

World wide market and price development of natural fibres

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4th EIHA Conference, November 2006

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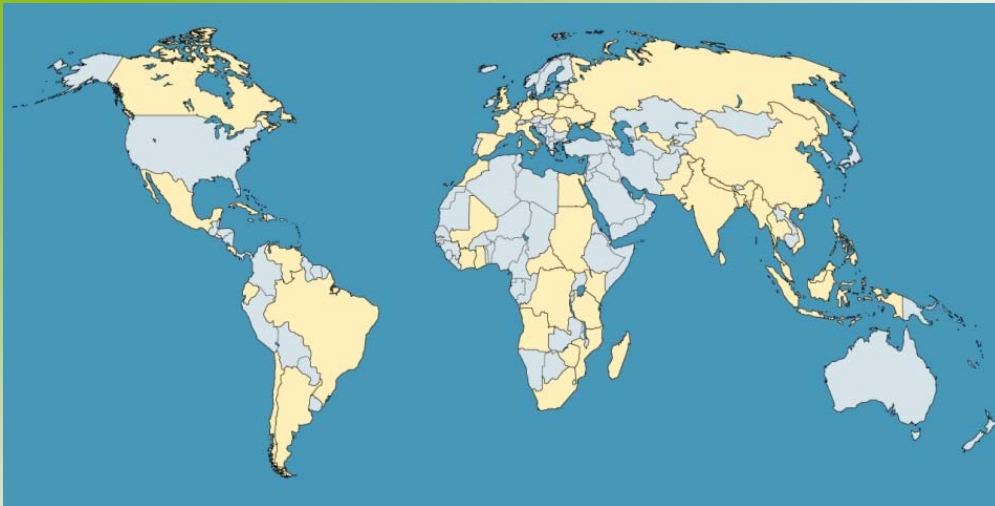
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World map

Natural fibre producing countries (except cotton)



Countries marked yellow grow and harvest more than one thousand hectares of abaca, coir, flax, hemp, henequen, jute, kenaf or sisal fibres per year.

Source: FAO

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Natural fibres in this study - main data

Natural Fibre Plants	Area harvesting (ha) (world)	Production (Mt) (world)
Jute	1.343.620	2.859.105
Jute-like (Kenaf et al.)	296.241	382.581
Sisal	375.687	315.573
Coir	(only by-product)	398.000
Flax	504.995	770.467
Hemp	52.307	67.818

Source: FAOSTAT 2006, FAO Commodities & Trade Division (Coir)

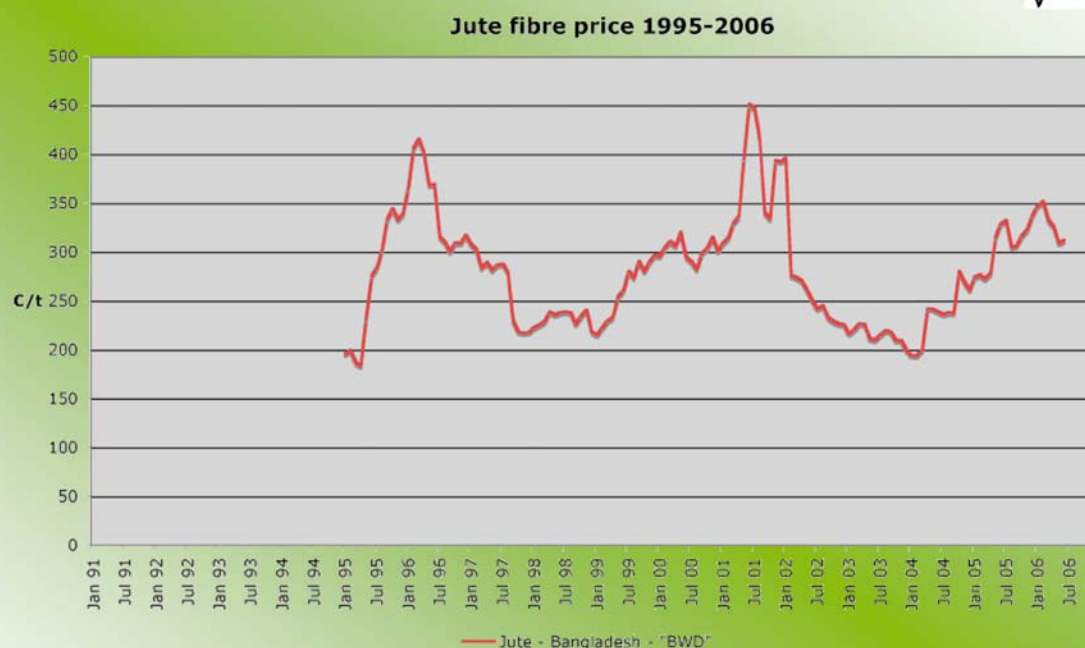
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Jute

