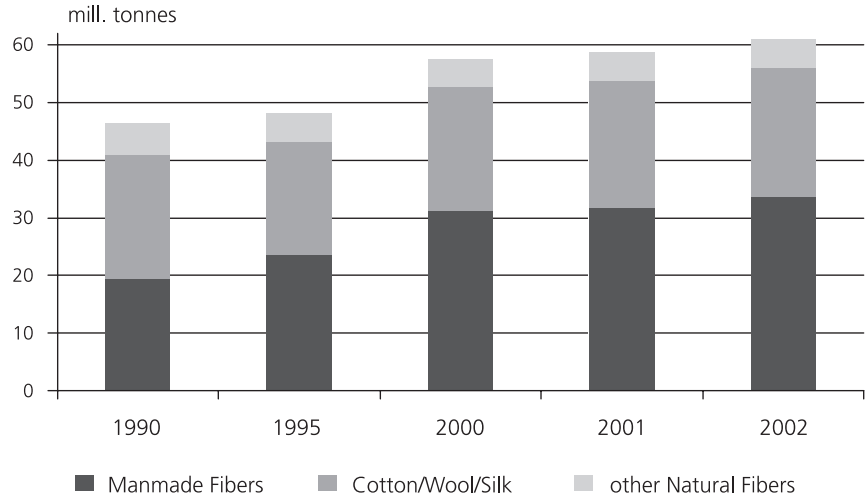
The above chart illustrates the regional distribution of last year's PTA production. For Western Europe supply and demand was balanced. For the years to come an increasing surplus production is forecasted. Asia has and will continue to have a balanced production and demand. Taiwan and South Korea have been the most important countries for shipments abroad. On the other hand, PR China's consumption of nearly 6.5 million tonnes exceeds more than double local production. North America will continue to be a net exporter. Africa and the Middle East are expected to remain net importing regions, although major expansions will be put into operation in Iran and Turkey.

3. World fiber supply in 2002

The global volume of the fiber production in the year 2002 rose by 4.1% to 61.12 million tonnes, meltspun nonwovens are not included. With a world population of 6.23 billion, this corresponds to an average per capita consumption of 9.8 kg, which is 2.9% up to the previous year.

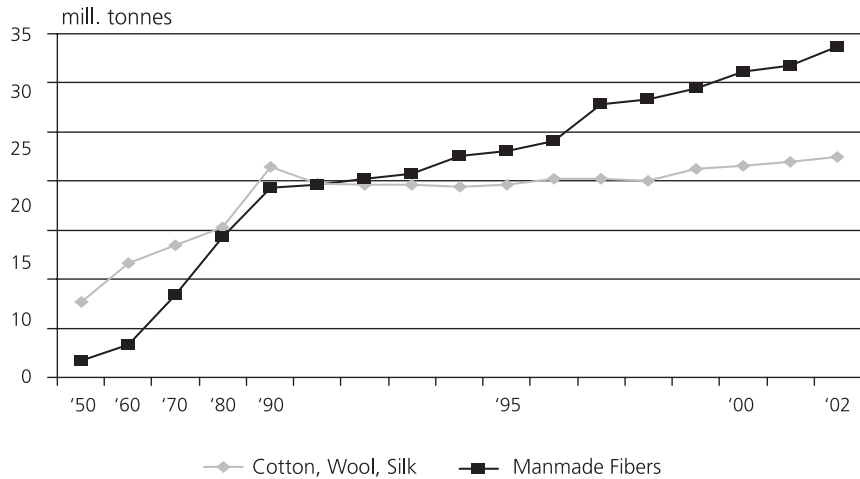
Manmade fibers accounted for 33.66 million tonnes (+6.1%), comprising a 55.1% market share. The second group of fibers comprising cotton, wool and silk rose by 2.2% to 22.46 million tonnes. As the global cotton production was significantly lower in line with a record global cotton usage, world ending stocks declined nearly 20%. The long-term downward trend in wool production has come to an end, although the conditions in Australia are unfavorable. Already last year there was a large amount of de-stocking. In terms of sheep numbers the dry conditions combined with still very good sheep prices are expected to have a significant impact during the current season. The third section with ramie, flax, hemp, jute, sisal and coir remained unchanged at 5.0 million tonnes. This group is only mentioned for the sake of completeness, it will not be included in any further comments.

World fiber supply



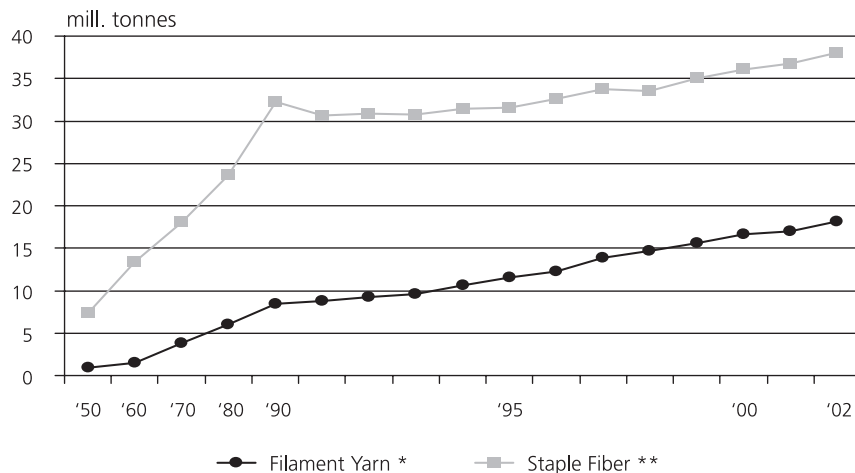
On a world basis, demand for fibers from the first two groups has increased by 4.5%. This growth has been supported by rising demand for each of the different fiber types above mentioned. As in the recent years, the manmade fibers performance exceeded that of cotton in terms of the growth rate.

Global fiber production



This chart shows the long-term inter-fiber competition. Since the beginning of the 90's manmade fibers have been the most important fiber type in terms of volume. Actually, manmade fibers account for a 60% share on the processed fibers being monitored by the Swiss Saurer.

Yarn and fiber production



* Polyester, Polyamide, Polypropylene, Cellulosics, Silk
 ** Cotton, Wool, Polyester, Polyamide, Polypropylene, Acrylics, Cellulosics

Another approach to the world textile market, suitable for the following explanations, is the breakdown into filament yarn and staple fiber above shown.

The filament segment relates to yarns on bobbins which are subsequently subject to further processing steps, i.e. texturing.

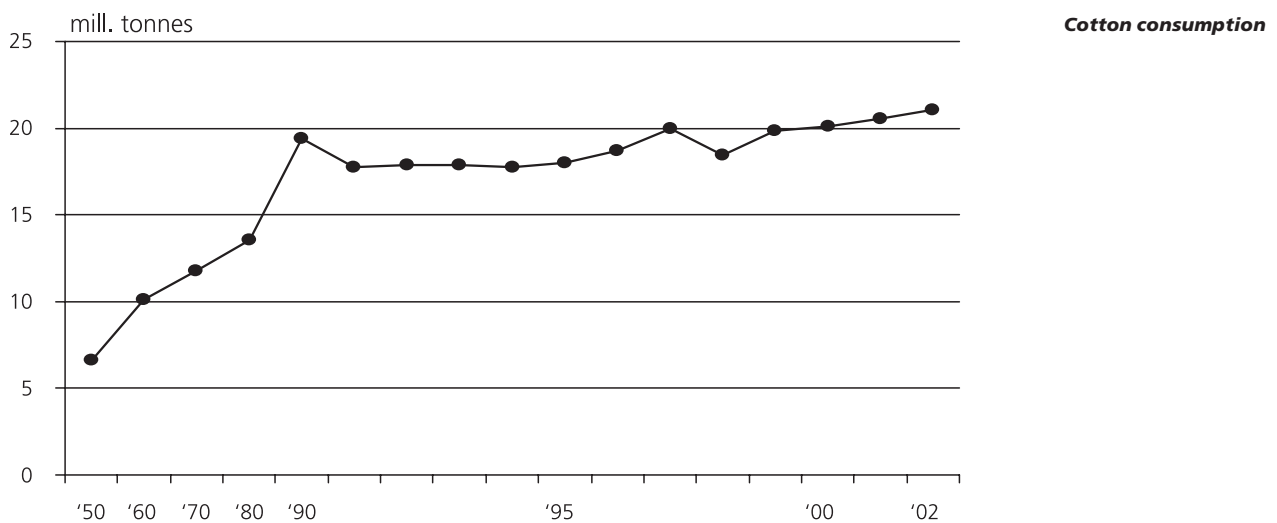
Staple fibers relate to cut fibers that are the raw material for spinning of staple fiber yarns (synonym: spin fiber yarn) and for manufacturing of nonwovens.

4. Development of the individual fiber types

a) Cotton

Stimulated by low prices, world cotton consumption for 2002 reached an all-time high. Taking into consideration the volume of cotton being further processed, last year's volume has exceeded the production of raw cotton by more than 2 million tonnes. The consumption amounted to a record 21.1 million tonnes in 2002, representing a 2.4% increase.

