



World-wide market data on hemp and other bast fibres

**11th EIHA conference
Wesseling, 2014-05-21**

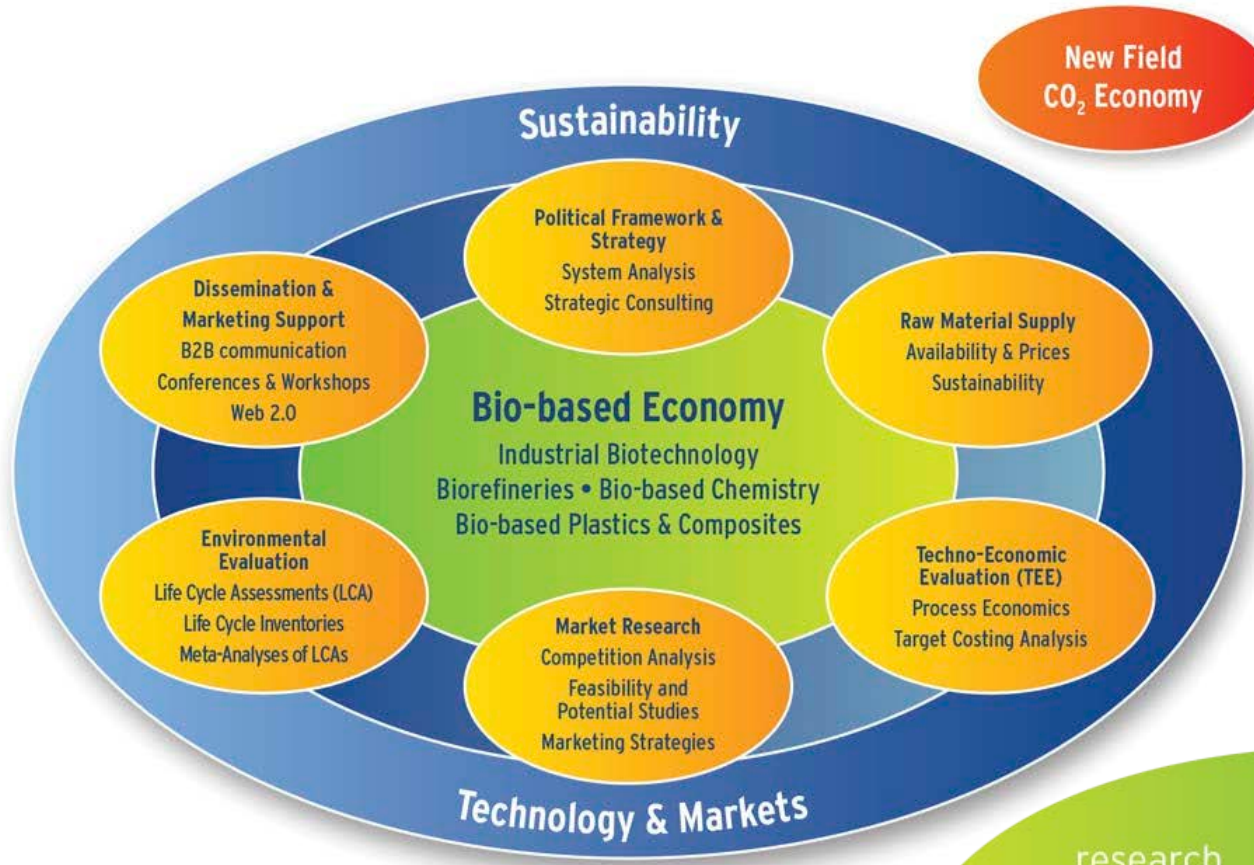
Michael Carus
(Managing Director)

nova-Institut GmbH, Hürth (Cologne), Germany

Bio-based Economy – Bio-based Chemistry and Materials

- Raw Material Supply
- Techno-economic Evaluation
- Market Research
- Ecological Assessments
- Dissemination
- Policy







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Agrarminister wollen künftig 4,5 Prozent der Direktzahlungen in die zweite Säule umleiten

Environment: Commission proposes to reduce the use of plastic bags
Extensive public consultations found broad support for an EU-wide initiative

Ruanda: Tüten mitbringen verboten
Seit 5 Jahren macht ein kleiner afrikanischer Staat es uns vor: "Wir sind sehr stolz auf das, was wir erreicht haben."

European Commission's proposal to reduce consumption of plastic bags an important opportunity to promote bioplastic alternatives
European Bioplastics promoting measures for bioplastic alternatives in Member States

Vorschlag der EU-Kommission zur Reduktion des Konsums von Kunststofftragetaschen eröffnet Fördermöglichkeiten für Biokunststoffe
European Bioplastics: den Mitgliedsstaaten sollte Flexibilität beim Umstieg auf Biokunststoff-Taschen zugestanden werden

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CO₂: a renewable feedstock

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Dipl.-Phys. Michael Carus
Founder & Managing Director
+49 (0) 2233 48 14 - 40
michael.carus@nova-institut.de

Department Sustainability

Ecology, Economy, Policy



Dipl.-Umweltwiss. Roland Essel
Environmental Evaluation & Management
+49 (0) 2233 48 14 - 42
roland.essel@nova-institut.de



M.Sc. agr. econ. Elke Breitmayer
Life Cycle Assessments,
Economics & Resources
+49 (0) 2233 48 14 - 57
elke.breitmayer@nova-institut.de



Dr. Sc. agr. Stephan Plotrowski
Economics & Resources
+49 (0) 2233 48 14 - 53
stephan.plotrowski@nova-institut.de



M.A. Pol. Lara Dammer
Policy & Strategy
+49 (0) 2233 48 14 - 55
lara.dammer@nova-institut.de



M.A. Soz. Linda Engel
Management Assistant
+49 (0) 2233 48 14 - 58
linda.engel@nova-institut.de

Department Technology & Markets

Bio-based Chemicals and Materials,
Industrial Biotechnology, CO₂ Utilization



Dipl.-BioL. Achim Raschka
Bio-based Chemistry &
Industrial Biotechnology
+49 (0) 2233 48 14 - 51
achim.raschka@nova-institut.de



Dr. rer.nat. Asta Eder
WPC, Wood & Bio-based Materials
+43 (0) 676 363 14 55
asta.eder@nova-institut.de



Florence Aeschelmann
Bio-based Plastics & Composites
+49 (0) 2233 48 14 - 48
florence.aeschelmann@nova-institut.de



B.Sc.-Geogr. Barbara Dommermuth
Markets & Editor,
Bio-based News
+49 (0) 2233 48 14 - 56
barbara.dommermuth@nova-institut.de



Dr. rer. nat. Fabrizio Sibilla
Bio-based Chemistry &
Industrial Biotechnology
+49 (0) 2233 48 14 - 47
fabrizio.sibilla@nova-institut.de



Dr. med. Franjo Grotenhermen
Pharmacology & Therapeutic Uses
of Medical Plants
+49 (0) 2952 97 08 573
franjo.grotenhermen@nova-institut.de



Marion Kupfer
Chief Editor, Bio-based-News
+49 (0) 2233 48 14 - 40
marion.kupfer@nova-institut.de



Stefanie Clermont
Chief Financial Officer
+49 (0) 2233 48 14 - 53
stefanie.clermont@nova-institut.de

Office Management



Ina Hellige
Office & Conference Management
+49 (0) 2233 48 14 - 40
ina.hellige@nova-institut.de



Gero Carus
Office Assistant
+49 (0) 2233 48 14 - 40
gero.carus@nova-institut.de

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Dipl.-Geogr. Dominik Vogt
Conference & Project Management
+49 (0) 2233 48 14 - 49
dominik.vogt@nova-institut.de



Jutta Millich
Conference & Project Management
+49 (0) 561 50 35 80 44
jutta.millich@nova-institut.de

IT & Graphics



Daniel Steeg
Databases, Web 2.0
+49 (0) 2233 48 14 - 40
daniel.steeg@nova-institut.de



Maksim Krivtsov
IT System Manager
+49 (0) 2233 48 14 - 43
maksim.krivtsov@nova-institut.de

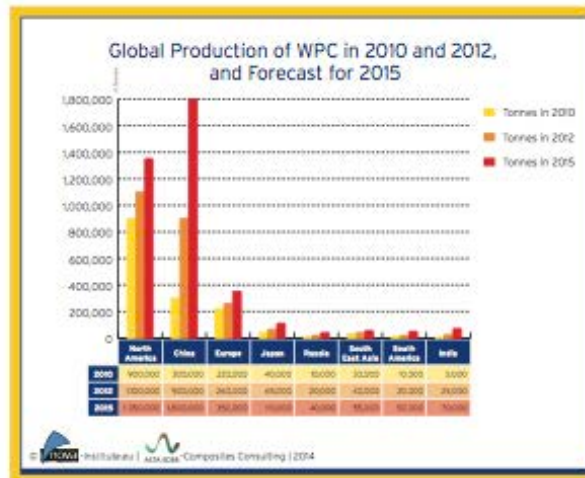




World Fibre Markets

Wood-Plastic Composites (WPC) and Natural Fibre Composites (NFC): European and Global Markets 2012 and Future Trends