(& Kenaf)



Price history of jute fibres



Jute fibres as second most important natural fibres - first is cotton - have shown some periods of good price stability. Seasonal price changes are not recognizable. Also visible in this diagram are two past price peaks and the steady price increase since 2004. The price increased due to strong demand despite India's reduction of stocks since 2004.

Jute fibre production (& Kenaf)

Averages of jute production in 2002-2003

	India	Bangladesh	Myanmar	Nepal
Area harvested [1000 ha]	991,5	468,0	59,0	12,0
Production of fibres [1000 t]	2019,0	878,0	42,0	17,5
Fibre Yield [t/ha]	2,0	1,9	0,7	1,5

Averages of jute, kenaf & allied fibre production in 2002-2004

	India	Bangladesh	China	Myanmar	Thailand	Nepal	Vietnam	Other
Area harvested [1000 ha]	1005	485	55	57	30	12		
Production of fibres [1000 t]	1830,0	893,7	152,0	44,9	47,7	17,0	15,9	56,7
Fibre Yield [t/ha]	1,8	1,8	2,7	0,8	1,6	1,5		

India and Bangladesh are the primary producers of jute fibres. Some Southeast Asian countries have also production capacities and know-how and might expand their production in the future, but the centre of gravity is in South Asia.

China produces most kenaf world-wide, as far as the FAO knows. Chinese natural fibre production is solely for China's own needs.

Kenaf is not well documented world-wide and statistical information for kenaf alone is almost impossible to get.

Source: FAOSTAT

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Key findings about jute & kenaf

- Jute is in competition with crude oil based materials in almost all applications.
- Jute price did follow the crude oil price to some degree.
- Chinese demand growth drove jute prices up ("China factor").
- Jute is in rich supply in comparison to automotive industry needs and unlikely to react with higher prices to increased automotive sector demand.
- Jute area harvesting can be expanded, if the farmers will get an adequate jute straw price. This depends on competition to other regional crops.
- Information on kenaf is hard to get, it is said to be close to jute in its price development.

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Sisal



Price history of sisal fibres



The sudden price decrease in 1993 can be explained by weak demand in times of stable supply. Other price movements can be explained by unstable currency exchange rates (especially for Brazil) and shipping costs. The low price in 2002 was like that due to a strong US-\$, afterwards strong demand (especially from China) led to higher prices. The price jump of No.3 in early 2003 is according to the responsible FAO representative most likely due to statistical imperfections.

Source: FAO

Averages of sisal fibre production 2002-2004 in primary producing countries

	Brazil	Tanzania	Kenya
Area harvested [ha]	219.305	46.000	23.167
Production of fibres [t]	139.900	24.200	24.300
Fibre Yield [t/ha]	0,6	0,5	1,0

- The data of harvested area in Tanzania, given by the FAO, may be too high. Experts estimate about 17.000 ha.
- The area for sisal in China might be about 15.000 ha. China is the number two of global sisal production: 45.000 t/year.
- The yield of sisal-plantations in China seems to be much higher than in other countries.