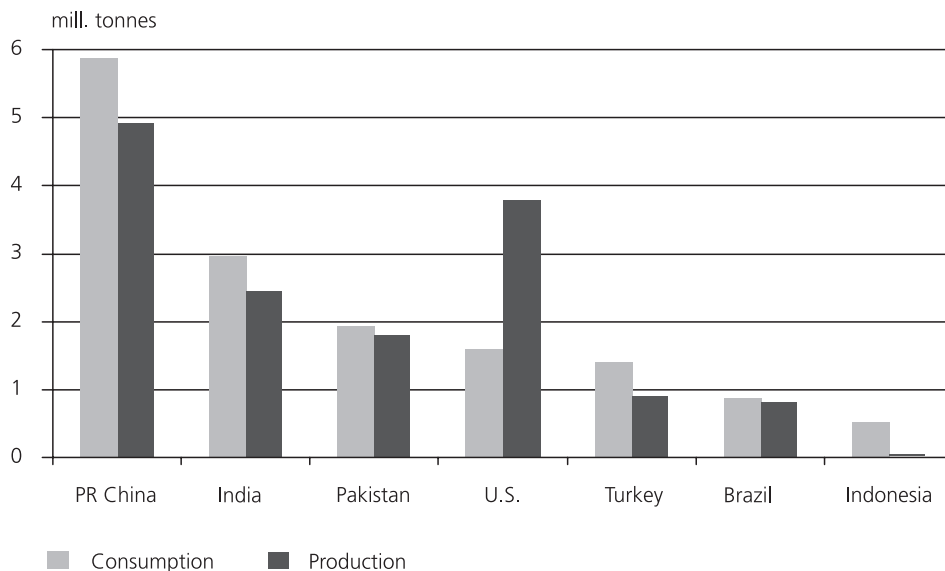
The trade volume was close to 6.5 million tonnes with the U.S. (2.4 million tonnes), Uzbekistan (0.8 million tonnes) and Australia (0.6 million tonnes) responsible for about 60% of the global shipments of raw cotton. The leading importing nations comprise PR China, Indonesia, Turkey (each 0.5 million tonnes) as well as India, Mexico, Russian Federation and Thailand (each 0.4 million tonnes).



The graph below shows the leading cotton processing countries. The U.S. is the only raw cotton net exporting country in this group. Cotton consumption remained below last season, reflecting the long-term decline in the local yarn capacities. All the other nations have increased their cotton consumption.

Apart from Brazil, which is estimated to have increased its cotton stocks, all the other countries had double-digit declines. PR China's stocks eroded by 28% coming to 2.0 million tonnes, a quarter of world cotton stocks.

**Cotton consumption
and production in 2002**



b) Wool

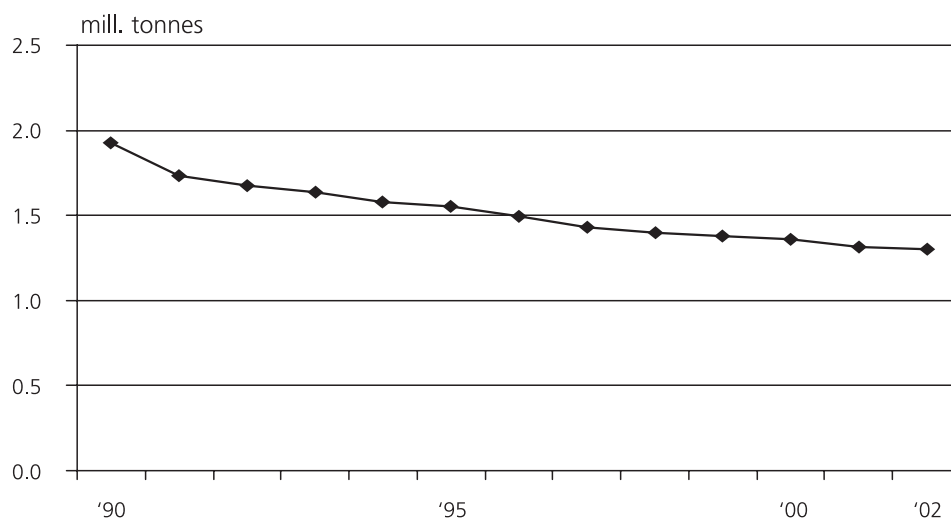
Wool is most commonly used for clothing apparel, hand knitting yarn, carpets, blankets, upholstery and tapestries. The most wanted wool is used with compiled and blended filaments. The price of wool has many determinants, i.e. fiber diameter, the staple's strength and length, vegetable matter, position of break and the color.

There is a greater demand for finer, lighter weight fabrics, and finer wool can be used in a larger range of clothing products. There is also a more limited amount of fine wool available. Staple strength gives an indication of the fiber's ability to withstand the tension placed on it during processing. Fiber breakage also causes a lower average fiber length or an uneven fiber distribution of length in the top, which again devalues the price of the product. Variation in fiber length, as a result of fiber breakage, also interferes with the spinning performance of smooth yarn, and thus has a negative effect further along the processing chain at weaving.

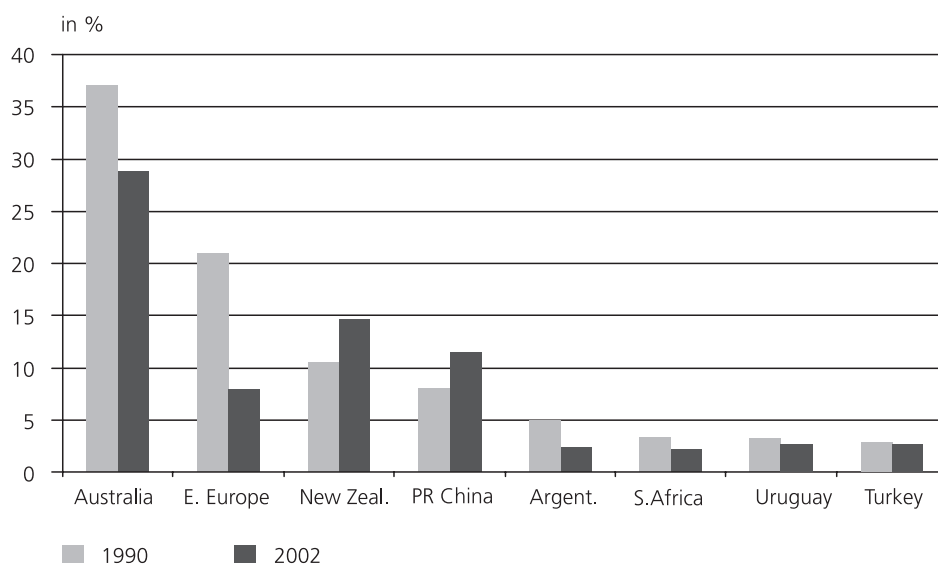
The removal of vegetable matter causes fiber breakage and the greater its amount the more breakage and waste occurs. Longer wools are used for weaving, because they produce a smoother and stronger yarn. They are also used in upholstery fabrics where a smooth finish is required. Shorter wools provide less strength in the yarn, and are therefore more profitably used for knitting. Finally, the brighter the greasy wool, and the expected color after scouring (i.e. washing to remove grease and suint), the higher the price it will receive.

Wool has continued its long term downward trend since 1989, ending up at approximately 1.3 million tonnes. That is about 1% lower than last year's level.

Australia leads the world wool production, taking in a 30% market share, and wool business is an integral part of Australia's economy. The further decline was mainly influenced due to the worsening drought conditions in some parts of Australia. On the other hand, New Zealand and Argentina saw some slight increases in wool production of 3% and 7% respectively.



As a consequence of regulation measures imposed by Australian farmers in the 80's, the world market has been subject to structural changes. After the collapse of the market price, sheep breeding was often stopped due to losses incurred.



Changes on the wool supply side

In 2002, the world wool market price stagnated until the end of August. With wool supplies falling faster than actual demand, raw wool prices, whilst remaining volatile, have moved sharply up by about 30%.

c) Polyester Fibers

Due to some amendments in the polyester production, the global output volume in 2001 moved up to 19.60 million tonnes. From that updated amount, the 2002 production increased by 7.2% to 21.02 million tonnes.

The majority comes from filament yarn, which has gone up by 8.0% to 12.14 million tonnes. The manufacturing of staple fibers increased by 6.2% to 8.87 million tonnes.

Due to the continued rapid growth of the Chinese industry, the Asian share in the world polyester industry rose to 81%. Further increases in Asia have been observed in Thailand by 8.9%, Pakistan by 6.0%, India by 2.7% and Taiwan by 1.6%. While the remaining Asian countries more or less stagnated, Japan continued to decline by 10.2%. This was mainly

caused by shifting capacities to the neighbouring countries. Furthermore, output in South Korea declined by 5.4%, although we have seen a slight expansion in filament capacity by 3%.

