Linen, or flax, is considered to be the oldest fibre in the world (dyed flax fibres have been found dating back some 36,000 years); then followed cotton (some 8,000 years ago), and linen was reserved for the elite circles in ancient societies. Sometime later came silk. Of all these three natural yarns, it was cotton which became king.

"Wolde you bothe eate your cake, and have your cake?"

In the world of the 21st century, the status of cotton is under threat. Over the past 70 years, it was challenged by upstart synthetics and man-made fibres, all claiming better credentials; today cotton faces the challenge of the green agenda and its use of water resources.

The truth is that there isn't a single fibre that can claim superiority in terms of the environment and sustainability. The real question is: will there be enough yarns and fibres of all types to meet the demands of the next generation? While most companies are concerned about their immediate fabric requirements for the next two or three seasons, should they be concerned about their longer-term survival?

A little bit of Old English, but "Wolde you bothe eate your cake, and have your cake?" was a figure of speech which first appeared back in 1546. Today, the proverb is more recognisable as 'having one's cake and eating it too' — once eaten, it is difficult to retain possession of the cake as well. Its relevance to the world's textile industry becomes more apparent when one appreciates that the textile industry depends heavily on the petrochemical industry and the other increasingly contentious issues of water and its usage.



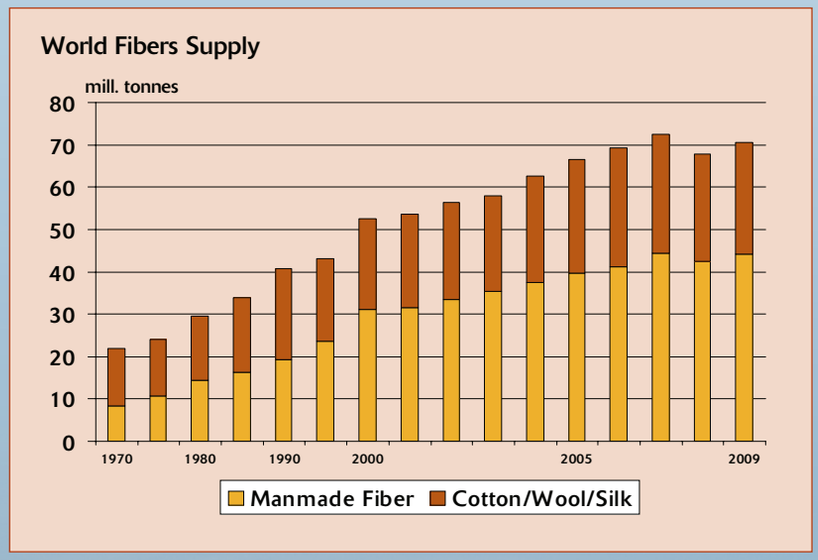
Mature cotton field ripe for harvest.

Shutterstock

"Think of it as a cake," Steven Jesseph said, referring to oil. "We've eaten half of it already and what remains has to last for the rest of time." The CEO of WRAP, the Worldwide Responsible Accredited Production organisation, was referring to the remaining oil reserves dotted around the globe. He had charted the consumption of the fossil resource over the centuries and what was left in each part of the world today. It was quite a sobering thought, although the presenter wasn't trying to spoil the atmosphere of the most recent Beast to Beauty Conference held in London this year. Whilst his presentation targeted the development of the footwear industry, and the production of synthetic, look-alike leather, based as it is on an oil by-product, it also made one think of the multiplicity of fibres that owe their continued development to the oil industry.

Then along came Dr Michiel Scheffer, of the Saxion University of Applied Sciences in the Netherlands, giving a presentation at Autex 2010, the tenth world textile conference, held in Vilnius, Lithuania, in June. His analysis of the fibre industry forecast a worldwide shortage of 10 million tonnes of fibre by 2025. He was already seeing a shortfall in global fibre production back in 2008 (some 1.5 million tonnes), and noting its effect on the cost of fabric prices and therefore clothing — but who is to gainsay his prediction? And it is doubtful if his calculations would have taken into account major natural disasters such as have been witnessed in recent weeks in Pakistan, the world's fourth largest producer of cotton, after China, India and the US. It is estimated that between 15-20% of the country's cotton crop will have been lost in the floods. (In recent years, China, too, has lost high percentages of its cotton crop to floods.)