Authors: Michael Carus, Dr. Asta Eder, Lara Dammer, Dr. Hans Korte, Lena Scholz,
Roland Essel, Elke Breitmayer



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Source: Carus & Eder et al. 2014

**Most of the following
figures are coming from
this market study**

**Please see
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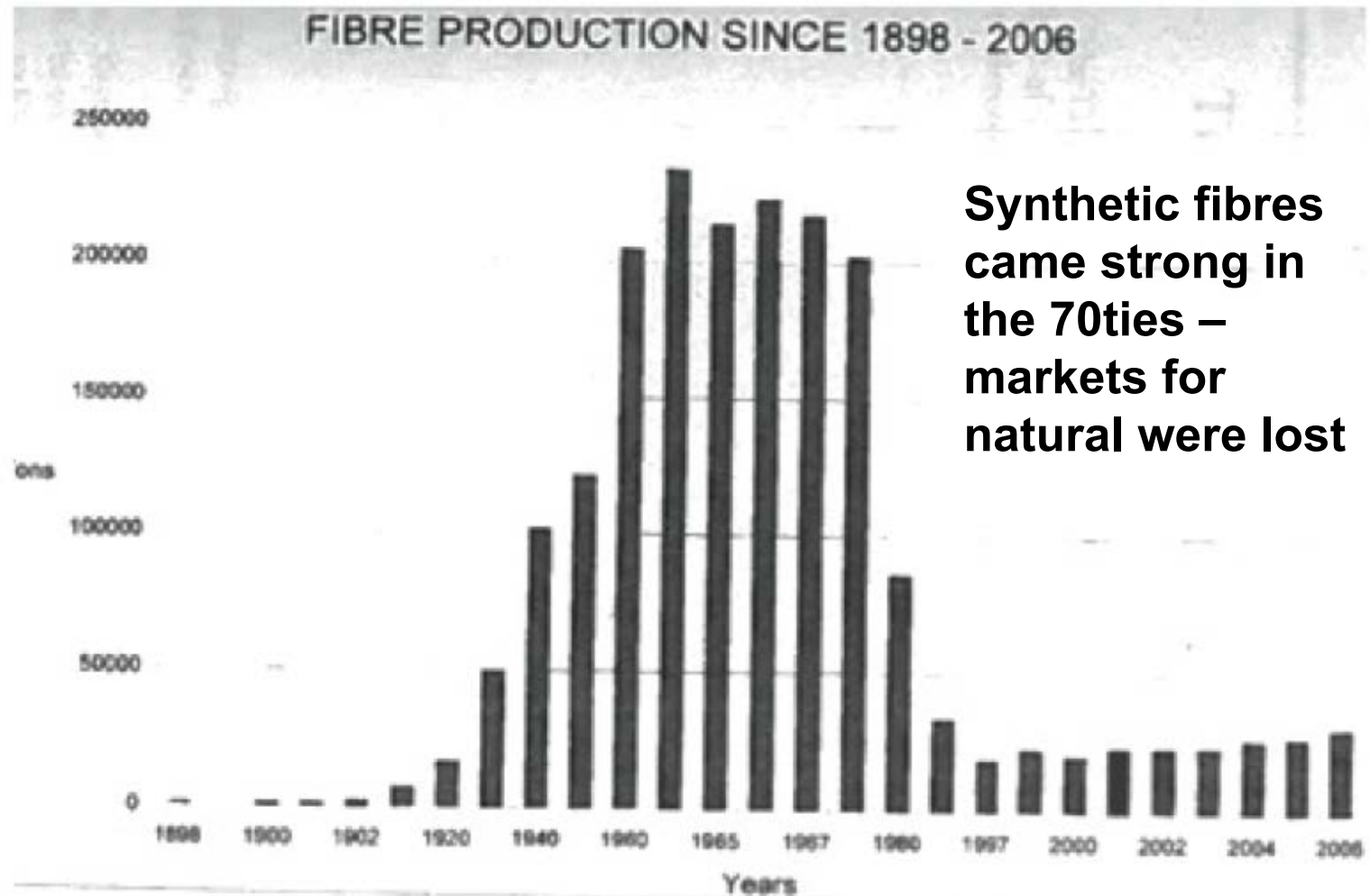
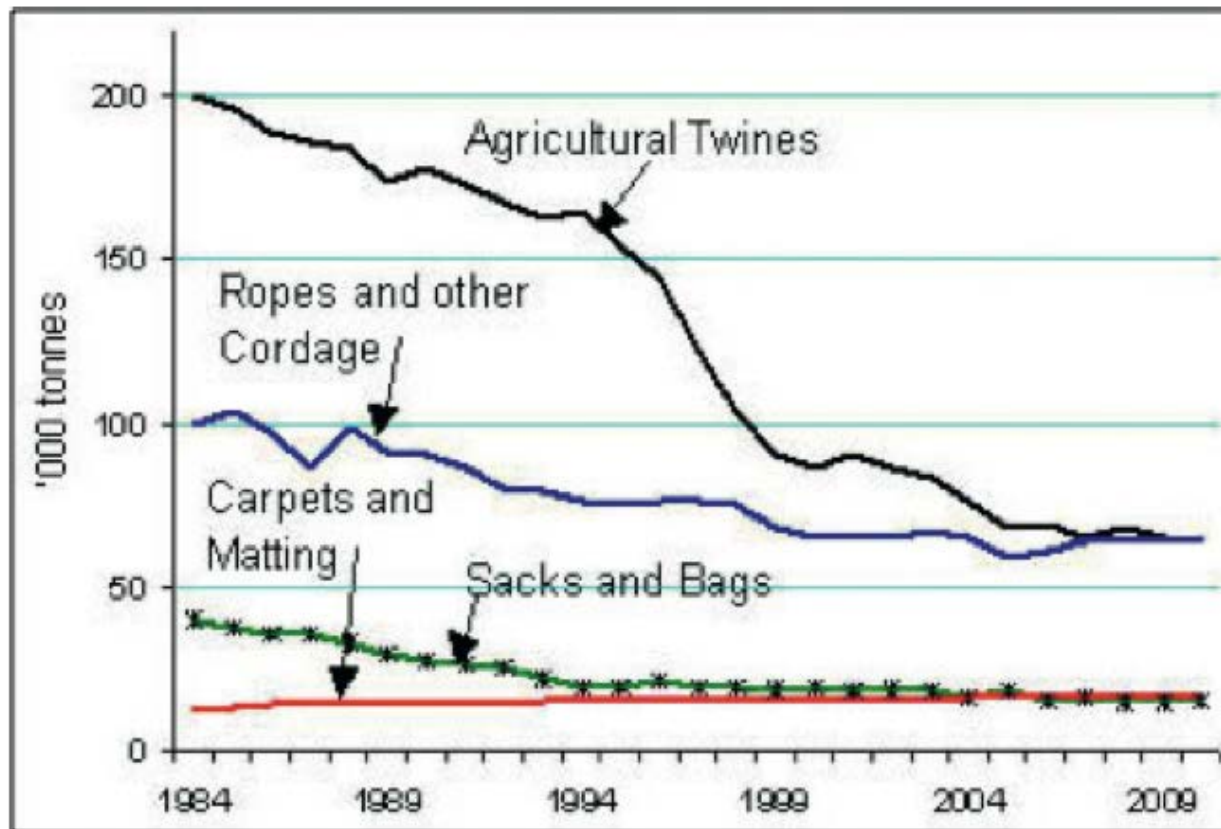


Figure 8.6: Sisal fibre production in Tanzania 1898–2006 (Tenga 2008)