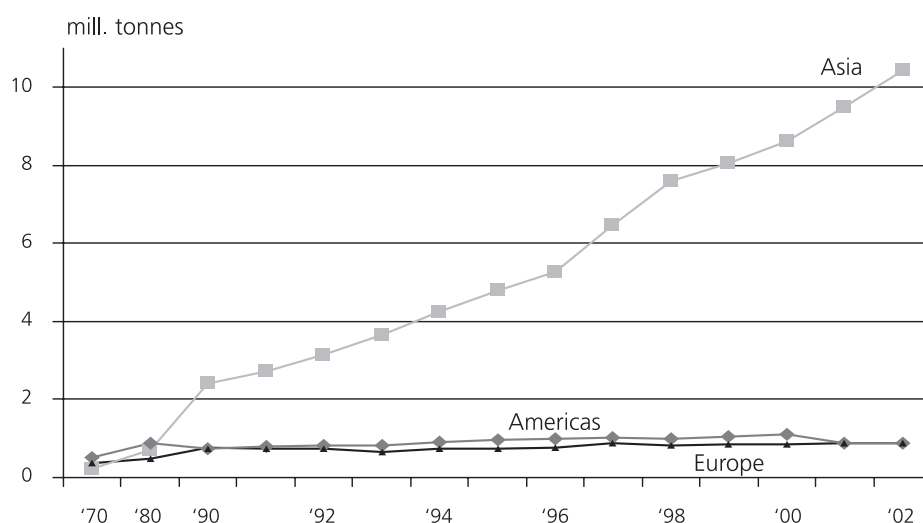
The Americas reached an amount of 2.12 million tonnes, representing a 10% world market share. The U.S. production rebounded by 5.3% to 1.47 million tonnes. Due to low-price shipments from Asia, the performance in Mexico and Brazil declined by 12.6% and 5.8% respectively.

Europe has witnessed a decrease in both regions, Western Europe without Turkey by 1.9% and Eastern Europe by 5.5%. The lower production in Eastern Europe was mainly influenced by double-digit decreases in the Community of Independent States. Contrary to these declines, Turkey enjoyed a robust 9.5% growth in the polyester production.

The rest of the world slightly increased production by 3.1%, the strongest increase was in South Africa by 14.8% and Saudi Arabia by 6.3%.

To demonstrate the extraordinary dynamic of the Asian markets with PR China taking the lead, a close look at the regional development of polyester filament production is helpful.

Polyester filaments and their development by region



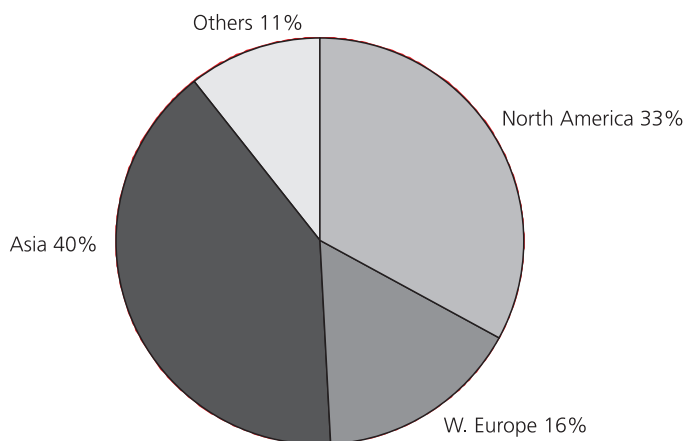
d) Polyamide Fibers

A favorable 4.0% increase to 3.94 million tonnes in line with volume changes in Europe and the Americas characterizes the world picture on polyamide fibers.

The Asian share in world production stagnated at 40%. While the PR China made a 11.5% higher contribution, the production in Japan declined by 22.5%. All other polyamide-producing nations have witnessed favorable conditions in terms of output volume.

As in the polyester industry, the European production was 2.9% lower than in 2001. Despite a double-digit increase in Italy and a 7.4% growth in Turkey, the entire Western European region declined by 1.0%. An approximately 16% decline in the Community of Independent States is mainly responsible for the worsened performance in Eastern Europe.

The American output grew by 10.8% to 1.46 million tonnes due to a significantly improved performance in the Nafta region that raised its volume by 12.4%.



e) Polypropylene Fibers

Last year's output of polypropylene fibers accounted for 2.97 million tonnes, showing the slowest growth rate of all synthetic fibers (3.7%). This market approach excludes nonwovens, monofilaments, tapes and fiberfill.

Contrary to the previous Saurer fiber report, nearly all of the increase in volume came from carpet yarns due to higher utilization rates. The Americas and Europe managed to keep their 90% plus market share in this segment due to a combined growth in output by more than 3%.

The small-scale market for textile filaments made further efforts to enter new applications and market niches supported by comparatively low raw material costs.

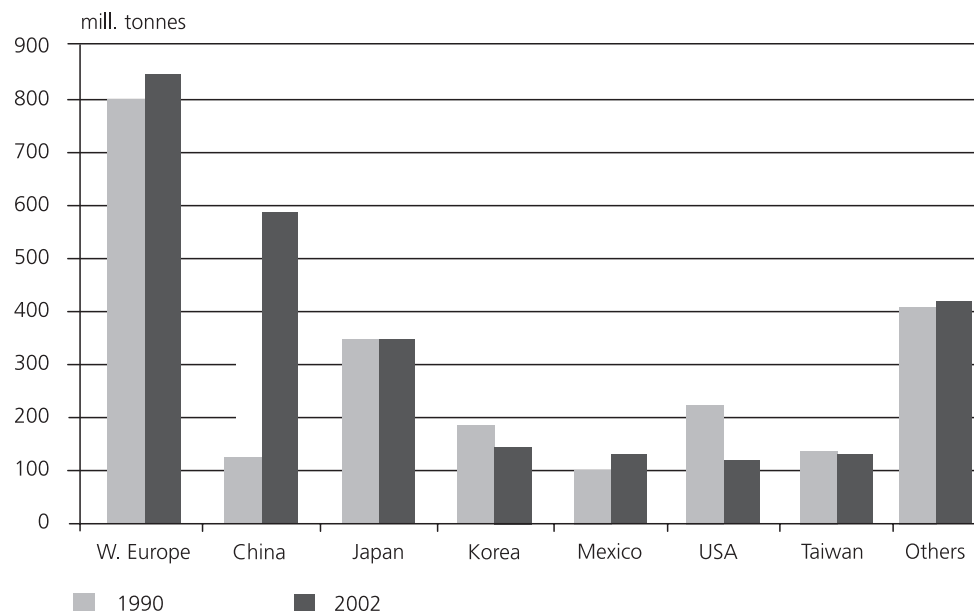
The situation of staple fibers can be described as flat, with a world production of about 1.32 million tonnes. Despite a 1.0% decline in Europe, this region is still the center of this industry sector. The producers in the Americas and Asia performed better by increasing the output by 2.2% and 3.3% respectively. The majority of staple fibers is being used in nonwovens. The lack of demand is caused by an incremental substitution by spunbonded nonwovens.

f) Acrylic Fibers

World production of acrylic fibers has slightly been corrected to a level of 2.55 million tonnes in 2001. Last year's performance showed an above-average increase of 6.9% to 2.73 million tonnes. Asia has gained further market shares and occupies more than half of the previous year's world production.

The leading players in this industry have been the same for the past decade with Western Europe (Turkey included), PR China and Japan accounting for two thirds of world output. While production in all European regions increased, Nafta ended on a 4.0% lower level.

Acrylic fibers and their development by region



A driving force to re-structuring the Chinese acrylic fiber industry has been the extremely high level of imports, absorbing about 15% of world production. The three major goals comprise a reduction in costs, expanding capacity of existing plants and developing new fiber types. The only newcomer, a Mitsubishi joint venture, will come on-stream in 2003. Total capacity is estimated to rise by about 20% in the mid-run to about 775,000 tonnes per year. Last year's output rose 11.2% together with continued rises in imports, leading to a domestic consumption exceeding 1.0 million tonnes.

South Korea's production jumped up by 78.0%. This is more a technical reaction as strikes in 2001 enforced major deactivations. Taiwan, the former winner of these strikes, slightly increased production by 2.5% due to a favorable export performance. India has witnessed a remarkable increase by 13.9% to more than 100,000 tonnes.

The industry in Japan faced mixed conditions, sluggish domestic demand and increasing exports, bringing the total volume back to the year 1990 by a 1.9% decline.

The production in Western Europe including Turkey increased by 4.2% on the back of rising consumption.

g) Cellulosic Fibers

As in the previous years, the market for cellulosic fibers has witnessed a mixed performance. The total amount of cellulosic fibers increased by 2.1% to 2.71 million tonnes. Asia has been the main center of production with a 59% share, followed by Europe accounting for 25% and the Americas with 15%. In regional terms, there has been a strong shifting of production activities from Europe and Nafta, showing a combined 15.7% decline, to Asia with an increased production by 7.8%.

The demand for cellulosic filament yarn continued a well established decline by 4.0% to 0.46 million tonnes. This decline was completely caused by lower demand for acetate filament yarn based on the displacement by synthetics in apparel applications. Viscose textile filament yarn showed a small increase thanks to higher production in PR China.

High-tenacity viscose filament yarn asserted its position due to stable consumption for high-performance tire applications in Western Europe.

Cellulosic staple fiber enjoyed a 3.4% rise in production to 2.25 million tonnes. Viscose staple fiber showed a strong performance by more than 4%; particularly in Europe we have seen production running close to capacity. Demand was also strong outside Europe especially in viscose fibers for nonwovens and modal. Acetate tow, the only application of which is in cigarette filters continued its rising trend, production last year for the first time ever seems to have surpassed the 600,000 tonnes level. Demand is particularly good in PR China where future investments in acetate tow will come on-stream as the local production just meets 40% the domestic consumption.