Source: FAOSTAT 2006, Experts and Producer

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Key findings about sisal

- Sisal price depends on polypropylene price because of the competition with crude oil based materials.
- Sisal price depends on prices of alternative cellulose raw materials for the pulp & paper industry, on agricultural demand for sisal twines and on the demand for new industrial applications like metal polishing.
- Sisal price depends on the future demand from China.
- Sisal as a multi-year plant is less likely than others to react in short time to eventual strongly increased demand on the world market.

Coir



Price history of coir fibres



Since 2000, the price of Sri Lankan mattress and twisted fibre first declined due to low demand and the emerging competition from other Asian countries. This trend reversed in 2003/2004 as growing Chinese demand modestly raised prices despite the excess supply of coir raw material

Coir fibre production

Country	Area Harvested (ha)	Coconuts Produced (1,000)	Yields (Nuts/ha)	Coir Production (t)
India	2.000.000	9.287.500	4.644	248.000
Philippines	3.214.200	14.294.200	4.447	6.000
Sri Lanka	446.952	1.947.120	4.356	55.000
Thailand	328.320	1.432.000	4.362	37.000
Viet Nam	133.600	920.000	6.886	11.000
Other countries	4.745.887	26.162.769	5.513	-

Even the few countries that produce relevant quantities of coir from coconut husks - India, Sri Lanka, Thailand - utilize less than 25% of available husks. In case of a further increase in demand for coir, this guarantees a significant global surplus in the raw material. Coir supply is therefore independent of the coconut yields and can be considered as a raw material with excellent long-term reliability, although it's a economically dependent by-product of coconut processing.

Source: FAO 2006

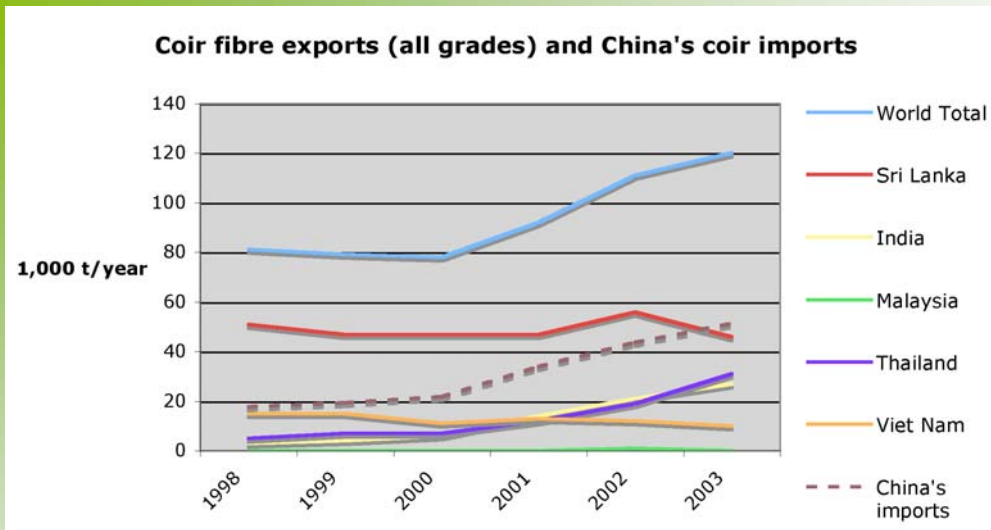
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Applications for coir fibre

Coir Fiber Grade / Origin	Applications
Bristle Fiber Long, clean, parallel fiber fraction produced in Sri Lanka using traditional "Ceylon drum" system, lower grades from India also use Traded in bundles/hanks.	Brushes, brooms, high-strength twine
Mattress (short) / Omat Fiber (medium) Shorter coir fractions produced on "Ceylon drum" system. Traded in bales, 130-160 kg	- Stuffed bedding - Erosion control blankets and rolls - Pollution control applications - Processing into twisted fiber - Spinning into yarn and twine for production of mats and matting
Mixed fiber Produced by decortication of whole green or retted brown husk, no separation by fiber length. Traded in bales, 130-160 kg	
Twisted (FMT) fiber Produced by twisting mixed fiber or blends of mattress and omat fiber into continuous strands. Uses FMT (Fehrer Machine Twisted) technology. Major exporter is Sri Lanka. India produces for domestic market, small quantities produced in Thailand, China, Brazil. Traded in coils, 25 kg or 150 kg.	1. Rubberized coir („Gummihaar“) (formation of layered non-wovens, sprayed with latex, drying, vulcanization). Used in - Mattresses - Upholstery - Car seats - Rubberized horticulture products (mulch mats, tree disks, flower pots) 2. Non-rubberized applications: - Erosion control blankets - Drainage and air filters - Non-wovens for acoustic and thermal insulation