**Especially
the markets
for twines
and ropes,
sacks and
bags
decreased
over
decades**

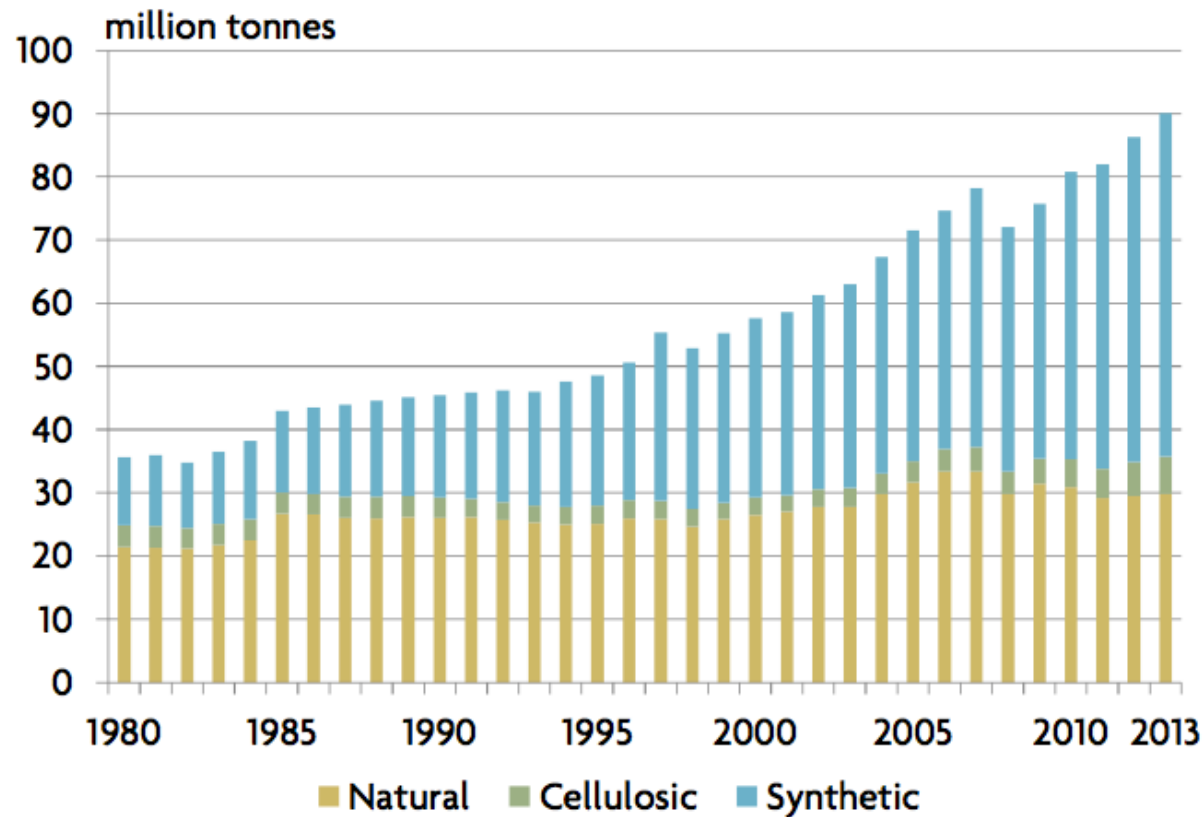
Figure 8.7: Market volumes of traditional fibre applications in China 1984–2009
(Mackie 2000)



