EIHA European Industrial Hemp Association

Why Hemp should be a crop of the future

Update, November 2008

John Hobson
President

Michael Carus
Managing director





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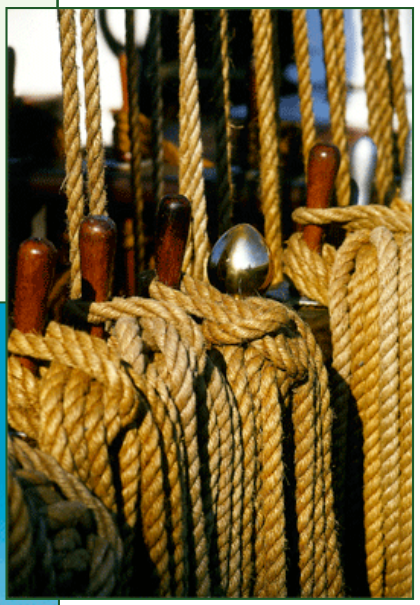
Discover natural fibres 2009
International Year of Natural Fibre

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History



Thread
Sacks
Ropes
Water hose



Ropes

In the Middle Age until the end of the sailing ship period Hemp was an important crop in many European Countries like UK, France, The Netherlands, Germany, Spain and Italy.





Canvas

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The European Industrial Hemp Association (EIHA)

Founded in 2005





John Hobson
President, Hemcore Ltd. (UK), since 2005



Bernd Frank
First Deputy Chair, BaFa GmbH (Germany), since 2005

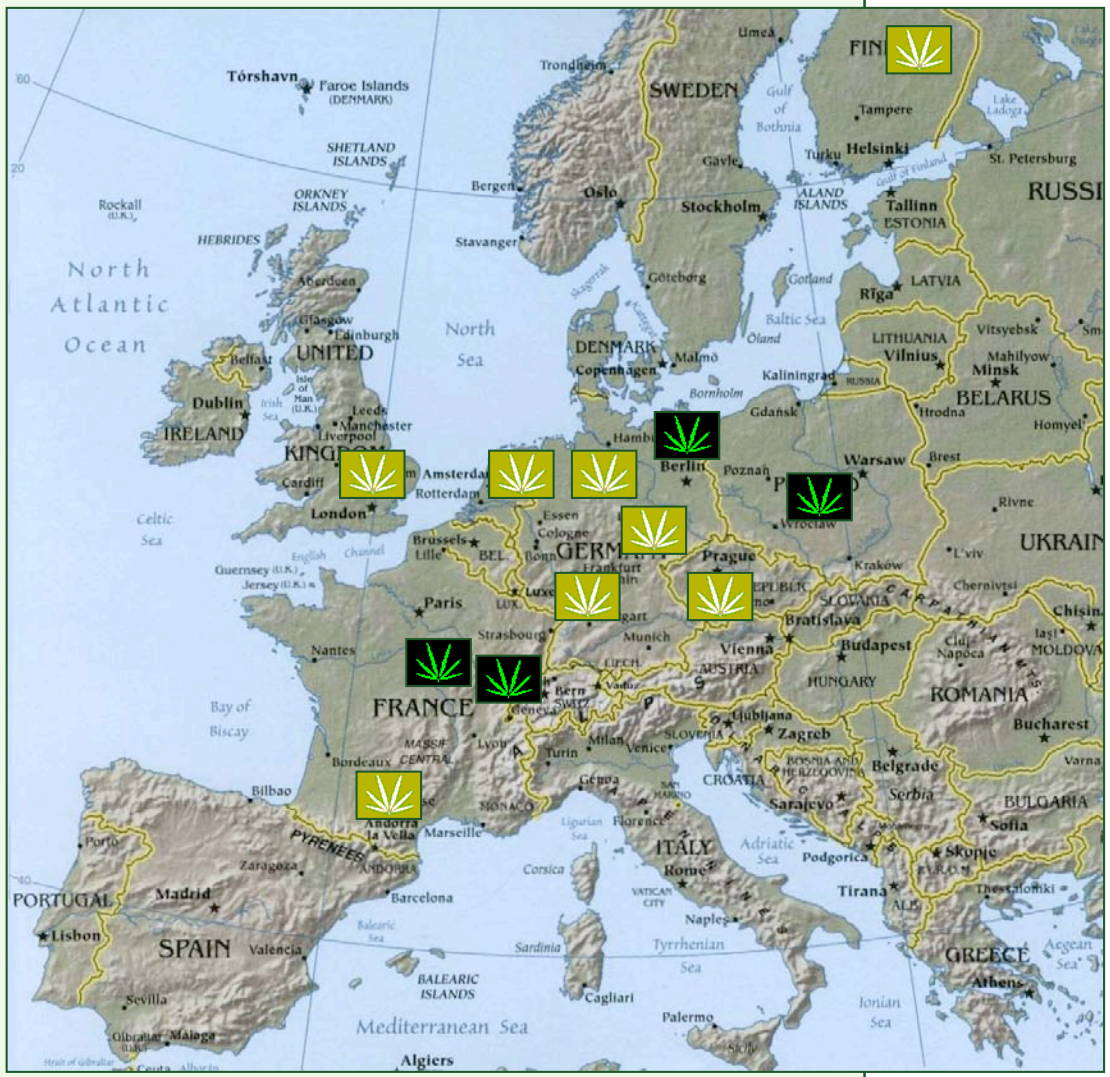
Joan Reverté
Second Deputy Chair, AGROFIBRE SAS (France), since 2007



Michael Carus
Managing director, nova-Institut GmbH (Germany), since 2005
Member of Steeting Committee of the „International Year of Natural Fibers“ FAO
Member of Steering Committee „Natural fibre reinforced polymers“ AVK

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Present hemp industry



Total Hemp cultivation area in the EU less than 15.000 ha in 2008

The European Industrial Hemp Association (EIHA) has 8 regular members (hemp processors) and 56 associate members from 21 countries (2008).