One bright spot in the cellulosic segment is lyocell, a next-generation fiber. Until just recently, nearly all of the fiber was processed for apparel applications. As it is finding greater use in nonwovens and household textiles the demand for this fiber has gone up sharply. Data on the production is not included in this survey.

h) Other manmade fibers

This group comprises elastane, aramid and carbon fibers with a total production volume of about 0.3 million tonnes. In line with the general increase in fiber consumption elastane fibers showed an above-average growth achieving a world output of approximately 240,000 tonnes. Considering an average waste rate of 5%, the world supply was 230,000 tonnes. Previous year's expansions cooled down from double-digit growth rates since 1996. Due to a variety of new applications resulting in a strong demand, future investments are expected to rise significantly.

The leading areas of consumption are active sportswear, hosiery and swimwear accounting for about two thirds of the world market. New competition will arise due to bicomponent fibers with advantageous properties in manufacturing and ultimately in daily use.

In the fast-growing staple yarn sector for elastic fabrics and knitwear for outer wear, elastic twisted yarns and Core as well as Siro-yarns prevail. The ElastoTwist® Balloonless Technology has to be pointed out especially, where the elastane lies untwisted in the core and is free to move opposite the covering yarn. Therefore, the advantage in ElastoTwist® yarns is that always a finer elastane can be used compared to Core yarns. Fabrics made of ElastoTwist® yarns are distinguished by highest quality and their excellent recovery capability.

Aramids are a family of nylons, used to make things like bullet-proof vests or fire-proof clothing. Additional applications are in optical fiber and tire-reinforcement. Last year's production is estimated to be about 35,000 tonnes. The U.S. based DuPont and the Japanese Teijin Twaron dominate this industry. Investments to further expand the production capacities coming on-stream in 2002/03 will secure their unquestioned leadership.

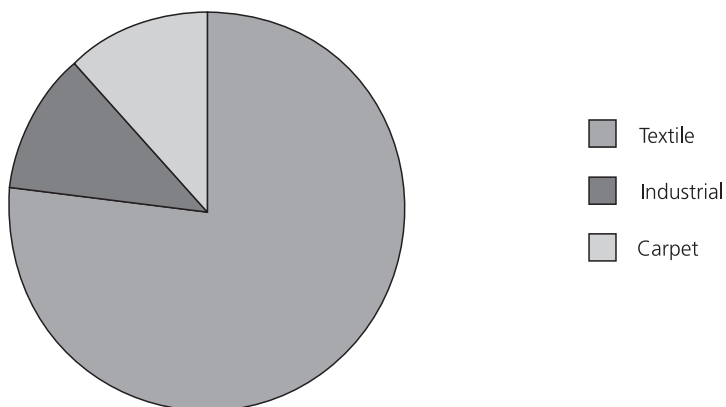
Global production of carbon fibers is estimated at below 20,000 tonnes. PITCH based carbon fibers have lower mechanical properties and are therefore rarely used in critical structural applications. PAN based carbon fibers are under continual development and are used in composites to make materials of great strength and lightness. Although we see nameplate capacity exceeding annual production by roughly 40%, new expansion investments have been announced, i.e. Mitsubishi Rayon Group by 1,300 tonnes and the French Soficar by 1,800 tonnes planned for start-up in August 2004. Industrial end-uses, recreation applications and aerospace are the main markets. The greatest challenge of this industry may be in automotive applications. Entering such a big-volume market will bring the fiber prices significantly down. Non-affordable prices have been the major obstacle for stepping into new civilian markets.

5. Filament Yarn

Last year's output of filament yarn was 18.02 million tonnes. The 6.7% increase came mainly due to a stronger demand for textile and carpet yarns as a result of global recovery. This rise in consumption has been supported by higher production levels as well as a worldwide de-stocking. PR China and Western Europe are estimated to be the only stock building regions.

The world filament yarn market comprises cellulosic and synthetic fibers for textile, industrial and carpet applications. The relative structure of these end-uses is shown below:

Applications for filament yarns



a) Textile Yarn

The textile filament yarn segment serves a broad range of applications from apparel to home textiles. An example of a subarea of this branche may point out the weight of this industry. The final consumer market for clothing and footwear expenditure is exceeding \$1,000,000,000,000 annually.

Textile filaments have shown the strongest increase in production by 7.5% to roughly 13.8 million tonnes. More than 80% of the textile end-uses come from polyester, that managed to further grow by 8.3% to 11.4 million tonnes. About 40% of the world polyester textile filaments are being manufactured in PR China, which continued to increase production by 22%. In the second half of 2002, investments for new capacities in PR China reached an all-time high. However, a remarkable number of old machines have been modernized. As a result, PR China has predominantly state of the art equipment making this segment the most modern industry in the world. Particularly, small-scale producers are making investments to increase efficiency in order to compete with big volume suppliers like the Sinopec group of companies. Although, the focus is still on commodity yarns, a tendency to expand in specialities is noteworthy. The main interest in Asia as well as in Europe applies for the range of the micro and supermicro filaments.

Polyamide textile filaments rose by 5.0% to 1.7 million tonnes with a decreasing consumption for fine yarns used in stockings. This decline was more than offset by favorable conditions for coarser yarns and micro filaments for underwear and sports clothing.

Viscose textile filament yarns continued to decline by 3.7% to below 0.4 million tonnes.

Polypropylene filaments, predominantly used in carpets, showed a further tendency to enter new market niches for textile applications. Trials on new end-uses especially occur in Europe and Asia. Based on the knowledge to produce coarser sewing threads for big bags, textile related ones may soon be ready for marketing. The demand for upholstery and sportive textiles continued to show a healthy growth.

According to the spinning process, textile yarns are split into in POY and FDY. Partially oriented yarns, accounting for about 75% of the world market, require further processing before these yarns can be used in the manufacture of fabrics. With respect to the volume, texturing is the most popular process to finally draw the yarns together with giving the yarn a comfortable feeling called "textile touch".

This industry has witnessed a 12% boom in shipments of texturing machines compared to 2001 with in total about 730 machines. In line with strong expansions in the POY segment, PR China was again the unquestioned destination for texturing machines. The share of last year's shipments to PR China accounted for about 60%. The group of nations comprising Taiwan, India and Turkey received in total a little bit more than 20% of the shipments. While the Americas hardly participated in this global expansion, Italy has taken the leading position in Western Europe.

Two issues have been raised by the industry, resulting from the economical side as well as changes in the upstream spinning sector. We have seen an even worsening pressure on margins as the prices for crude oil and fiber intermediates have gone up. The texturing units could often not pass on the increased POY filament prices to their customers. In the second half of 2002, eroded margins have led to a reduction in manufacturing and a delay in investments. The impact will be visible in 2003 with a cooled down availability of new capacity. The second issue derives from the growth in spinning speciality yarns. Future decisions on investments will consider the following aspects to a greater extent: efficiency, operator convenience, flexibility and less consumption of energy.

b) Industrial Yarn

This market essentially comprises polyester, polyamide, polypropylene and viscose yarns. They are predominantly used in the automotive industry as reinforcing or composite materials. As the world production of cars and light trucks has gone up by 4.4% to almost 58 million units, the consumption of industrial yarns increased at a slower rate of 1.3% to 2.1 million tonnes.

The global industry structure has not fundamentally changed yet, but a tendency to establish Asian market strength and conditions as we can observe in the textile yarn business is becoming effective in the mid-run. Polyamide, losing market share, still covers the majority of the world demand, followed by polyester comprising a 46% market share. Viscose industrial yarn, mainly part of high-performance and high-speed tires in Western Europe, continued to slightly decline as in the previous years.

The manufacturing activities in Western Europe remained at least at last year's level, while Turkey enjoyed a rising production of polyamide and polyester industrial yarns. The development in Eastern Europe can be described as flat, the encouraging level from 2001 fell back by about 11%.

The 3.7% decline in the Americas was more than offset by strong output increases in Asia, mainly in PR China, South Korea and Taiwan.

The favorable climate in the Chinese industry results from an increasing local consumption. Domestic polyester production has gone up by 16.0% and net imports nearly doubled to approximately 11,500 tonnes.

On the back of the booming Chinese automotive industry, efforts to further reduce the dependency of high-quality tire cord yarn imports are visible. The strategic position of this segment will gain further attractiveness due to governmental planning to build 5,000 miles of roads and motor highways annually within the next couple of years. From that point of view, it is unquestioned that the Chinese polyester tire cord yarn capacity, particularly HMLS yarns, will jump up in the years to come.

The polyester industry in South Korea and Taiwan was mainly pushed by export-oriented production. In South Korea, while production increased by 22.0% to 150,000 tonnes exports jumped up by 50.0% representing an export share of close to 40%. The Taiwanese output was driven by shipments abroad to an even greater extent. The 12.5% rise in volume accounted for an export ratio of 78% of domestic production.

Meanwhile, leading and well-established producers in the U.S. and South Korea are observing this new market development very carefully, but holding back investments in their home markets. Despite the declining production in the Russian Federation, the favorable development in this industry will continue. Contrary to PR China, modernizing of outdated and inefficient polyamide 6-equipment will be in the center of the future activities.

Twisting has a wide range of uses from apparel to carpet and technical applications. For industrial applications, filament yarns are almost exclusively twisted and cabled. The industry has witnessed a strong recovery with shipments of machinery increasing by almost 80%. This segment is more than 50% dependent on the tire production.