Share of natural fibres in the fibre market is decreasing over the last 20 years

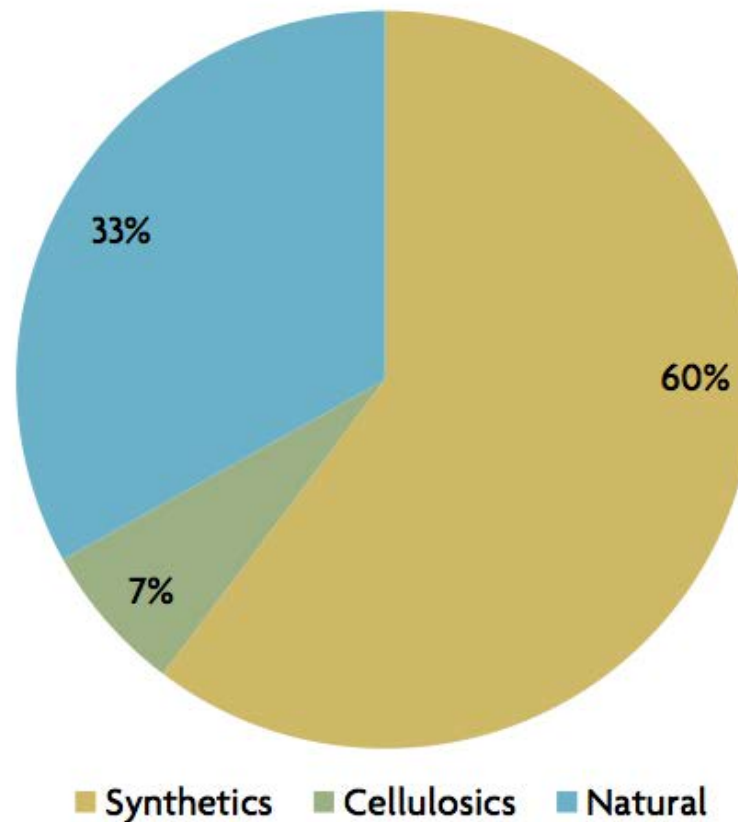


World Fiber Consumption





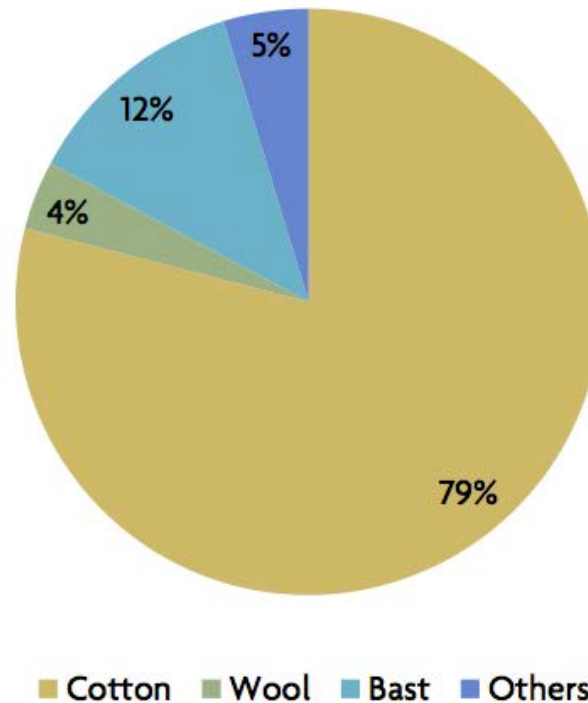
World Fiber Market 2013



**Only 33%
market
share is left
over for
natural
fibres today**

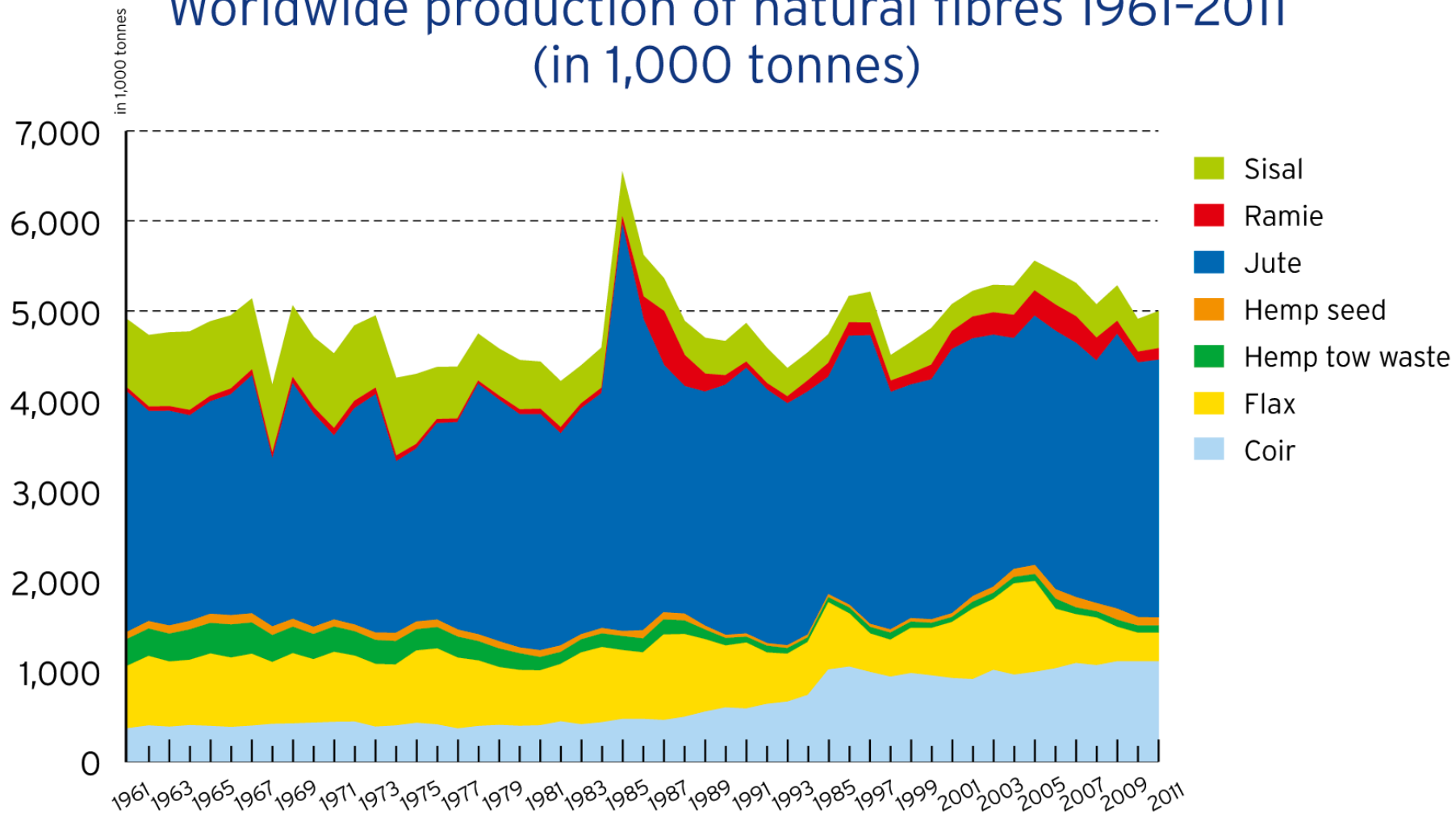


Natural Fibers Share 2013

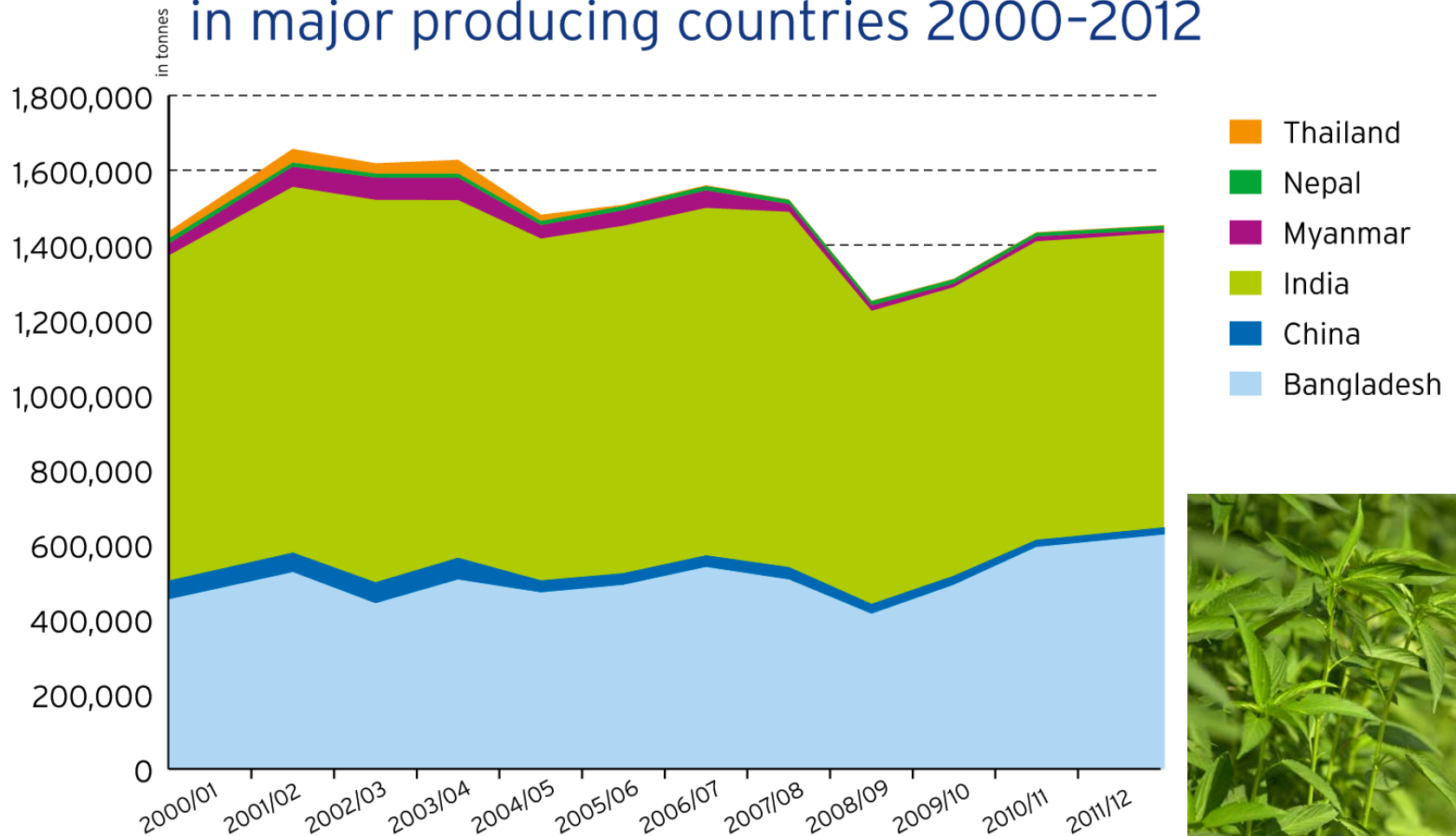


With 79% Cotton has the highest share in natural fibres, followed by bast fibres (mainly Jute) and wool.

Worldwide production of natural fibres 1961-2011 (in 1,000 tonnes)



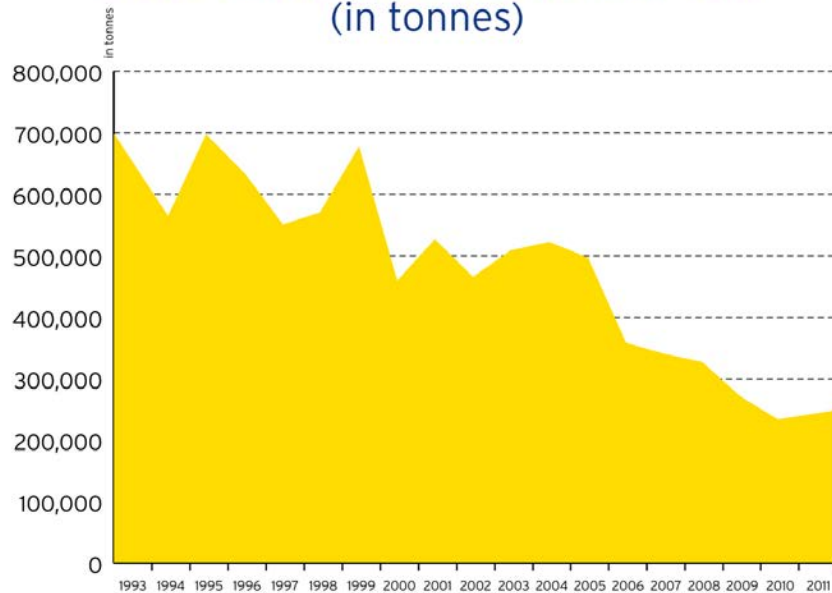
Cultivation area of jute, kenaf and allied fibres in major producing countries 2000-2012



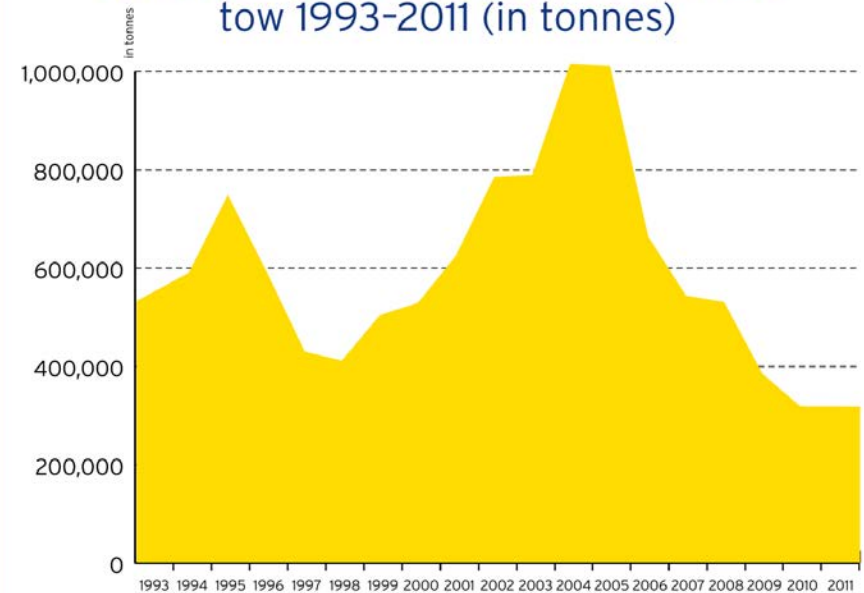


Global fibre flax cultivation (Europe, China, Egypt ...) is decreasing

Global flax cultivation area 1993-2011
(in tonnes)



Worldwide production of flax fibre and tow 1993-2011 (in tonnes)