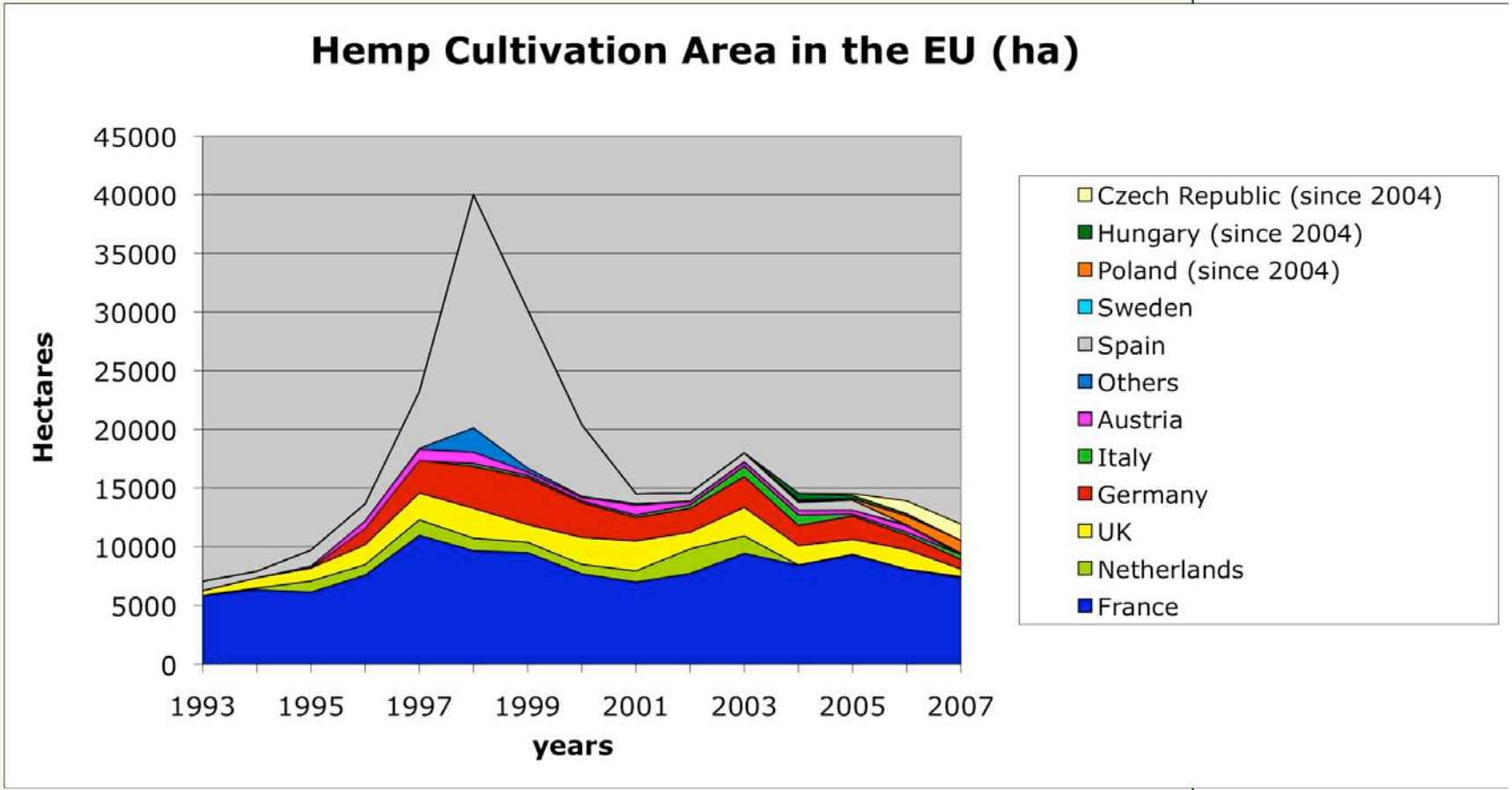
Hemp processors

EIHA members

Non-EIHA members

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Cultivation of Hemp in the EU



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The Hemp Industry

- **Production and processing**, hemp is grown on larger arable farms in the vicinity of a small number of major processing industries. In 2006, 86,685 tonnes of hemp straw was processed into an estimated 22,863 tonnes of hemp fibre.
- **Use**: hemp fibres are mainly used in the special paper industry (75%), with additional outlets for composites materials and insulation materials ("novel" demand). By-products (shives mainly for the equestrian sector) provide additional income.