The year 2002 has been a good year in the field of tire cord. In total a capacity of 60,000 tonnes has been put into operation with regard to Direct Cabling machines. Out of this approximately 80% has been for replacement of old Ring twisting machines while the remaining capacity went into new tire cord plants. The ten leading tire producing countries comprise about 70% of global capacity. Out of them, the U.S., PR China, South Korea, India and Brazil participated stronger than global recovery in this segment. As mentioned above, Russia will gain further relevance. Additionally, small-scale markets like Argentina, Turkey and Vietnam intend to integrate forward to a greater extent.

The sector of industrial yarns has been very much different to tire cord. Despite a declining textile industry in Europe, technical applications have offered new opportunities for innovative companies.

End-uses such as geotextiles, MRG, conveyor belts, driving belts, hoses for hydraulics, fire hoses etc, pneumatic cushioning, tarpaulins, flat belts, ropes, protective cloth and artificial grass for all kind of outdoor sportfields, have become a very much promising market. These applications are also growing worldwide. However, Europe is still growing and at least defending its leading position due to a great strength in innovations. This proves the growing number of companies exhibiting at the Techtexile in April at Frankfurt as well as the increasing number of visitors.

c) Carpet Yarn

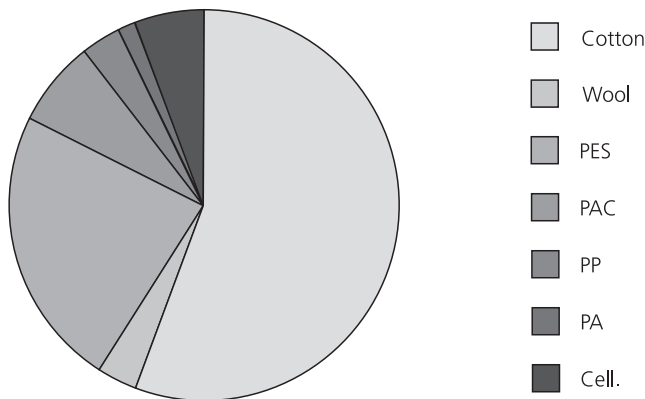
Strong consumer demands for carpet yarns have led to an increase of world production by 6.7% to 2.1 million tonnes. The raised output level, especially in polyamide, was attributed to higher utilization rates.

As already indicated in the previous year's fiber report, the demand for upgrading and some expansion of capacity has continued, especially in the U.S. and Turkey. In 2002, we have seen polyamide carpet yarn production to rise by 7.7% to 0.94 million tonnes, while polypropylene increased by 6.0% to 1.16 million tonnes. As in the past, the center of the carpet yarn manufacturing has been in Europe and North America with a combined market share of about 88%.

While new installations in the U.S. have been observed for both segments, Turkey and the Middle East were focussed on polypropylene. Stronger competition for Belgium, the leading European carpet yarn nation, will arise as Turkey is to diversify into polyamide carpet yarn manufacturing.

6. Spun Yarn

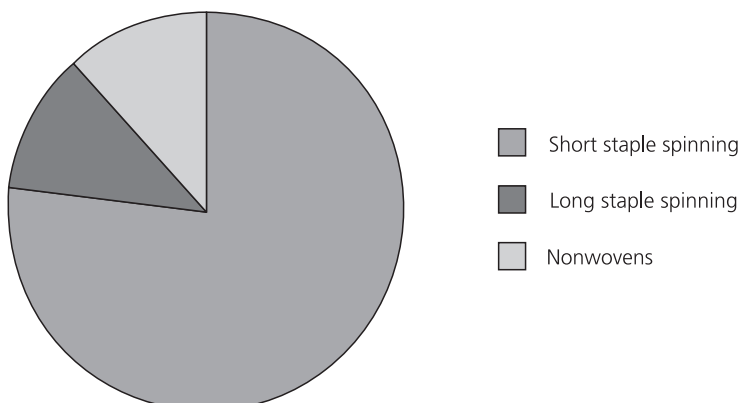
Staple fibers are the raw material for the spun yarn and nonwovens production. The chart below illustrates the ratios of the different types:



Staple fiber supply

The global amount of staple fibers being further processed was 38.01 million tonnes with natural fibers taking in a 59% share. With the exception of wool, the volume of all the other types rose in a range from 0.9% to 6.9%.

The global supply of staple fibers can be split into the following three subsequent processing technologies:



Staple fiber consumption

a) Short staple spinning is the most popular application, predominantly using cotton, followed by about 25% synthetic staple and 5% cellulosic staples. The world production is estimated to be close to 30 million tonnes, showing an increase versus 2001 of nearly 4%. Out of that total production two thirds are spun on the ring spinning cotton-system.

The most frequently used production methods are ring and rotor spinning. Both segments have witnessed rising investments with a stronger growth in the open-end spinning market. As we have seen shipments slightly exceeding 4 million short staple spindles rising by about 7.0%, open-end rotors showed a double-digit increase by 38.5% to 360,000.

The leading group of nations in last year's ring spinning investments comprises PR China, India, Pakistan, Turkey, Syria and Bangladesh totalling more than 80% of the previous year's market.

For quality reasons the rotor spinning industry is predominantly demanding automated systems, on a global basis the market share accounts for about 80%. This pattern of consumption is remarkable for the PR China, where previous year's shipments of automated positions tripled. An increase of these sophisticated machines has also been observed in Turkey, whereas in the U.S. and Europe the demand strongly decreased. High-volume capacities in denim fabrics have led to stiffer competition, the more so as the global jeans market is now decreasing. Especially, Taiwanese denim producers last year benefited from a surge in demand from the U.S. and Hong Kong. This results in a further differentiation of the yarn in terms of structure and quality. Future growth potential is still in knitting applications.

The group of nations comprising Brazil, PR China, India, Indonesia, Pakistan, Turkey and the U.S. account for about 75% of the world short staple yarn production. It seems that all of them have increased cotton-system output. Apart from Indonesia, which hardly produces any raw cotton, the other leading producing countries are more or less self-sufficient. Due to the crisis in the textile industry, the U.S. is continuing to expand shipments of raw cotton.

Despite this bottleneck in raw materials in Indonesia, the spinning industry is still promising due to low labor costs and skilled workers. Fuelled by new investment loans from the local government bank, we saw a number of about a quarter million spindles being put into operation last year. As a consequence of the Indonesian cotton supplies from abroad, the country has the highest proportion of manmade fibers being processed into spun yarn amongst this group.

Brazil plans to expand the planted area within two years by 70% to take advantage of the favorable situation in the textile industry caused by the exchange rate and positive quota negotiations with the EU. To cope with the foreign requirements, there is an apparent trend to produce more finer count yarns. In 1992, the share of finer counts was 27% as compared to nearly 45% last year.

Although India's textile exports have gone up by 8% to \$13 billion, the number of installed spindles remained unchanged. With investments in the range of the previous years, this proves India's necessity to modernize its equipment. As per December 2002, 35.8 million spindles were installed, of which close to 3 million were in more than 1,100 small-scale spinning units.

Meanwhile, the long-term decline in Taiwan, South Korea and Japan continued. Taiwan formerly possessed about 5.6 million spindles, of which currently less than 1.5 million are

still in operation. This reduction will go on with less than 1 million spindles installed in the short run. However, a small portion of used rotor spinning equipment was newly put into operation last year. Due to governmental regulations imposing investment limits for PR China, Taiwanese investors were encouraged to shift production to South America, South Africa and Vietnam.

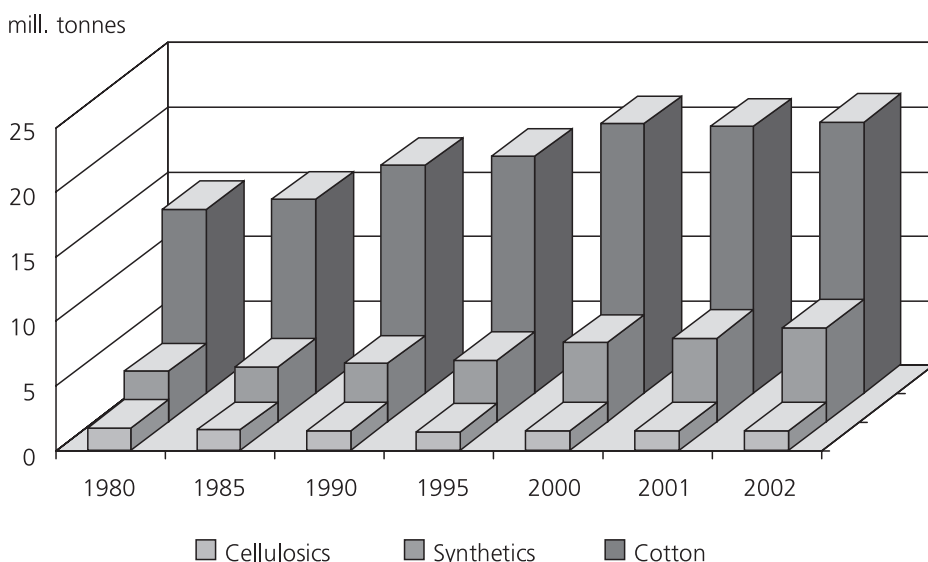
South Korea, which nearly halved its short-staple equipment in the last decade to roughly 1.8 million spindles, now has several offshore cotton facilities with more than 1.2 million spindles at its disposal. From a strategic point of view, the most foreign equipment is located in Uzbekistan – a country with the fifth largest raw cotton production exceeding domestic use by nearly three times.