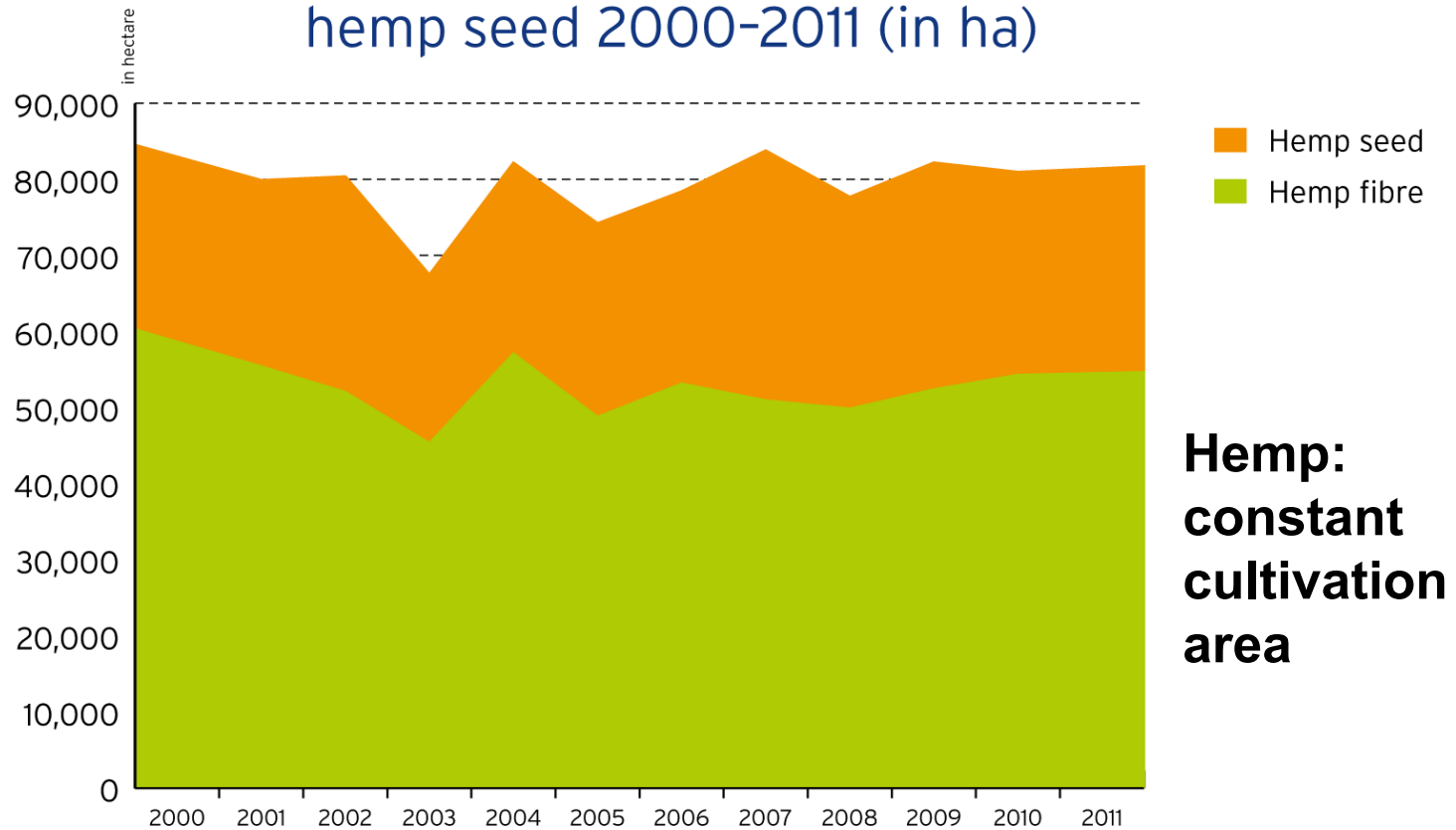




Hemp cultivation and production

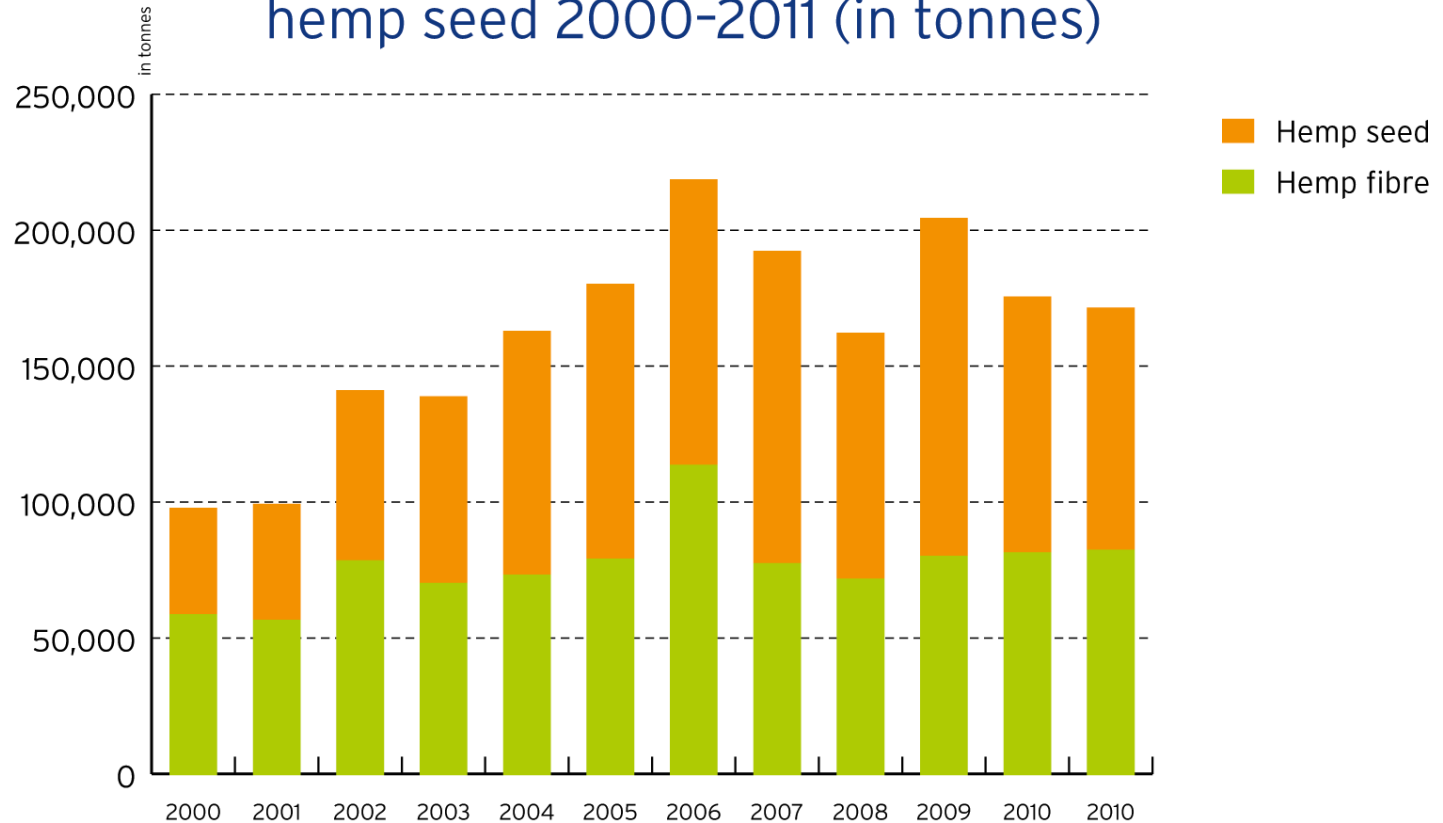


Global harvested area for hemp fibre and hemp seed 2000-2011 (in ha)



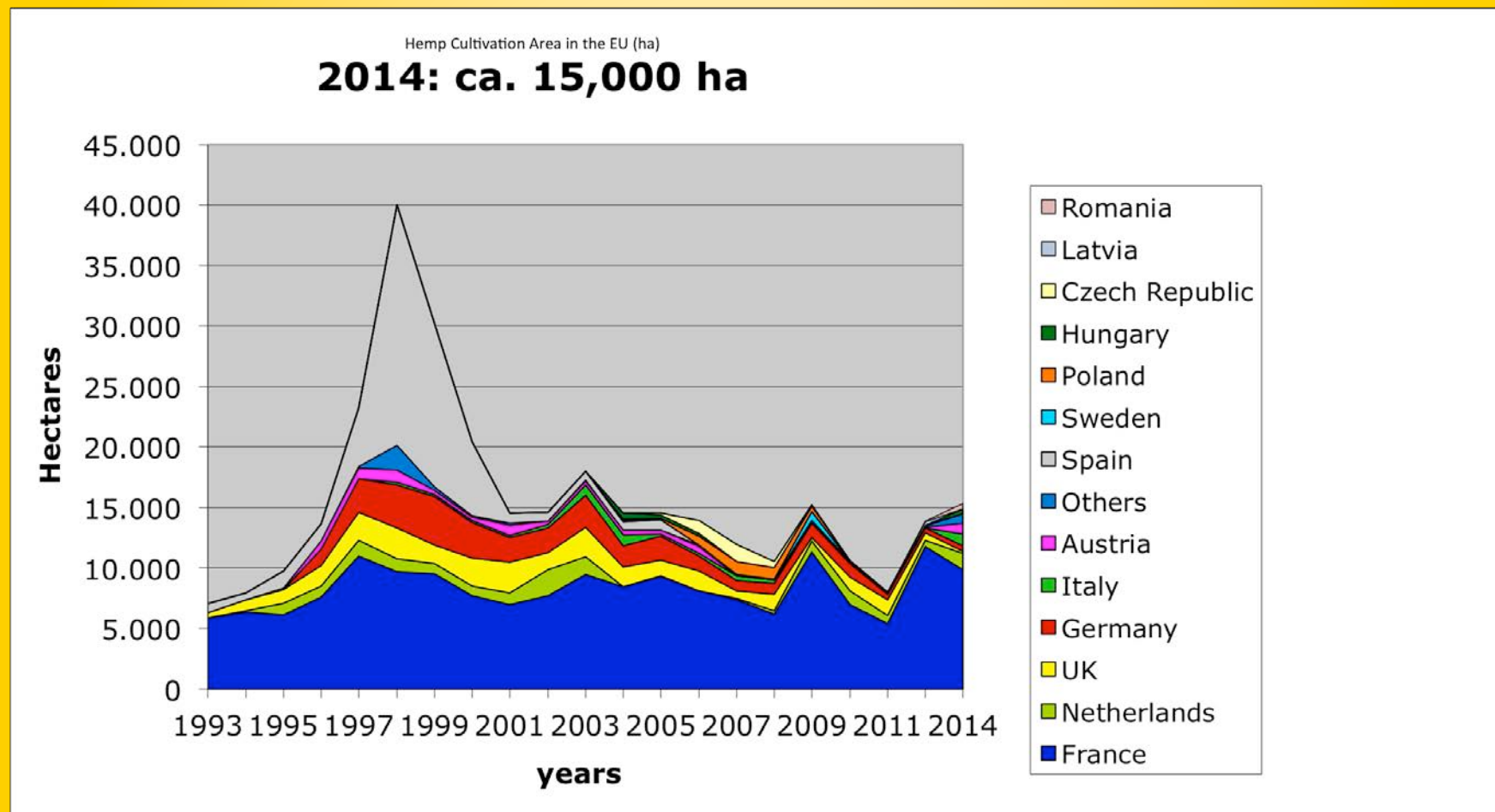


Global production of hemp fibre and hemp seed 2000-2011 (in tonnes)