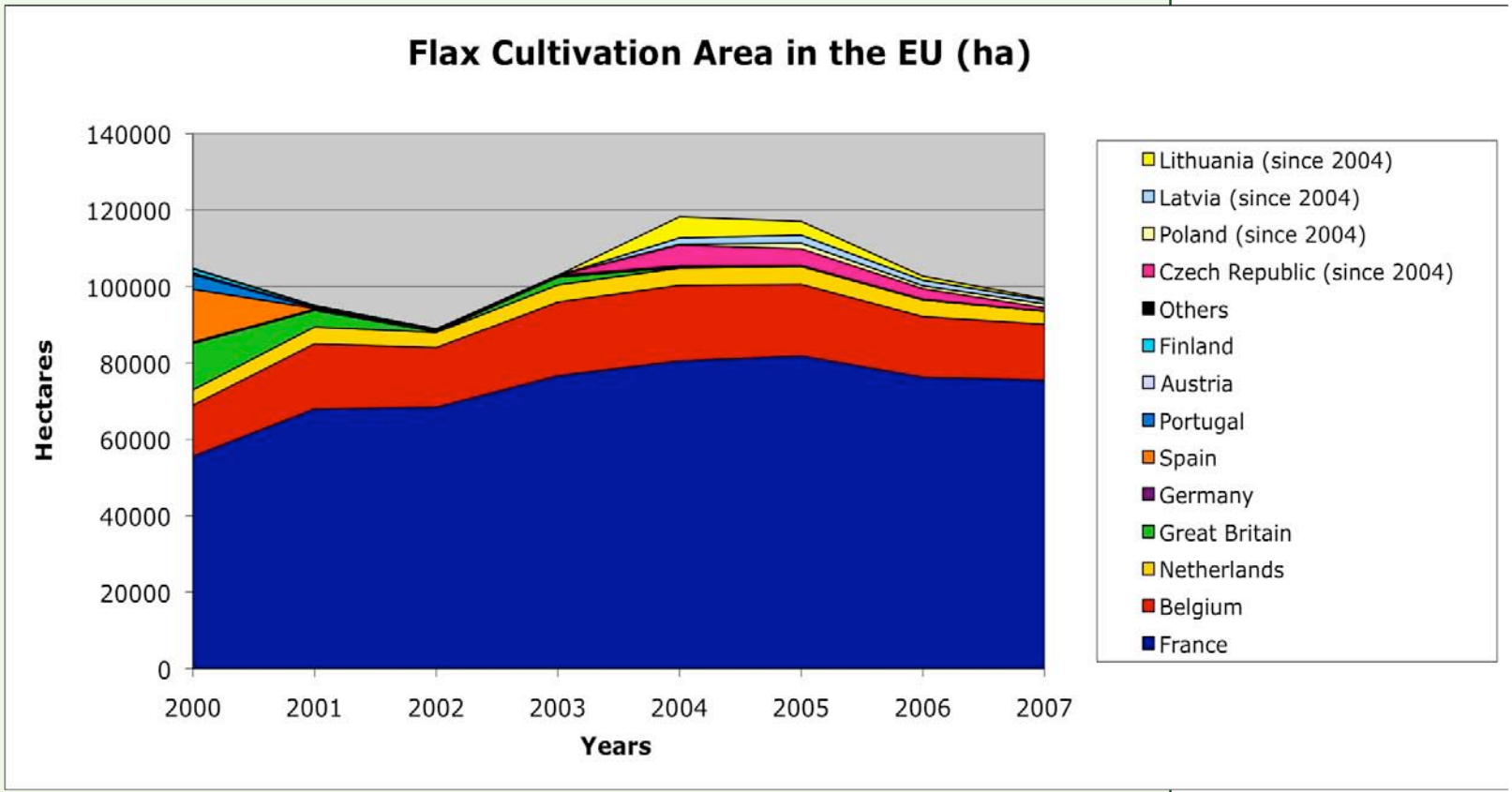
  (ANDI 2007 / Council of the European Union 2008)





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Cultivation of Flax in the EU



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The Flax industry

- **Processing**, in the EU-27 around 140 processing plants transform 635,589 tonnes of flax straw (2006) into long fibres (112,914 t) and short fibres (61,775 t). This equals 53% of world production of flax fibres.

- **Use**: Long Fibres are used in the textile industry. Some 80% of EU output is exported, mainly to China. Short flax fibres are used for composite material, textiles and paper (new outlets are developing following novel demand). Further income is derived from the sale of linseed and shives.

  (ANDI 2007 / Council of the European Union 2008)





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Hemp agronomy
Key benefits for cultivation (1)

- **Robust, adaptable plant**, well suited to the central European climate.
- **Fast growth** (up to 4 m in 100 days), large biomass yields (up to 9-10 t dry matter per hectare in commercial cultivation), with modest fertilisation.
- **Strong suppression** of weeds thanks to its fast and dense growth, no herbicides are required. In fact no agrochemicals are needed whatsoever, a fact rare in agriculture today.





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Hemp agronomy
Key benefits for cultivation (2)

- **Soil-improving and conditioning**, leaves the cultivated soil free of weeds and aerated; yield and quality benefits with successive crops.
- **Good for the rotation**, a complete change from Peas, Beans and Oilseed Rape. Spreads the farm workload.
- **Excellent lead** into a first Cereal,contributes to the preservation of biodiversity.





Regional added value and jobs (1)

- **Compared to other crops**, hemp yields a relatively high regional added value. Storage, processing (fibre and shive separation) and in most cases further steps of the process chain usually take place right next to the field.
- **Regional processing reduces** costs and increases its environmental credibility.
- **According to the Ernst and Young report**, for the EU commission, Hemp as well as Flax leads to more regional employment per Hectare than wheat: Actual figure are 800 jobs on 10,000 farms (4 times as much as wheat per Hectare). 2,000 jobs at 1st processing stage (5 times as much as wheat per Hectare) in around 100 companies.