In his recent presentation, however, the Dutch professor was highlighting the dearth of new fibres that have reached the market in the past decade and more. The only new fibre, one



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of commercial relevance, is PLA, and that was launched, or relaunched, back in 2000 to great fanfare. After all, it was Wallace Hume Carothers, who first made PLA in 1932 when he was a group leader at the DuPont Experimental Station laboratory, near Wilmington, Delaware. He developed a process involving the direct condensation polymerisation of lactic acid in solvents under high vacuum. Ironically, he abandoned the polymer as too low in melting point for fibres and textiles use and went on to develop nylon instead (which brings us back to the petrol business).

Dr Scheffer predicts that global fibre shortage will leave the industry with a 10 million-tonne gap in 15 years time. Changes in the textile supply chain are necessary if production levels are to meet future demand. "There are three major issues," he said. "Cotton is giving way to food in agricultural regions because cotton is not an attractive crop to produce. We also have the problem of peak oil and the future cost and availability of petrochemicals as a source of textiles. Thirdly, there is a waste issue with the whole textile industry, with not nearly enough recycling going on. Germany is the best recycling economy in the world and even there less than 10% of textile products are being recycled at the moment."

PLA could certainly be one possible solution. Although much work needs to be done to make PLA suitable for extensive use in the apparel industry, Dr Scheffer suggested this natural source for polymers could provide around one-third of the shortfall. He said that hygiene and health products would be the easiest area to find additional applications for PLA. This in itself would free up other fibres for use elsewhere in the textile supply chain, in applications such as clothing.

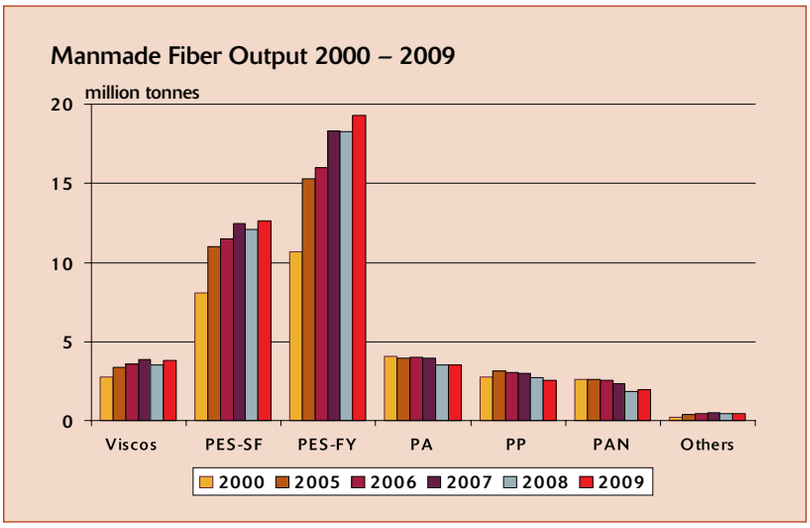
But, in terms of commercial reality, just consider how much investment in time and money went into developing PLA. Would any company today be prepared to make the same sort of financial investment over a similar timeframe? And has the world that much time to wait? (If we can't have our textiles, perhaps we can return to leather as a renewable and long-lasting resource, while at the same time rethink the use of the horse-and-cart as oil supplies dwindle!)