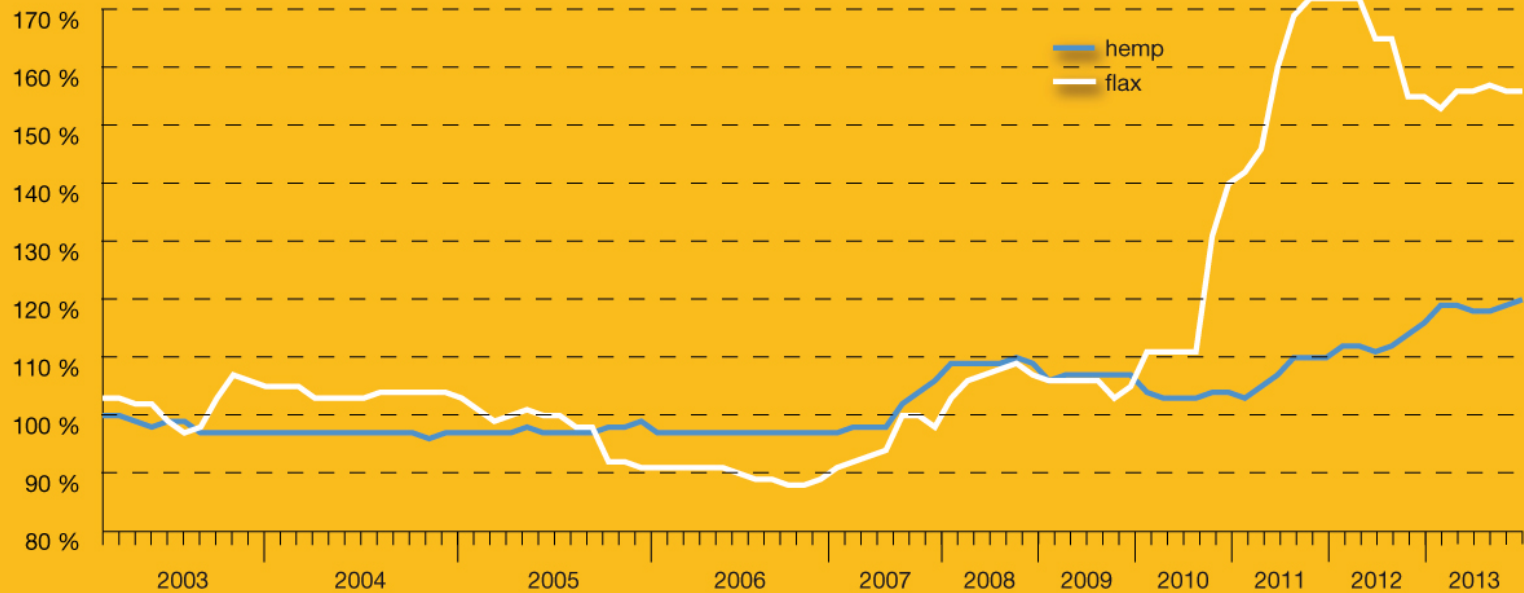
European Hemp: Back to 15,000 ha, more countries involved and increasing share for seed production