Source: Leson & Associates 2006

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Since 2000, global trade in coir fiber has grown rapidly, driven largely by demand from China, where coir imports have grown at a rate of more than 50% p.a.

Demand for and imports of coir into Europe and the U.S., mostly for novel erosion control products, have also grown, yet only at rates of 2% and 10% per year, respectively.

Source: FAOSTAT 2006 and Sri Lanka Coconut Statistics 2004

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Key findings about coir

- Past and future development in coir prices is not very sensitive to the price of crude oil price.
- Surplus production of coconut husks, and limited capital needs to expand production provide a large supply reserve, which will keep prices down.
- Due to low value density, shipping costs are a relevant price factor for European customers, but not likely to further increase significantly in the next 5-10 years.
- Availability and price of the specialty grade “super clean” twisted coir used by the automotive industry may be most sensitive to limited competition between qualifying suppliers in Sri Lanka.

Flax

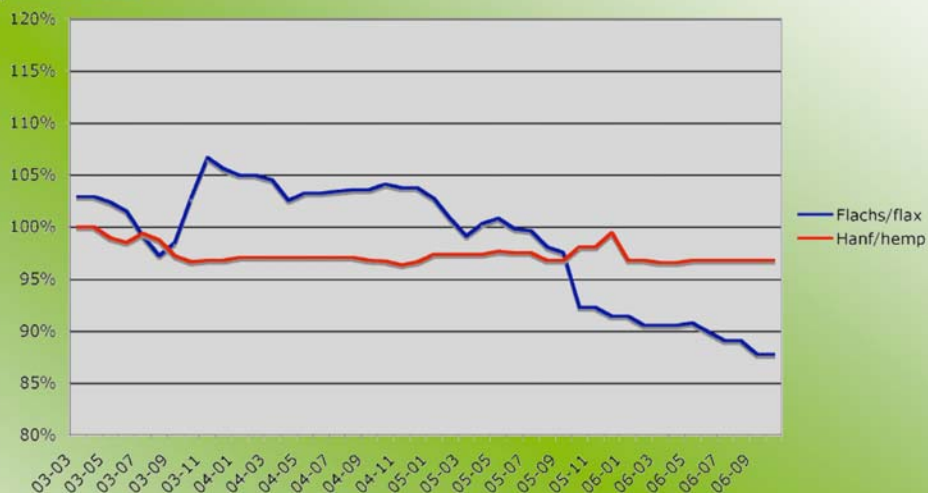


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Medium-term price history of flax fibres



N-Fibre-PriceBase



Flax technical fibre prices are covered by the N-FibreBase price index since march, 2003. The non-weighted average reveals only decreasing prices since late 2005.

Recently, the EU processing subsidy for short fibres is necessary to keep the price competitive - and it will continue over three years or more.

Flax fibre production

Averages of flax fibre production in 2002-2004 (long & short flax fibres)

	China	France	Belgium	Russia	Belarus	Rest of EU(25)	Rest of world
Area harvested [1000 ha]	152,2	75,2	18,1	80,7	73,0	25,7	unreliable information
Production of fibres [1000 t]	486,9	96,3	21,5	50,3	41,3	18,3	unreliable information
Fibre Yield [t/ha]	3,2	1,3	1,2	0,6	0,6	0,7	-

Flax fibre production is traditionally strong in France/Belgium(/The Netherlands) as well as Belarus/Russia/Lithuania. Separated for decades, both have developed different structures and are beginning to co-operate. Corporations from both areas did for example enter strategic marketing alliances.