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Regional added value and jobs (2)

- **According to Ernst and Young** the following working hours are required per Hectare: Wheat 4 hours, Hemp 8 hours. This difference is explained by the greater harvesting effort required for Hemp.
- **Also included** in the Ernst and Young report was that Hemp requires 2-3 times more workforce in the primary processing stage than wheat.
- **In summary** the growing of Hemp has a very positive effect on employment, particularly in regional employment in rural districts.
- **Hemp production** takes place in rural districts where it plays an important role in the economic and social environment.





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Estimated employment in the flax and hemp sector

- **Agriculture:** 850
- **First processing:** 2,000
- **External inputs first processing:** 200
- **Second processing:** >1,000

- **Total:** > 4,050

(ANDI 2007 / Council of the European Union 2008)

Member State	Flax area (ha, 2006)	Number of farms (2005)
France	76 278	6 320
Belgium	15 919	2 290
Netherlands	4 366	610
Czech Republic	2 736	110
Poland	2 586	3 320

Source: DG AGRI, Eurostat and AND International

Member State	Hemp area (ha, 2006)	Number of farms (2005)
France	8 083	840
UK	1 671	140
Romania	1 450	110
Germany	1 233	265
Czech Republic	1 086	10
Poland	762	80

Source: DG AGRI, Eurostat and AND International

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Decortication and fibre separation: From straw to dust, fibre and shives - a zero waste process



Straw





Fibre





Shives



Dust

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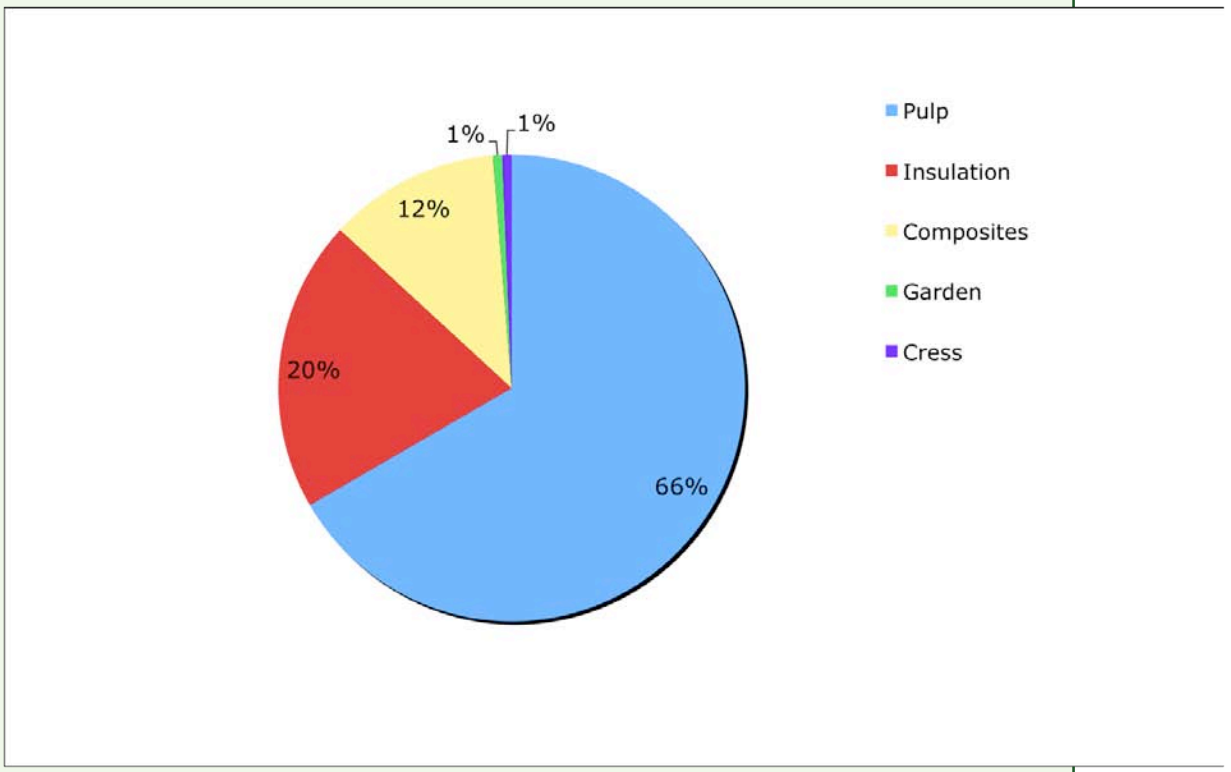
Applications and markets for hemp fibres and shives