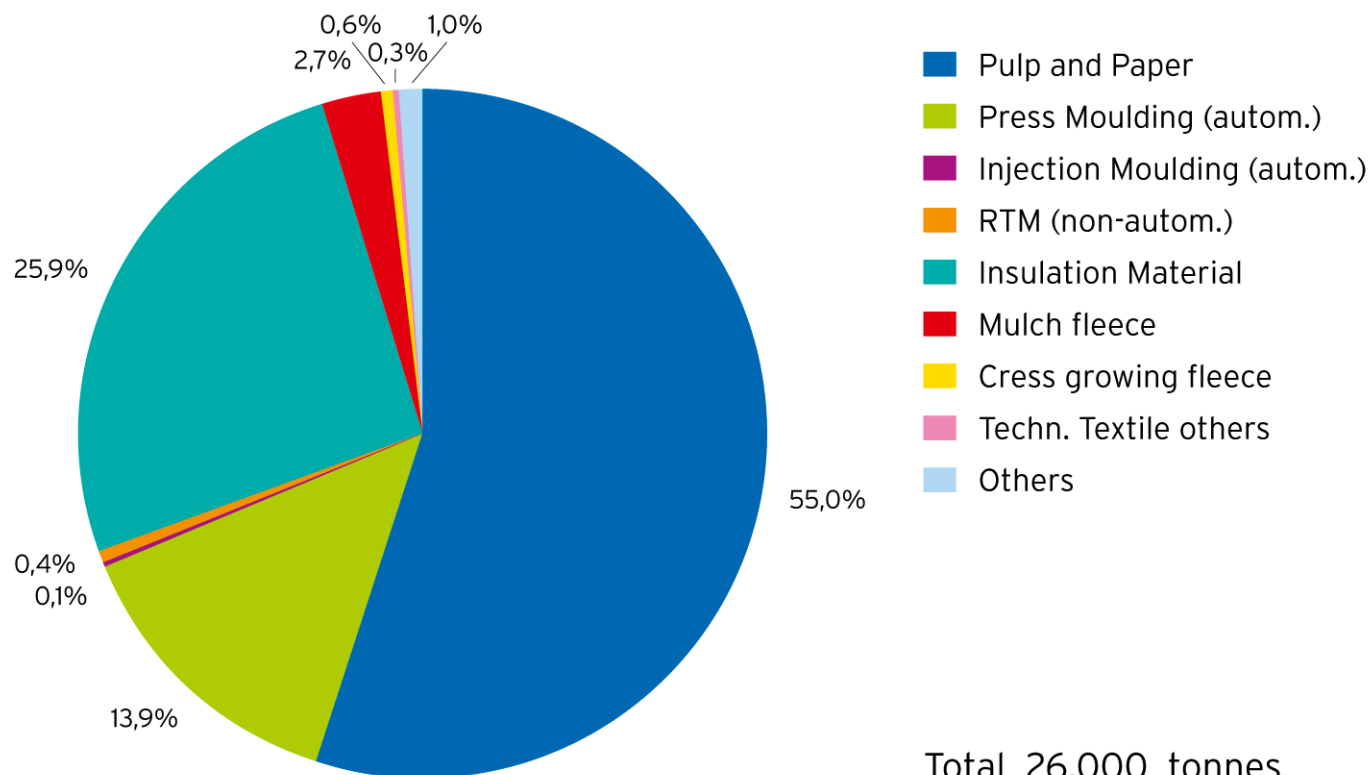
Hemp fibres: Stable prices for 10 years

Price index: Hemp and flax technical short fibres



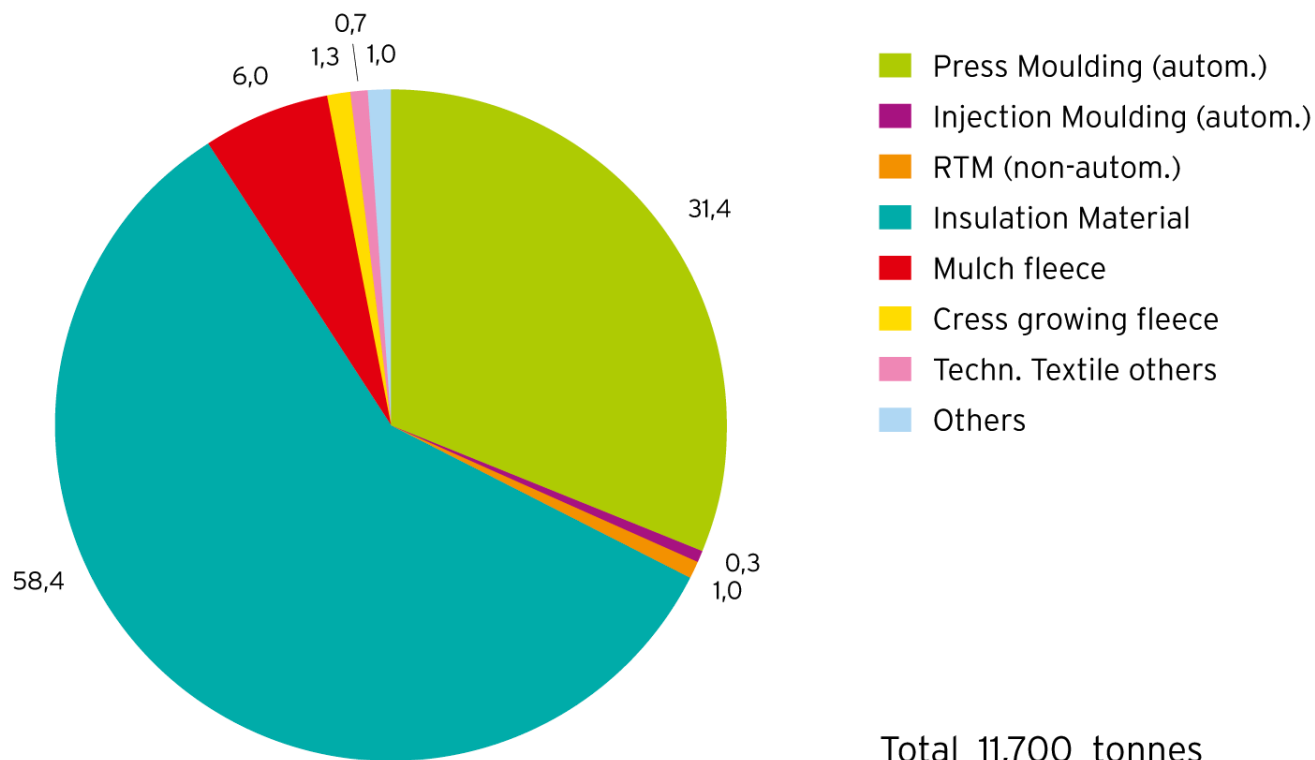


Applications for European hemp fibre from 2010 harvest (in percentage)



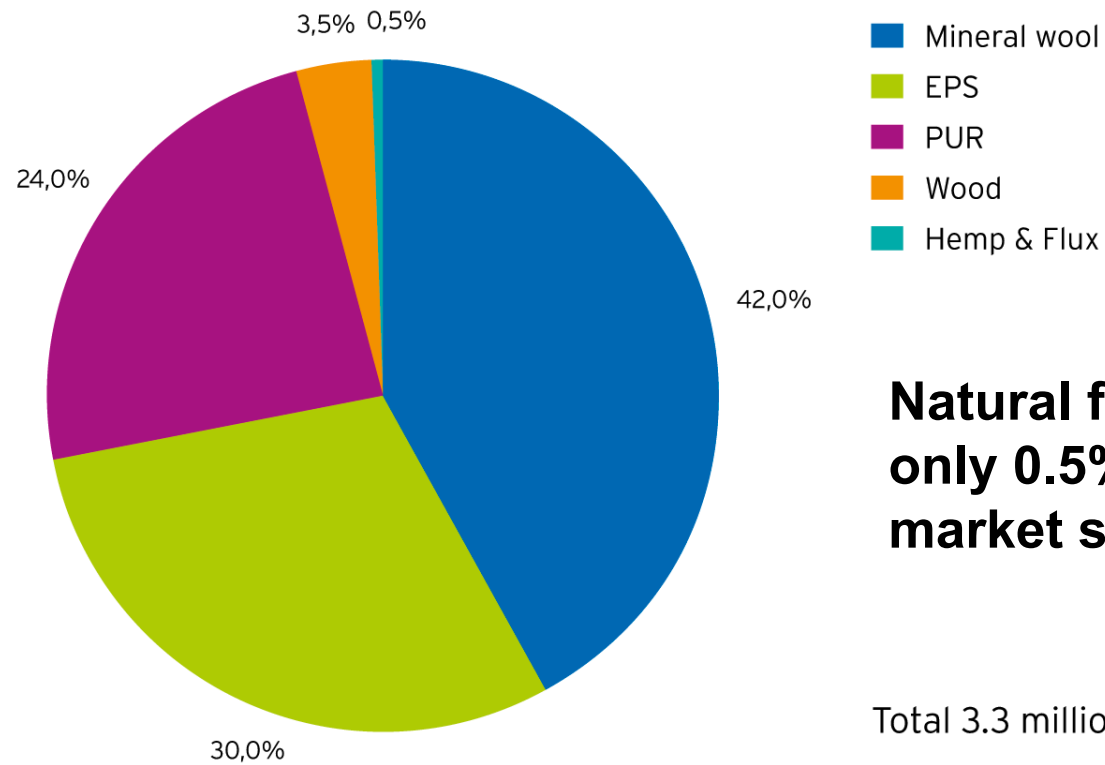


Applications of European hemp fibre (without pulp & paper) from 2010 harvest (in percentage)





European insulation market and shares of types of materials



**Natural fibres
only 0.5%
market share**

Total 3.3 million tonnes



European Automotive Industry



Wood and Natural Fibres Composites for Automobile Interior Parts

- **Total amount: 150,000 t/a (EU27)**
- **Fibre use: 80,000 t/a (EU27)**
Wood, Cotton, Flax, Kenaf, Hemp, Jute, Sisal, Coir
- **Established and stable market with a new potential**
 - Good mechanical properties
 - Light weight
 - Impressive GHG saving
 - Price competitive
 - Good accident behaviour
 - High bio-based share
- **New trends**
 - **Showing the natural fibres** under transparent films or lacquers
 - **Using bio-based polymers** from 50-60% to 100% bio-based

BMW 5 Series



Fibre



Non-woven fleece



Naked door



Finished door

Source: BMW 2008, nova-Institut 2013



30,000 t natural fibres per year in the European Automotive Industry – ca. 4,000 t hemp fibre

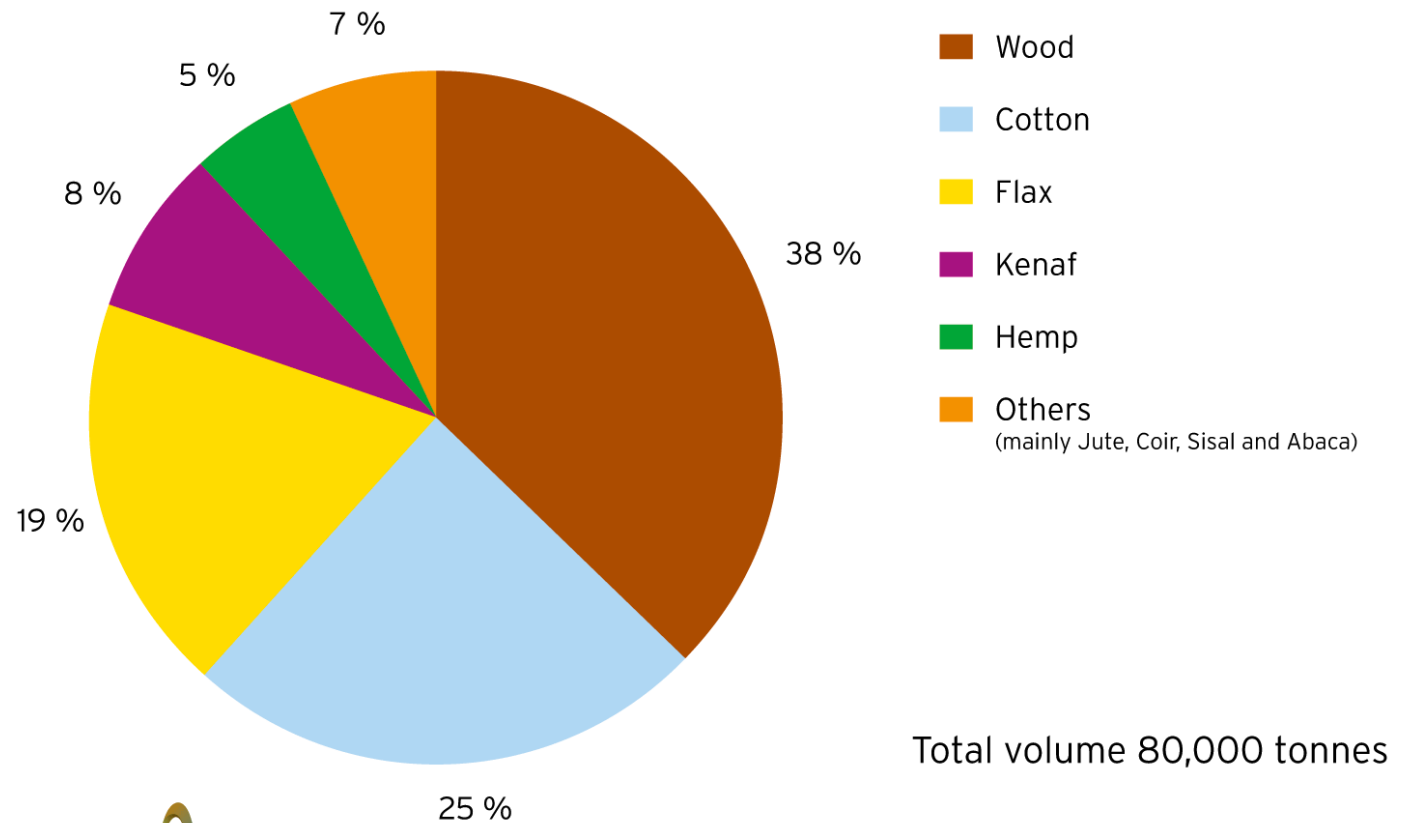
Biocomposites with Natural Fibres, Wood Fibres and Recycled Cotton in the European Automotive Production in 2012