China is no doubt an important flax producer, but the FAO statistics on China are on a very weak basis and doubtful. Chinese production is furthermore for China's domestic needs and not directly relevant for the European market. The quality of the flax long fibre is very limited and can not substitute the European long fibre.

Source: FAOSTAT 2006

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Applications and prices for flax fibre

Sales realized by the European flax economy in 2003

	Volume [t]	Price [€/t]	Sales [Mio. €]	Turnover share [%]
Textiles long fibres	115,321	1,593	183.7	88.7
Textiles short fibres	29,500	345	10.1	4.9
Special & technical paper	25,000	170	4.2	2.0
Non-wovens (insulation ...)	1,850	400	0.7	0.3
Composites	17,000	500	8.5	4.1
Flax total	188,671	-	207.2	100

The primary product of flax is the long fibre for textile applications. All other products are only unavoidable by-products for which the industry has found markets, too.

This makes the flax fibre quality for non-wovens dependent on the long fibre production. A European flax production primarily for non-woven-quality fibres would almost certainly not be economical with recent price levels.

Source: Ernst & Young / AND International 2005

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International agencies do not provide useful statistics on flax trade, but the nova-Institut knows by its long-time contact with the flax sector about the important characteristics of international flax trade.

The European flax sector with its focus on long fibres has turned for years to Chinese fibre buyers, which runs parallel to a creeping erosion of the European flax manufacturing capacities. Today, an estimated 50-80% of European flax fibre production are exported to China for textile uses (and export of flax manufactures to Europe, US and Asian countries).

This new dependency did already fire back some months ago, when flax fibre prices fell slightly because Chinese fibre demand was “sleeping”, leaving more fibres left in the European storages.

The dependency on Chinese demand meant that short flax fibre prices fell since 2005 because not enough of the European production could be sold to the Chinese textile sector. This motivated flax traders to sell their short flax fibres cheaper in Europe for technical applications.

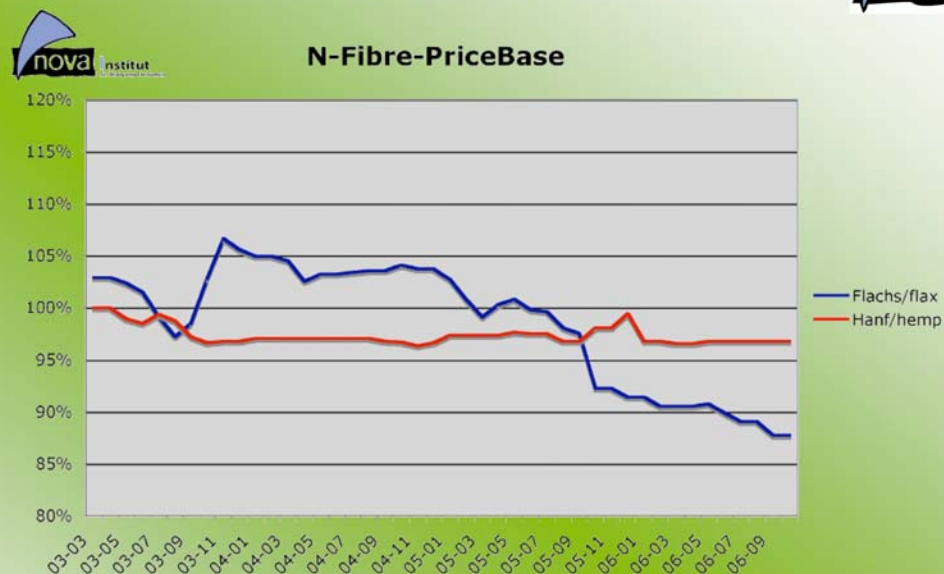
Key findings about flax

- Flax technical fibre development is in quantity and price highly dependent on long flax fibres for the textile industry.
- Technical flax fibres were for years very stable in price, but might easily double their price with a flax textile fashion wave.
- Flax technical fibre supply is not critical as long as the textile fibre business is running well.
- Flax textile fibre business is very dependent on Chinese customers, but it is expected that the Chinese will buy the European flax fibres also in the future.
- Recently the EU processing subsidy is necessary to produce and sell flax technical fibres in competition with other natural fibres; this can change with increasing prices for exotic fibres. Also it is expected that the processing subsidy for flax technical fibre will continue at least for the next three years.