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Hemp

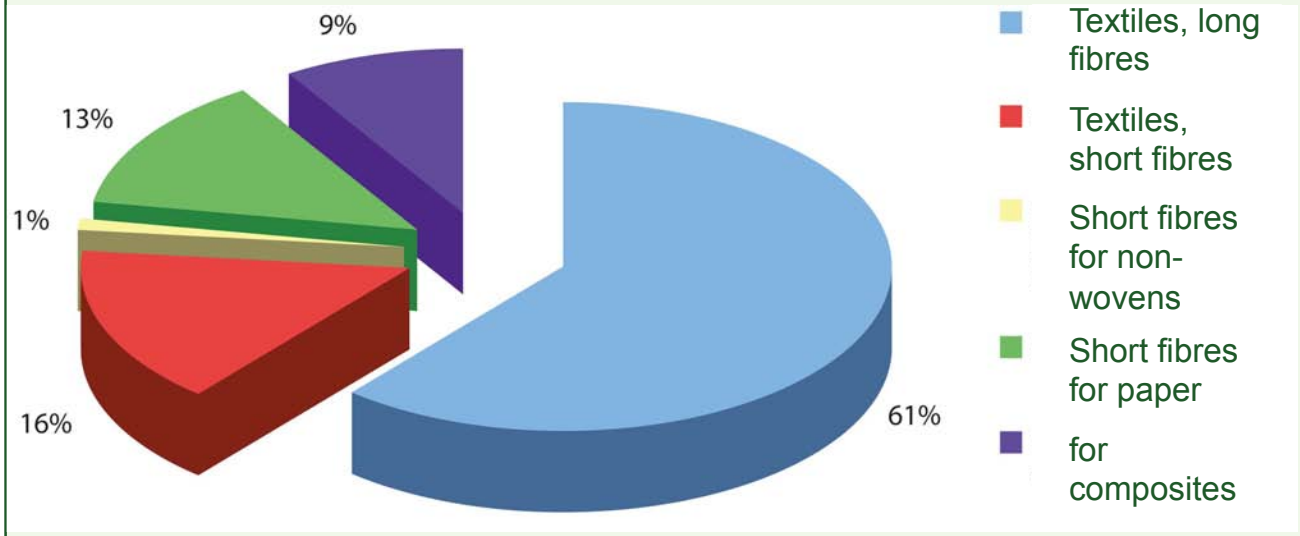
Applications for Hemp fibres 2006 (EIHA 2007)



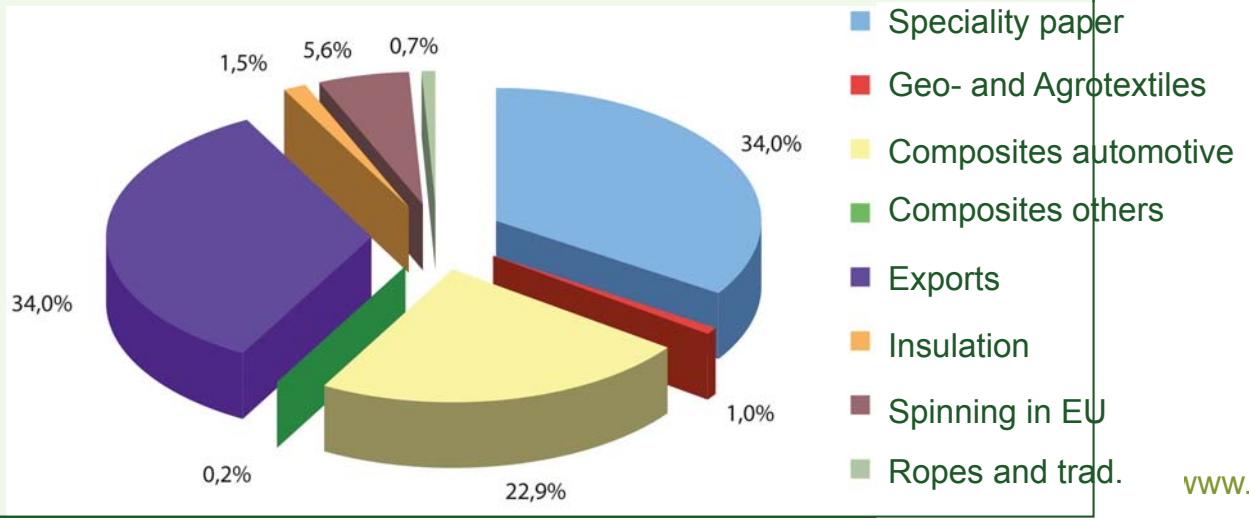
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Flax