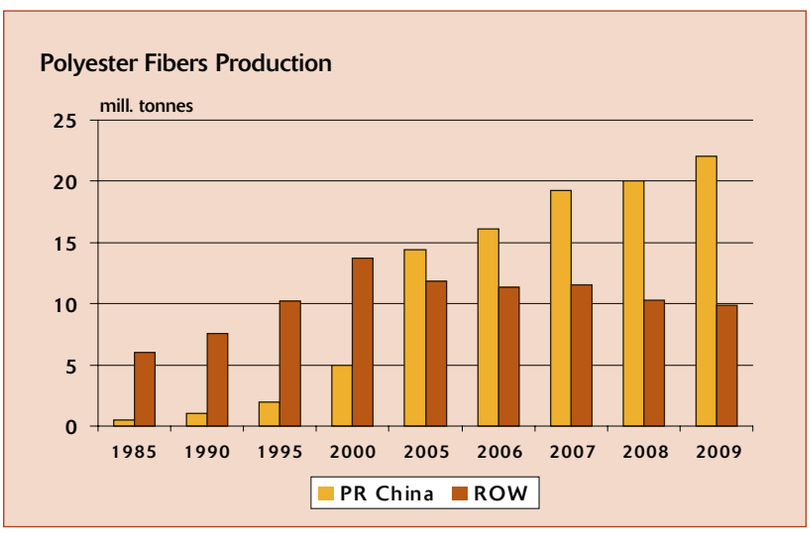
The current state of play

Despite an increase in global fibre consumption in 2009, to 70.5 mta, the professor could be right in his analysis. This total would suggest an average per capita textile consumption of 10.4 kg. The average consumption in the EU in 2008 was calculated to be about 30 kg, while in China it would have been closer to 3 kg. With the economies of countries such as China and India, with their massive and growing populations, it would be fair to assume a serious increase in consumption. Combine that with water resources increasingly being diverted away from agriculture, it becomes clearer why Dr Scheffer is led to his forecast of shortage of fibre.

But economics is an imperfect science. According to other analysts, while fibre consumption has gone up, there appears to have been a demand shortfall in the last two years that could add up to 19 million tonnes. According to the Oerlikon Textile report The Fibre Year 2009/10, the textile and apparel industry has lost a large manufacturing and processing volume in the last two years.

The current season's world cotton production is expected to decline 4.8% to 22.3 million tonnes, possibly more now as a result of the Pakistan disaster. Nevertheless, the increasing approval and cultivation of genetically modified cotton has resulted in soaring cotton yields. In the season 2003/04, actual cotton production started to outpace the long-term trend but output returned to the long-term trend due to 3.5% lower yields per hectare. This is the fifth consecutive seasonal decline in cotton area. In





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contrast, global consumption is projected to rise 5.4% to 25.2 million tonnes. Can agriculture keep pace? According to USDA, the US department of agriculture, there were 33.3 million hectares under worldwide cotton production in 1965. The yield was 372 kg per hectare; by 2009, the number of hectares had fallen to 30.2 million but yield had increased to a staggering 740 kg per hectare. (For those with a penchant for figures, the land area growing cotton worldwide would equal some 2.5 times the area of the state of Mississippi.)

Wool has had declining fortunes in recent years. According to Oerlikon's survey, 2009 saw another fall to 1.1 million tonnes, and wool for the apparel sector fell by 8% to just over 550,000 tonnes. Economics is not the only factor; in Australia, drought was behind the fall in sheep numbers, down to 72 million, the lowest head count since the 1920s. China, as the second biggest producer, saw a decline too as it moved away from wool sheep to meat production. Increased living standards have an effect, too, on fibre production. The trend in New Zealand to switch from wool to dairy products saw its production fall by a massive 23.5% — but this is of less concern to the apparel industry as much of their wool production would have targeted the interiors market.

With linen and silk being minority natural fibres, less importance is given to them in the overall picture. In the cellulosic sector, however, the market increased 7.7% to 3.8 million tonnes. According to The Fibre Report, it was a good year for producers thanks to a growing demand in nonwovens, textile applications and fire retardant product. Viscose also benefited apparently from a shortage of cotton and an increasing demand for comfort that consumers felt cotton was not necessarily supplying. (Tow fibres, usually associated with the linen industry, was also part of the acetate subsector growth: the stimulus was the growth in filter cigarette consumption, especially in developing markets!) In the fight for water resources, growing trees could be seen to have an advantage over cotton as less water and other resources are needed to grow trees.

Synthetics

The synthetic fibre segment showed a mixed performance, states the report. The total market was up 3.7% to 40.3 million tonnes. Polyester production increased by 5.3% and acrylics rose 4.4% but polypropylene decreased by 6.5% and polyamide was down 1.4%. The Asian manufacturing volume of more than 36 million tonnes now corresponds to 83% of the global market. Much of the declines mentioned in the report were the result of poor economic performance in the industrial, home and interior markets. This could, of course, mean that the apparel sector held up well. It also means that for specialist performance fibre users, the fibre producers could welcome their attention. Acrylics saw the first growth in the last four years, and in 2009 global output increased 4.4% to 1.9 million tonnes.

Oerlikon's "The Fiber Year" is a very comprehensive and detailed annual analysis of the world fibre market, and the current edition is its tenth. Combining its statistical material with Dr Scheffer's predictions, one is left with the uncomfortable feeling that fibre prices will continue to rise as supply falls short of demand, petroleum prices stay high and food production increasingly dominates the agricultural sector. For the sports enthusiast, the cost of his or her recreational requirements could increase, too.