Hemp



Price history of hemp fibres



Technical hemp fibres were introduced in about 1998, documentation of the price development began in march, 2003. Traders do agree that no significant price change happened at that time. A very minor event was that one company gave up its 'high' price strategy in 2003, slightly influencing the index.

Hemp fibre production

Averages of hemp fibre production 2002-2004

	France	Rest of EU (25)	China	Russia	Rest of World
Area harvested [ha]	8.551	7.804	11.600	5.000	unreliable information
Production of fibres [t]	15.793	9.188	27.368	2.067	unreliable information
Fibre Yield [t/ha]	1,8	1,2	2,4	0,4	-

Hemp fibre production can be divided into four groups:

- France did never forbid hemp completely and did therefore retain a relatively strong hemp economy. Most of its production is for specialty papers.
- Other EU countries forbid hemp production, allowed it again in the 90's and did even promote research on new flax & hemp applications. Composites and insulation products are the main uses for their production.
- China does also have a very significant production, albeit FAO statistics on this are not well-based. Much of its production is rather unofficial, but large official efforts to expand production in the province Yunnan are known and might lead to a strong increase in production.
- Russia retained also a significant hemp production, but this is economically pretty isolated from the Western Europe market.

Source: FAOSTAT

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Global hemp fibre trade

The trade with hemp fibres is very limited. There's some inter-state trade inside the European Union, but most fibre production is for domestic uses.

There are especially no intercontinental trade connections of any relevance - the European hemp sector is autonomous, as the North American hemp economy (hemp oil production only) and the Chinese hemp economy, too.

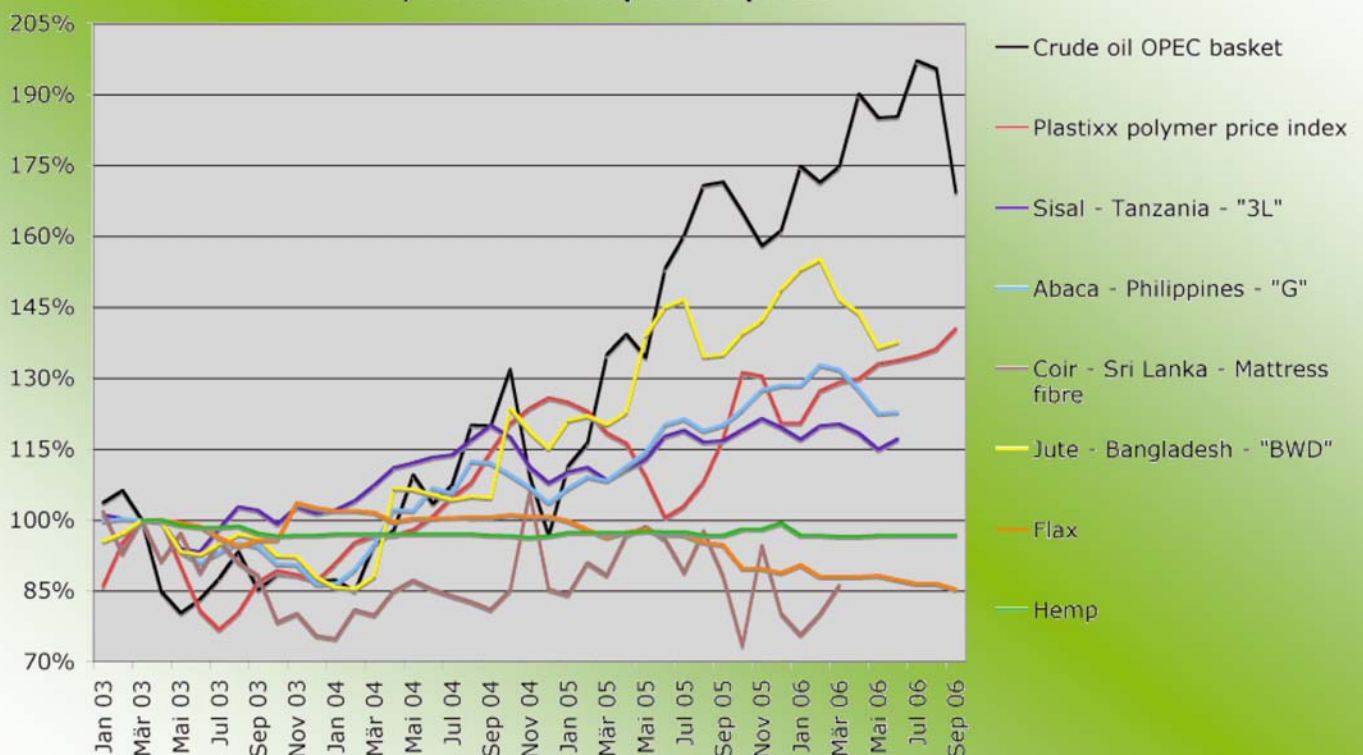
Hemp fibres as a European renewable resource have therefore the advantage that they are completely independent from other than Euro <-> British Pound conversion rates.