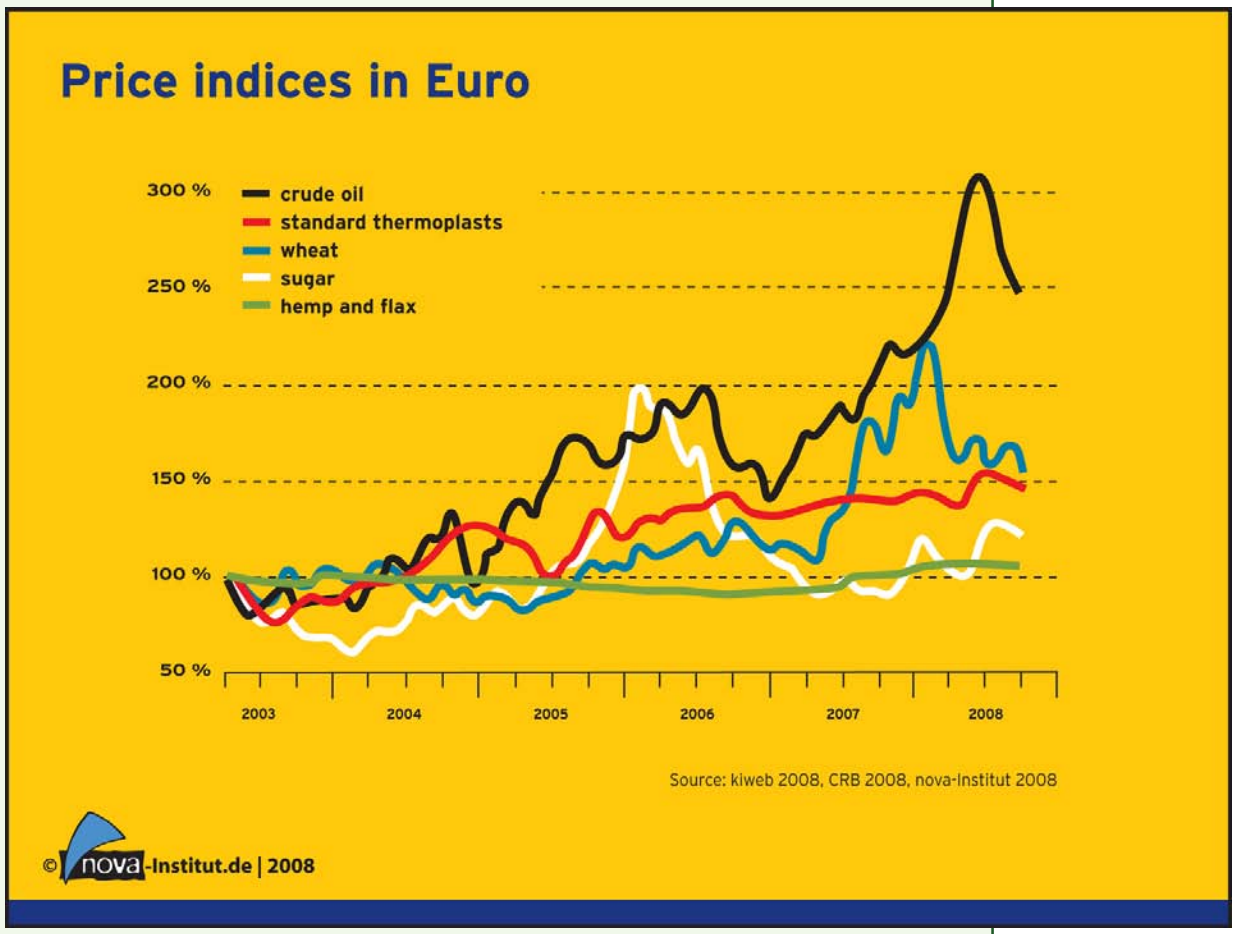
Applications for Flax fibres



Applications for Flax short fibres



Price development Short Fibres (nova 2008)



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EU 2007: Production of 24.000 t hemp fibres – main applications



Non-automotive



Insulation

Automotive





Agrotextiles



Pulp & Paper

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Valuable and innovative biomaterials

- Along with a high yield, Hemp produces **natural fibres of the highest quality**. Their mechanical properties are equal to the best natural fibres available.
- Along with biopolymers and wood, Hemp and other natural fibres constitute the "**new material generation – biomaterials**". Hemp can be used in many ways with new and innovative material concepts. In particular when natural fibres are mixed with plastics they add and extend the properties of the material.
- Hemp, along with wood and polymers and other natural fibres can play an important part in **reducing plastic components and metallic materials** – and improve the profile of **bioplastics** for durable applications.

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Natural fibre composites (1) – innovative technology for the automobile industry



BMW 5 Series



Fibre



Non-woven Fleece



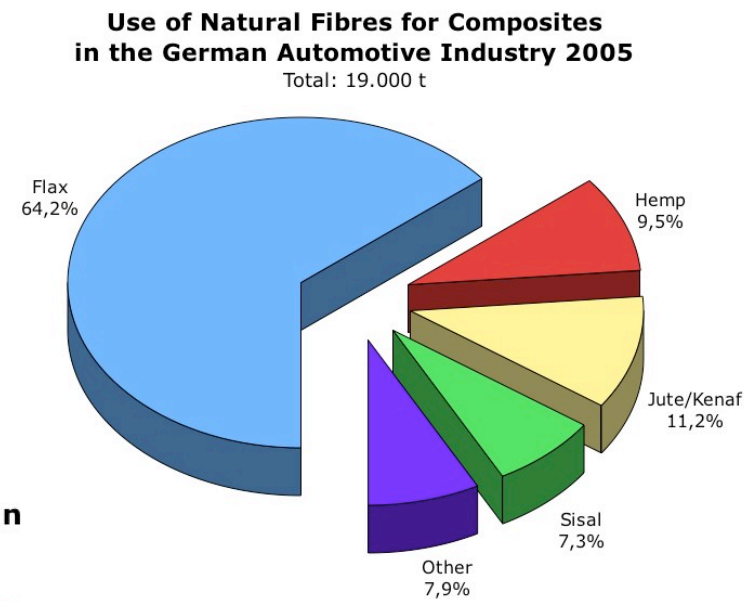
Naked Door



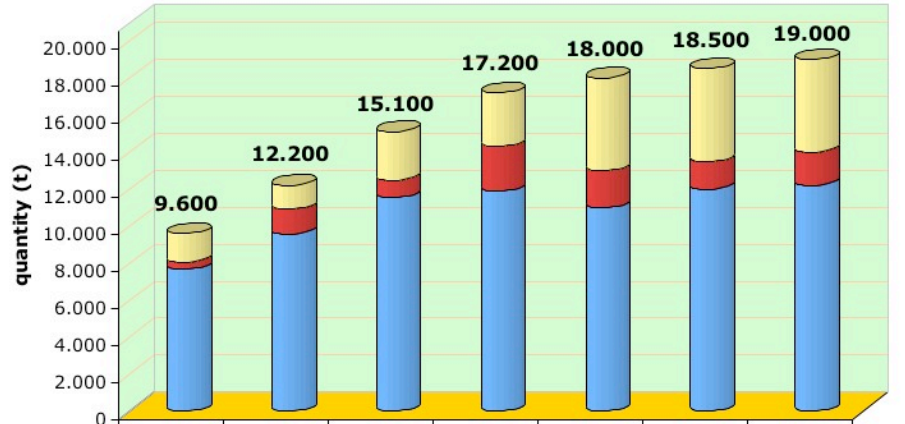
Finished Door

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German Automotive Industry – ca. 30,000 t Natural Fibre Composites (2005)