Japan’s textile industry, ranking fourth in international labor cost comparison in spinning and weaving industry, faced several adverse circumstances supporting the further decline in production. In the light of the most serious depression, additional pressure comes from high volume imports of cotton made-up goods resulting in further reductions of domestic cotton-type spindle capacity by more than 7% to 2.65 million and shifting production facilities abroad.

A similar development can be observed in Italy shifting equipment to Eastern Europe and closing spinning plants due to high labor costs in Italy.

Although on a small-scale basis, the textile industry plays an important role in the development of countries, i.e. Bangladesh. It is the largest manufacturing sector contributing 5% to the country’s GDP and providing 50% of industrial employment. At present, Bangladesh has about 160 spinning mills. Industry experts recommend a further 70 units to be put into operation with a total of 1.8 million spindles. In the second half of 2002 the climate has improved and new dimensions in the spinning industry are most likely soon to come. A restriction as of today may be, that the country only produces 10-15% of the cotton requirement of the local spinning mills. Additional countries gaining future attractiveness will be Syria and Vietnam.

A market showing further signs of recovery is Russia. After the disintegration of the former USSR, the textile industry entered into a drastic decline in production. Last year’s performance is believed to have increased.

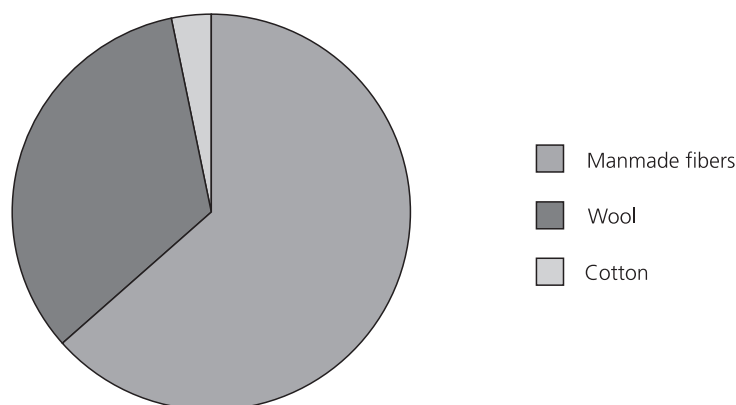


Consumption in short staple spinning

The chart above summarizes the development in the short staple spinning industry. Cotton is the most important material comprising a share of roughly 70%. For the given period, the average annual growth rate of all short staple yarn accounts for 1.9%, with synthetics showing above average increases.

b) The wool textile industry is estimated to be in the range of close to 4 million tonnes of long staple yarn. The consumption of materials by this industry are shown below:

Wool textile industry



Official figures only take into consideration worsted and woollen yarns without any blends, coming to a global production of approximately 1.5 million tonnes. As already illustrated, manmade fibers (acrylic, polyamide, polyester and other fibers) play an important role in terms of volume. This industry covers a broad range of final consumer demand, from fine yarns for weaving high-quality clothing to medium and coarser yarns for blankets, carpets, knitting and furnishing applications.

Last year's investments significantly declined by more than 20% to roughly 350,000 long staple spindles. The two leading markets in terms of installed capacity are PR China and Italy. While we have seen cooling down Chinese installations, there were no corresponding activities in the Italian market. While Chinese investors are only entitled to make investments for replacement or modernizing, Italian companies continued shifting machines to Eastern Europe or closing facilities due to high labor costs. Almost a quarter of last year's shipments went to Turkey, which further expanded its capacities.

The heterogeneity of this industry in Europe is exemplified with the Italian and Turkish industry. While Italy processes 70% woollen yarns at an average count of Nm 40 and 30% acrylic yarns at an average count of Nm 28 in the wool industry, Turkey concentrates to 90% on manmade fibers at the woollen spinning stage.

Due to a strong demand for woollen underwear and T-Shirts, the Chinese industry orients towards woollen yarns at an average count of Nm 60 to a great extent. These requirements derive from climatic conditions.

c) Winding is a production step in the ringspinning technology to produce ready-for-sale cross-wound packages. The spectrum of yarns is broad, ranging from cotton, cotton blends and 100%-non-cotton through wool to exotic yarn constructions.

After a temporarily weakness in investments, we have seen a strong market upturn exceeding even the level of the year 2000. On a world basis, about 130,000 positions have been commissioned. The majority of shipments had Asian destinations, following the general trend of shifting textile capacity to the developing countries in Asia.

About two thirds of the newly installed capacity went to PR China, India and Pakistan. As the Turkish textile industry witnessed an extremely positive turnaround after the crisis in the banking sector in 2001, the country ranks fourth in terms of deliveries. As already in the 90's, Syria enjoyed an above average increase in capacity. Favored by a governmental investment program, Italy also showed increasing demand in new equipment. Although obstacles in the development of the Vietnamese textile industry already became apparent, the extension and upgrading process continued.

Indonesia, South Korea and Thailand confirmed their long-term downward trend, participating in the global recovery on a small-scale level only. Meanwhile, investments in the Nafta region dropped to almost zero.

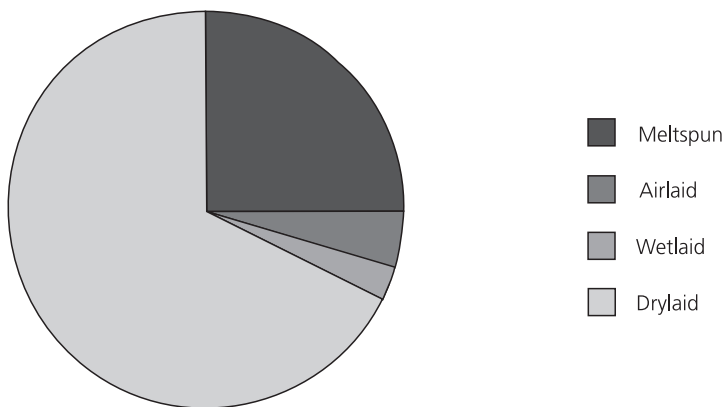
7. Nonwovens

Nonwoven fabrics are defined as sheet or web structures bonded together by entangling fiber or filaments (and by perforating films) mechanically, thermally or chemically. They are not made by weaving or knitting and do not necessarily require converting the fibers to yarn.

The following world picture of the nonwovens industry mainly bases on a presentation given at a textile conference *, that has taken into consideration a broader approach with integrating fiber filling, wadding, needled felt, and others.

The world nonwovens industry had an estimated global production in 2002 in the range of 6.0 million tonnes, equivalent to more than 100 billion square meters. The volume in square meters is believed to have grown faster than tonnage reflecting changes in consumer behaviour demanding lighter weights of coverstock materials.

This industry can be split into the following four technologies:

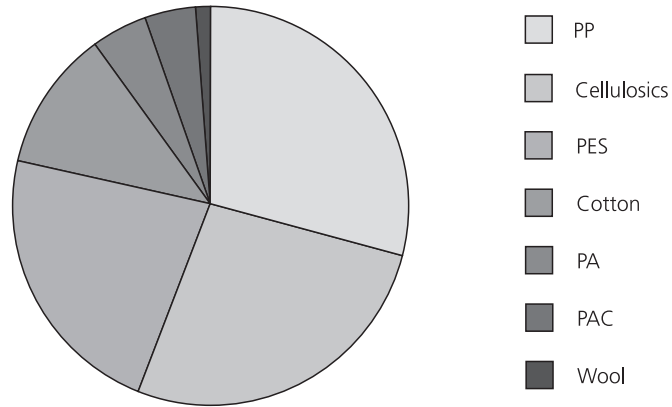


Nonwovens industry

This industry mainly produces staple or pulp based nonwovens, accounting for about two thirds of the world market. This sector of industry consumed about 4 million tonnes of staple fibers.

* Development of the world fiber market in the previous 20 years – Staple fibers compared to filament yarns, Denkdorf, November 2001, Mag. Josef Bachinger, Lenzing AG, Austria

**Staple fiber
consumption in
nonwovens industry**



The applications above mentioned, which are not being monitored by nonwovens associations, are a major consumer of polyester, polypropylene and cellulosic staple fibers for filling end-uses.

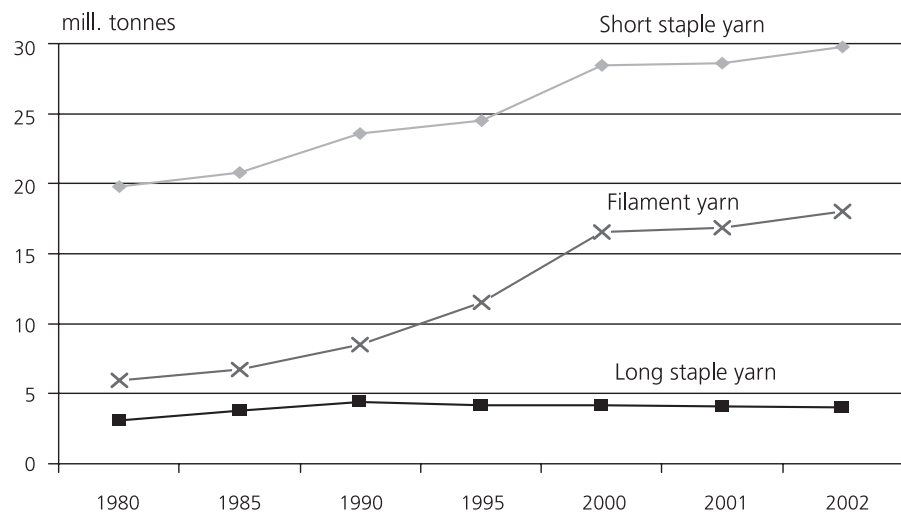
Further technologies in the nonwovens production comprise meltspinning, of which spunbonds are the most popular method. Last year the global spunbonded production just exceeded 1 million tonnes with polypropylene taking the lead with a 75% market share. About 0.4 million tonnes were airlaid and wetlaid nonwovens. Data on the production is not included in the statistical survey.