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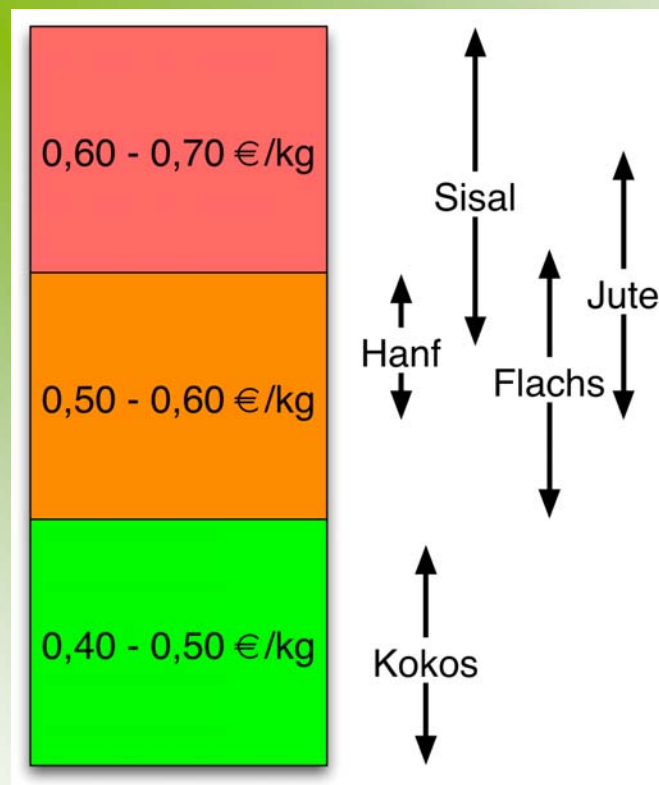
Key findings about hemp

- European hemp fibres have different application shares than other natural fibres: hemp short fibres are used for specialty pulp & paper, in composites and as insulation material. In composites and insulation, European hemp fibres have constant or increasing market shares.
- The hemp fibre prices was very constant over the last five years. This will continue until the prices for jute, kenaf and particularly short flax fibres will increase on the European market.
- Recently the EU processing subsidy is necessary to produce and sell hemp fibres in competition with other natural fibres; this can change with increasing prices for exotic fibres. Also it is expected that the processing subsidy for flax technical fibre will continue at least for the next three years.

Natural fibre, crude oil and plastics prices



Price Ranges for Natural Fibres for Non-wovens on the German Market 2006



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