Use of Natural Fibres* for Composites in the German Automotive Industry 1999-2005



	1999	2000	2001	2002	2003	2004	2005
Total	9.600	12.200	15.100	17.200	18.000	18.500	19.000
Exotic Fibres	1.548	1.279	2.618	2.895	4.995	5.000	5.000
Hemp	372	1.350	913	2.416	2.012	1.500	1.800
Flax	7.680	9.571	11.569	11.890	10.993	12.000	12.200

* without wood and cotton

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Natural fibre composites (2) – wide range of application possibilities



Scale



Grinding Disk



Toy Cars
Made by Injection Moulding

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Insulation – CO_2 emission and cost reducing application for construction







Application

Pulp and paper – special utilization of hemp



Pulp

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Agrotextiles (1), garden – easy to handle base for agricultural use





Tree planting

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Agrotextiles (2), cress – an environment friendly, annual renewable base layer for the plant industry replacing peat

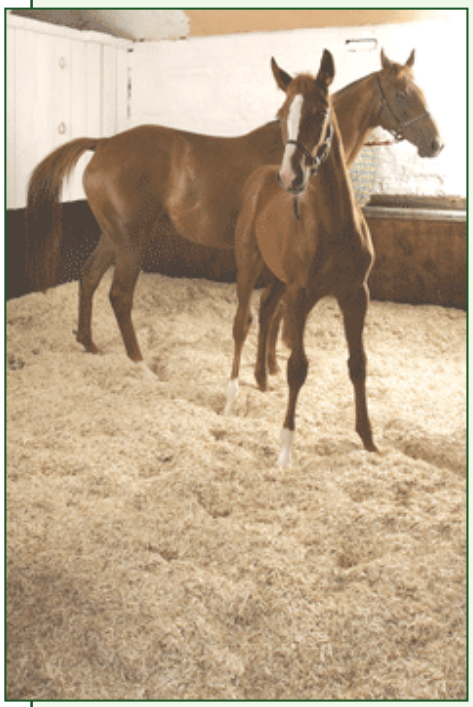




Cress production

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EU 2007: 48.000 t production of Hemp Shives – main applications



Animal Bedding

Particle Boards





Garden



Construction

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Animal bedding – implementation for the comfort of your animal



Horse stable ground



Chicken farming

Garden – decorative alternative to barkmulch





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Particle boards – alternative to wood-based particle boards with half the weight





Construction (1) – easy to handle construction material with great qualities



Spraying



Finished Wall

Construction (2) – applicable for large constructions as well



Beer Distribution Centre



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EU 2007: Production of 6.000 t, consumption of 12.000 t hemp seeds – main applications



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Hemp seeds – food applications





Hemp oil



Hemp nuts



Snacks

Ecology



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CO_2 Emissions & Sequestration

Hemcrete® sprayed wall mix

1m³ of wall mix contains:	Sequestration/emission
110 kg hemp shiv	**- 202 kg CO2/m³**
220 kg Tradical® HB	**+ 94 kg CO_2/m³**
Water	**0 kg CO_2/m³**
Nett carbon capture	**- 108 kg CO_2/m³**





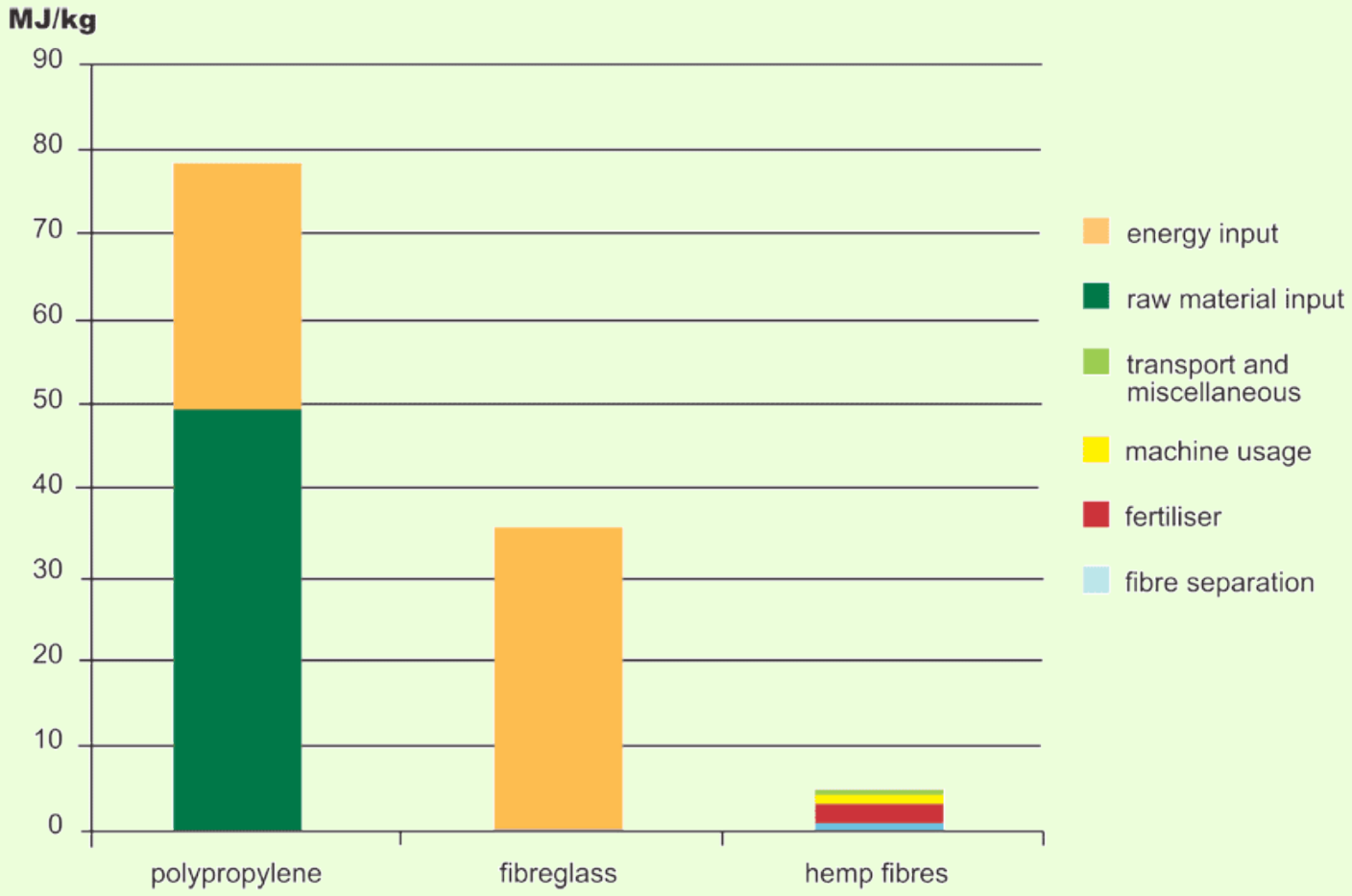
Ecology (1)