Driven by a rapid growth in PR China, the Asian output volume has come close to Western Europe and North America. PR China, Japan, South Korea and Taiwan are the four largest nonwovens-producing Asian countries. PR China's above-average growth rates have been fuelled by the rapid industrialization due to the key drivers being consumer and government spendings.

8. World yarn production

The global amount of filament and spun yarns accounted for 51.8 million tonnes showing a 4.3% increase over 2001. To make a bridge from filament to spun yarns, the graph below shows the long-term development.

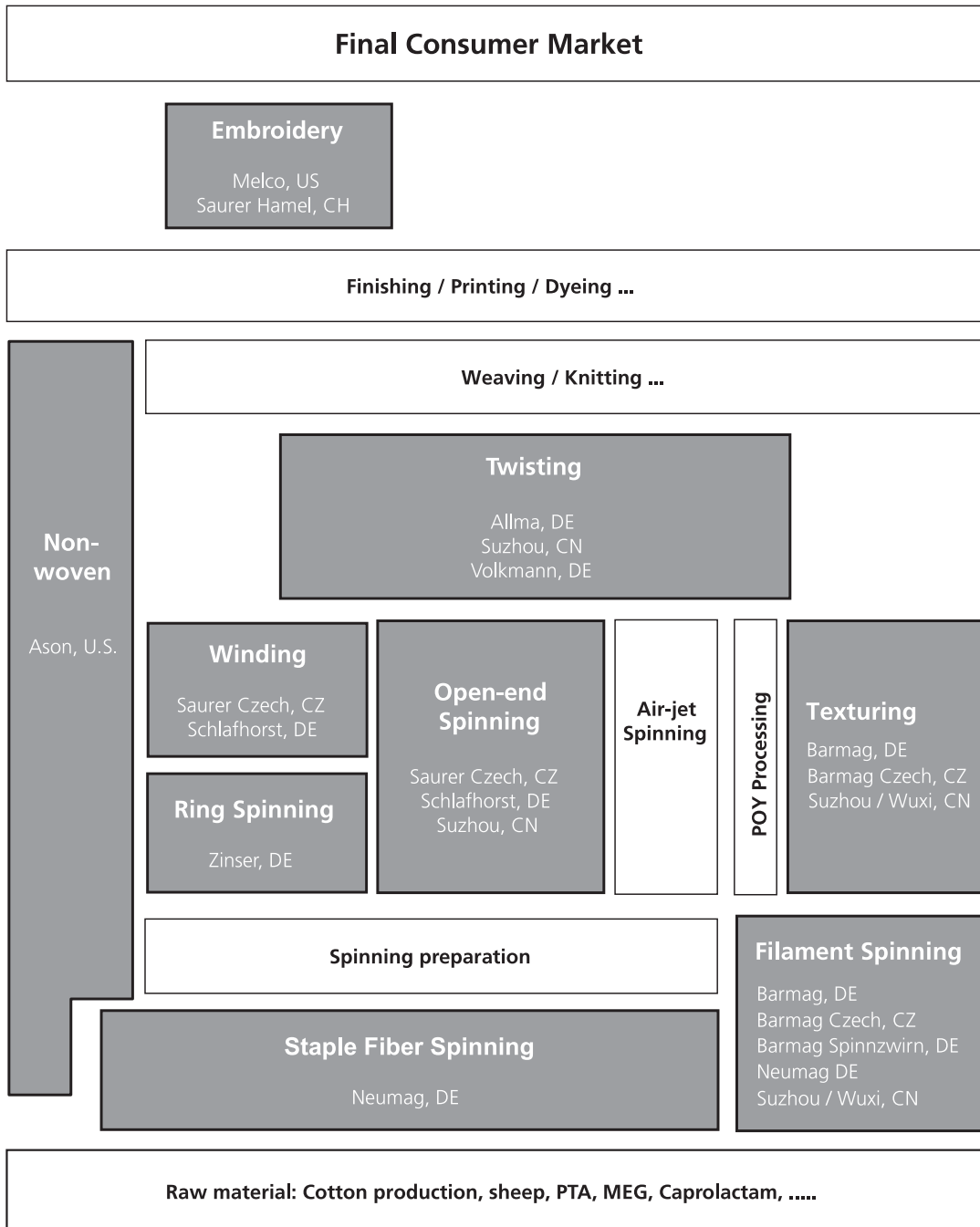
World yarn production



Although short staple yarn still dominates the world market with a 57.5% share, filament yarns have shown a more dynamic development over the period with an average annual growth rate of 5.1% comprising a 34.8% share compared with 20.7% in 1980.

Saurer

Competency along the textile chain



World Fiber Production

Year	Natural *	Manmade '000 tonnes	TOTAL	Population billion	Consumption kg / capita
2002	22.463	33.657	56.120	6,23	9,0
2001	21.981	31.730	53.711	6,15	8,7
2000	21.504	31.147	52.651	6,08	8,7
1999	21.266	29.400	50.666	6,00	8,4
1998	19.990	28.296	48.286	5,92	8,2
1997	20.189	27.523	47.712	5,85	8,2
1996	20.237	24.680	44.917	5,77	7,8
1995	19.600	23.594	43.194	5,69	7,6
1994	19.461	22.613	42.074	5,61	7,5
1993	19.631	20.765	40.396	5,53	7,3
1992	19.673	20.481	40.154	5,45	7,4
1991	19.740	19.738	39.478	5,37	7,4
1990	21.460	19.380	40.840	5,28	7,7
1989	21.409	18.944	40.353	5,20	7,8
1988	21.072	18.543	39.615	5,11	7,8
1987	20.638	17.864	38.502	5,02	7,7
1986	20.743	16.886	37.629	4,94	7,6
1985	17.732	16.259	33.991	4,85	7,0
1984	16.240	15.764	32.004	4,77	6,7
1983	15.705	14.850	30.555	4,69	6,5
1982	15.469	13.597	29.066	4,61	6,3
1981	15.189	14.631	29.820	4,53	6,6
1980	15.227	14.301	29.528	4,46	6,6
1975	13.349	10.677	24.026	4,09	5,9
1970	13.484	8.394	21.878	3,71	5,9
1965	13.401	5.486	18.887	3,35	5,6
1960	11.607	3.367	14.974	3,04	4,9
1950	7.723	1.681	9.404	2,56	3,7

* Ramie, flax, hemp, jute, sisal and coir not included

| Saurer

World Production of Natural Fibers

Year	Natural Fibers *				± in %
	'000 tonnes	Cotton	Wool	Silk	
2002	21.069	1.304	90	22.463	2,2%
2001	20.577	1.316	88	21.981	2,2%
2000	20.077	1.342	85	21.504	1,1%
1999	19.820	1.363	83	21.266	6,4%
1998	18.527	1.386	77	19.990	-1,0%
1997	18.690	1.424	75	20.189	-0,2%
1996	18.727	1.439	71	20.237	3,3%
1995	17.998	1.510	92	19.600	0,7%
1994	17.774	1.618	69	19.461	-0,9%
1993	17.885	1.678	68	19.631	-0,2%
1992	17.870	1.736	67	19.673	-0,3%
1991	17.745	1.928	67	19.740	-8,0%
1990	19.406	1.988	66	21.460	0,2%
1989	19.388	1.955	66	21.409	1,6%
1988	19.122	1.886	64	21.072	2,1%
1987	18.743	1.832	63	20.638	-0,5%
1986	18.891	1.789	63	20.743	17,0%
1985	15.929	1.744	59	17.732	9,2%
1984	14.440	1.744	56	16.240	3,4%
1983	13.993	1.657	55	15.705	1,5%
1982	13.782	1.632	55	15.469	1,8%
1981	13.516	1.616	57	15.189	-0,2%
1980	13.575	1.599	53	15.227	2,7%
1975	11.723	1.578	48	13.349	-0,2%
1970	11.784	1.659	41	13.484	0,1%
1965	11.884	1.484	33	13.401	2,9%
1960	10.113	1.463	31	11.607	4,2%
1950	6.647	1.057	19	7.723	n/a

* Ramie, flax, hemp, jute, sisal and coir not included

| Saurer

World Production of Manmade Fibers

Year	Cellulosics		Manmade Fibers		TOTAL	
	'000 tonnes					
2002	2.715	2,1%	30.942	6,4%	33.657	6,1%
2001	2.659	-3,6%	29.071	2,4%	31.730	1,9%
2000	2.758	6,9%	28.389	5,8%	31.147	5,9%
1999	2.579	-7,1%	26.821	5,1%	29.400	3,9%
1998	2.775	-3,6%	25.521	3,6%	28.296	2,8%
1997	2.879	0,3%	24.644	13,0%	27.523	11,5%
1996	2.870	-3,5%	21.810	5,8%	24.680	4,6%
1995	2.973	4,9%	20.621	4,3%	23.594	4,3%
1994	2.834	3,3%	19.779	9,7%	22.613	8,9%
1993	2.743	-1,6%	18.022	1,9%	20.765	1,4%
1992	2.788	-4,7%	17.693	5,2%	20.481	3,8%
1991	2.924	-8,3%	16.814	3,8%	19.738	1,8%
1990	3.189	-4,6%	16.191	3,8%	19.380	2,3%
1989	3.342	-0,9%	15.602	2,8%	18.944	2,2%
1988	3.371	2,6%	15.172	4,1%	18.543	3,8%
1987	3.286	1,4%	14.578	6,8%	17.864	5,8%
1986	3.241	0,2%	13.645	4,8%	16.886	3,9%
1985	3.234	-4,5%	13.025	5,2%	16.259	3,1%
1984	3.387	2,3%	12.377	7,3%	15.764	6,2%
1983	3.310	3,6%	11.540	10,9%	14.850	9,2%
1982	3.194	-7,8%	10.403	-6,8%	13.597	-7,1%
1981	3.464	-1,6%	11.167	3,6%	14.631	2,3%
1980	3.522	1,8%	10.779	7,7%	14.301	6,0%
1975	3.216	-2,2%	7.461	9,2%	10.677	4,9%
1970	3.585	1,0%	4.809	18,7%	8.394	8,9%
1965	3.446	5,3%	2.040	23,7%	5.486	10,3%
1960	2.664	5,2%	703	58,6%	3.367	14,9%
1950	1.611	n/a	70	n/a	1.681	n/a

Global Fiber Consumption

	Cotton	Wool	Synthetics	Cellulosics	TOTAL
1960	68%	10%	5%	18%	14.974
1970	54%	8%	22%	16%	21.878
1975	49%	7%	31%	13%	24.026
1980	46%	5%	37%	12%	29.528
1985	47%	5%	38%	10%	33.991
1986	50%	5%	36%	9%	37.629
1987	49%	5%	38%	9%	38.502
1988	48%	5%	38%	9%	39.615
1989	48%	5%	39%	8%	40.353
1990	48%	5%	40%	8%	40.840
1991	45%	5%	43%	7%	39.478
1992	45%	4%	44%	7%	40.154
1993	44%	4%	45%	7%	40.396
1994	42%	4%	47%	7%	42.074
1995	42%	3%	48%	7%	43.194
1996	42%	3%	49%	6%	44.917
1997	39%	3%	52%	6%	47.712
1998	38%	3%	53%	6%	48.286
1999	39%	3%	53%	5%	50.666
2000	38%	3%	54%	5%	52.651
2001	38%	2%	54%	5%	53.711
2002	38%	2%	55%	5%	56.120

| Saurer

World Production of Manmade Fibers

Year	Cellulosics			Synthetics		
	'000 tonnes	Filament	Staple	TOTAL	Filament	Staple
2002	461	2.254	2.715	17.557	13.385	30.942
2001	480	2.179	2.659	16.411	12.660	29.071
2000	533	2.225	2.758	15.995	12.394	28.389
1999	527	2.052	2.579	15.040	11.781	26.821
1998	581	2.194	2.775	14.141	11.380	25.521
1997	611	2.268	2.879	13.235	11.409	24.644
1996	640	2.230	2.870	11.594	10.216	21.810
1995	654	2.319	2.973	10.903	9.718	20.621
1994	630	2.204	2.834	9.957	9.822	19.779
1993	652	2.091	2.743	8.925	9.097	18.022
1992	695	2.093	2.788	8.577	9.116	17.693
1991	759	2.165	2.924	8.025	8.789	16.814
1990	837	2.352	3.189	7.637	8.554	16.191
1989	927	2.415	3.342	7.156	8.446	15.602
1988	950	2.421	3.371	6.855	8.317	15.172
1987	915	2.371	3.286	6.436	8.142	14.578
1986	934	2.307	3.241	6.026	7.619	13.645
1985	933	2.301	3.234	5.792	7.233	13.025
1984	959	2.428	3.387	5.444	6.933	12.377
1983	983	2.327	3.310	5.065	6.475	11.540
1982	967	2.227	3.194	4.612	5.791	10.403
1981	1.053	2.411	3.464	4.986	6.181	11.167
1980	1.130	2.392	3.522	4.854	5.925	10.779
1975	1.148	2.068	3.216	3.790	3.671	7.461
1970	1.391	2.194	3.585	2.398	2.411	4.809
1965	1.372	2.074	3.446	1.124	916	2.040
1960	1.131	1.533	2.664	417	286	703
1950	872	739	1.611	54	16	70

World Production of Synthetic Fibers

	Polyester	Polyamide	Acrylics	Others	TOTAL
1970	34%	40%	21%	5%	4.809
1975	45%	33%	19%	3%	7.461
1980	47%	30%	19%	4%	10.779
1985	50%	26%	18%	6%	13.025
1986	50%	26%	18%	6%	13.645
1987	52%	25%	17%	6%	14.578
1988	53%	25%	16%	6%	15.172
1989	54%	24%	15%	7%	15.602
1990	53%	24%	14%	9%	16.191
1991	54%	22%	14%	10%	16.814
1992	56%	21%	13%	10%	17.693
1993	57%	20%	13%	10%	18.022
1994	58%	18%	13%	11%	19.779
1995	60%	19%	12%	9%	20.621
1996	61%	18%	12%	9%	21.810
1997	63%	16%	11%	10%	24.644
1998	65%	15%	10%	10%	25.521
1999	66%	15%	9%	10%	26.821
2000	66%	14%	9%	11%	28.389
2001	67%	13%	9%	11%	29.071
2002	68%	13%	9%	10%	30.942

| Saurer

World Production of Manmade Fibers

mill. tonnes	1995	1996	1997	1998	1999	2000	2001	2002
PR China	3,2	3,5	4,3	5,2	5,8	6,7	8,2	9,9
U.S.	4,2	4,2	4,4	4,3	4,1	4,2	3,6	3,8
Taiwan	2,6	2,7	3,1	3,3	3,1	3,2	3,1	3,2
South Korea	1,9	2,1	2,5	2,5	2,7	2,8	2,4	2,4
India	1,0	1,2	1,5	1,6	1,8	1,9	1,9	2,0
Indonesia	0,9	1,0	1,1	1,1	1,2	1,4	1,6	1,6
Japan	1,7	1,7	1,8	1,7	1,5	1,5	1,5	1,3
SUBTOTAL	15,5	16,4	18,7	19,7	20,3	21,7	22,2	24,1
ROW	8,1	8,3	8,8	8,6	9,1	9,4	9,4	9,6
TOTAL	23,6	24,7	27,5	28,3	29,4	31,1	31,7	33,7

| Saurer

mill. tonnes	1995	1996	1997	1998	1999	2000	2001	2002
PES FY	6,7	7,1	8,5	9,4	10,1	10,7	11,2	12,1
PES SF	5,6	6,0	6,9	7,0	7,6	8,1	8,4	8,9
PA FY	3,2	3,3	3,5	3,4	3,4	3,6	3,3	3,5
PA SF	0,6	0,6	0,6	0,6	0,5	0,5	0,4	0,5
PP	2,0	2,2	2,4	2,5	2,6	2,8	2,9	3,0
PAC	2,4	2,5	2,7	2,5	2,5	2,6	2,6	2,7
Cellulosics	3,0	2,9	2,9	2,8	2,6	2,8	2,7	2,7
Others	0,1	0,1	0,1	0,2	0,2	0,2	0,3	0,3
TOTAL	23,6	24,7	27,5	28,3	29,4	31,1	31,7	33,7

| Saurer

Top 3 Producing Countries

PES FY	2002	% of world	2000	% of world	1995	% of world
PR China	4.770	39,3%	3.152	29,5%	1.022	15,7%
Taiwan	1.547	12,7%	1.525	14,3%	1.225	18,8%
South Korea	1.318	10,9%	1.517	14,2%	947	14,5%
TOTAL	7.635	62,9%	6.194	58,0%	3.194	49,0%

Unit: '000 tonnes

| Saurer

PES SF	2002	% of world	2000	% of world	1995	% of world
PR China	2.951	33,2%	1.815	22,5%	922	16,5%
U.S.	930	10,5%	1.041	12,9%	1.039	18,6%
Taiwan	884	10,0%	932	11,6%	753	13,5%
TOTAL	4.765	53,7%	3.788	47,0%	2.714	48,6%

Unit: '000 tonnes

| Saurer

PA FY	2002	% of world	2000	% of world	1995	% of world
U.S.	798	23,0%	851	23,8%	830	26,2%
W.Europe *	517	14,9%	582	16,3%	554	17,5%
PR China	440	12,7%	333	9,3%	252	8,0%
TOTAL	1.755	50,5%	1.766	49,4%	1.636	51,7%

Unit: '000 tonnes

| Saurer

PAC SF	2002	% of world	2000	% of world	1995	% of world
W.Europe *	851	31,2%	780	30,4%	883	36,4%
PR China	594	21,8%	475	18,5%	234	9,7%
Japan	358	13,1%	377	14,7%	374	15,4%
TOTAL	1.803	66,0%	1.632	63,6%	1.491	61,5%

Unit: '000 tonnes

| Saurer

* Turkey included