- Hemp exhibits **excellent ecological credentials in its cultivation**. Virtually all Agrochemicals are completely eliminated. Hemp is also well suited to growing under an organic regime.

- The Ernst and Young study (2005) reported that Hemp is associated with "**an environmentally conscious cultivation**". It requires considerably less input in terms of water, fertilisers and does not require Agrochemicals.

- Analysis that have been made in several European Countries and North America have studied **life cycle, eco and energy balances for various product lines**. Where Hemp has been used in applications it has yielded **definite ecological advantages**. These product lines include amongst others, Hemp **replacing glass fibres in composites and insulation**, Hemp fibres **instead of Cotton** in the Textile Industry and Hemp Shives **replacing conventional materials in the construction** industry.

CER_P-Cumulated Energy Requirement



Ecology (2)

- In the Karus et al. (2006) study on **natural fibre reinforced plastics**, the summary stated that: **"Finite resources were spared, there was less pressure on the environment and CO_2 emissions were reduced. If biopolymers were used these benefits are of course further enhanced**. ”

- Murphy & Norton 2008: "All **insulation** materials are beneficial to the environment because they save energy and reduce global warming potential. However, **NFIs (Natural Fibre Insulation) have the added benefit that they sequester CO_2, making a further contribution to reducing global warming potential**. The authors therefore consider it worthwhile to take advantage of the scope to develop **the environmental profile of the NFI materials and to boost their market presence**.”

R. Murphy, A. Norton (Imperial College): Life Cycle Assessments of Natural Fibre Insulation Materials. (PDF-document, 2.2 MB) Final Report, published on 2008-02-27. This study was undertaken at the instigation of the National Non-Food Crops Centre (the NNFCC), with funding provided by the UK Department for Environment, Food and Rural Affairs (Defra).

Summary

Hemp is **good for agriculture, the environment** and **enhances regional development**.

Hemp will and is playing an important role in the production of **innovative biomaterials** like natural fibres **reinforced plastics, insulation and construction materials**. Hemp fibre can improve the technical profile of **bioplastics** for use in durable applications.

Economy



Economy
– the currently very difficult situation

- **Competition from other natural fibres** from Asia, Africa and South America which limit the market price of natural fibres.
- **Competition from flax tow**, which is cross subsidized by high processing aid for flax long fibres (160 resp. 200 €/t). Without the short fibre processing aid (90 €/t) this unbalanced situation will lead to extremely unfair competition between flax and hemp (only France, Belgium and The Netherlands will profit).
- **Competition from high cereal prices**, which makes it extremely difficult to get farming areas for hemp and other niche crops.
- **Competition from energy crops**; energy crops receive subsidies in most European countries due to their CO_2 benefits – hemp receives no subsidies at all despite it's CO_2 benefits. This leads to unfair competition for farming areas.

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Economy – the risk and the solution

- Without processing aid the whole European hemp branch **will not survive the next three years**.
- The **increasing demand for biomaterials**, natural fibres reinforced (bio)plastics, insulation and construction materials has to be met by **natural fibre imports** from Asia, Africa and South America.
- **A great chance** for agriculture, biodiversity, regional development, innovation and ecology – and R & D spending with a volume of a few 100 Mio. € **would be lost**!
- **The ideal solution: A single processing aid** – same amount for all produced natural fibres over the next years (recommended by most natural fibre experts).
- **The minimum solution**: Keep the existent processing aid for short fibres until 2013. That means less than 3 Mio €/year (15.000 ha x 2 t fibre/ha x 90 €/t).

Inequality:
Flax & Hemp processing aid