Biocomposites	Volume fibres in tonnes in 2012	Volume biocomposites in tonnes in 2012	Processing technologies	Matrice
Natural Fibre Composites	30,000	60,000	95 % compressing moulding, 5 % injection moulding & others	55 % thermoplastics, 45 % thermosets
Wood-Plastic Composites	30,000	60,000	45 % extrusion & thermoforming, 50 % compression moulding, 5 % injection moulding & others	Extrusion: 100 % thermoplastics, compression moulding: > 90 % thermoset
Recycled Cotton Reinforced Plastics	20,000	30,000	mainly compression moulding	> 90 % thermoset
Total	80,000	150,000		

Table 9.3: Biocomposites with natural fibres, wood fibres and recycled cotton in the European automotive production in 2012, volume of fibres, composites and shares of processing technologies (nova 2014)



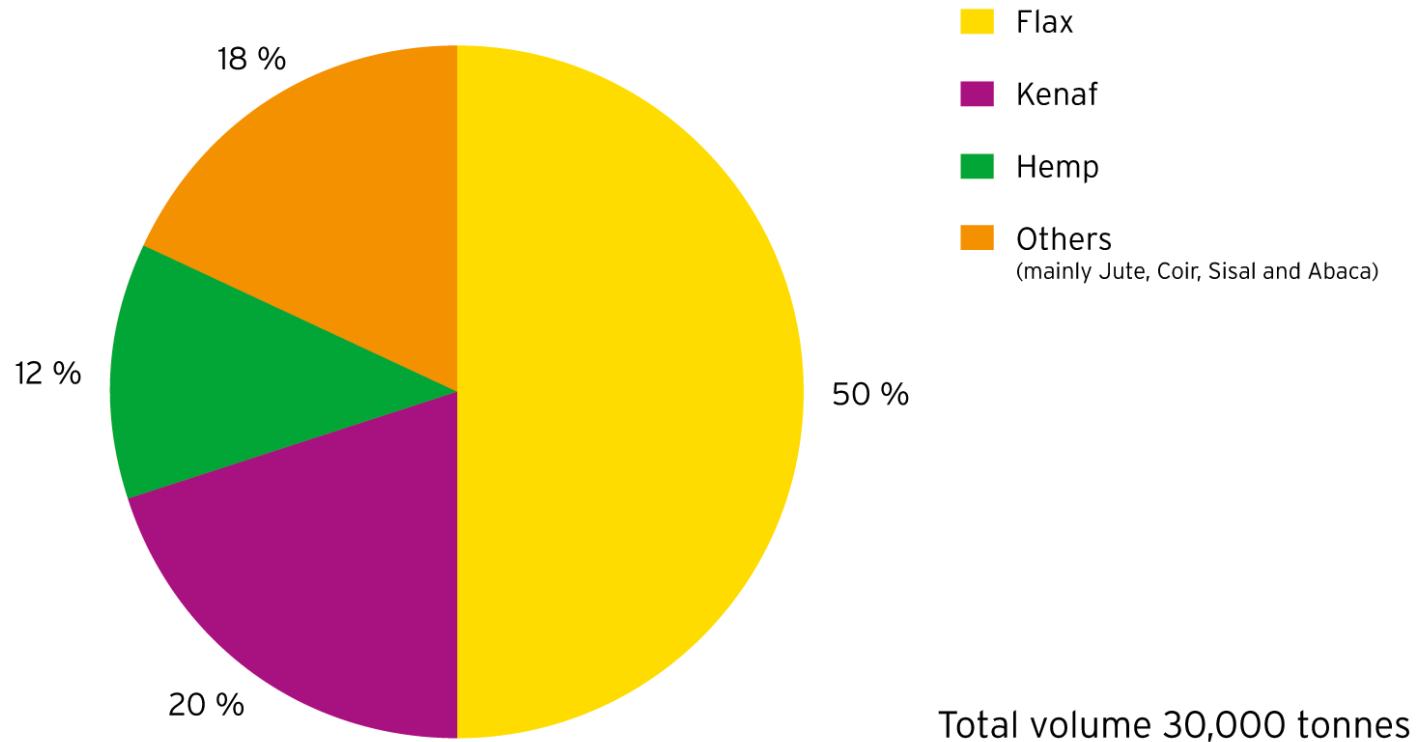
Use of Wood and Natural Fibres for Composites in the European Automotive Industry 2012





Use of Natural Fibres for Composites in the European Automotive Industry 2012

(without Cotton and Wood)

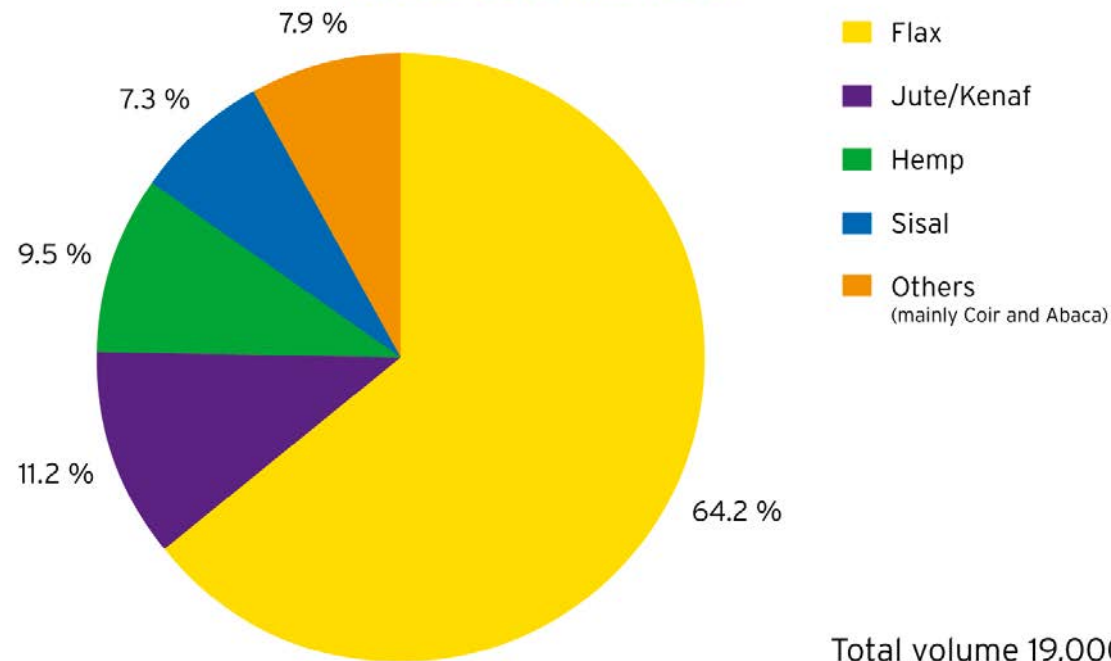




Compared with 2005 (this picture) Kenaf and Hemp fibres were the winner from 2005 to 2012

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

(without Cotton and Wood)





Success story compression moulded parts

Automotive interior parts	Area weight in g/m ²
Injection moulded pure plastic or glass fibre reinforced plastics	> 2,200
Compression moulded PP-NF	1,800
Compression moulded PP-NF with bonding agent MAPP	1,500
Compression moulded Thermosets+NF	1,400
Compression moulded Thermosets+NF In development	800 – 1,000

Superior light weight properties and very attractive low price level



Outlook

Right now, as our survey showed, this would merely result in **about 4 kg natural and wood fibres per vehicle in average in Europe**; but vehicles with considerably larger amounts of **20 kg** natural and wood fibres have been successfully produced in series for years.

A respective revision of the End of Life Vehicles Directive would cost Brussels or the member states nothing and would have crucial steering effects. If the political frameworks would make the use of natural fibres more attractive, biocomposites and natural fibres could really become a great success story.

Any incentive for the use of natural and wood fibres in the European automotive industry could help to extend the existing amount of **30,000 t/y for each natural and wood fibres, up to five times, that means to 150,000 t/y each** – the technologies are ready to use.

A great potential for biocomposites!



Outlook

Biocomposites	Production in 2012	Forecast production in 2020 (without incentives for bio-based products)	Forecast production in 2020 (with strong incentives for bio-based products)
WPC			
Construction, extrusion	190,000 t	400,000 t	450,000 t
Automotive, press moulding & extrusion/thermoforming	60,000 t	80,000 t	300,000 t
Granulates, injection moulding	15,000 t	100,000 t	> 200,000 t
NFC			
Automotive, press moulding	90,000 t	120,000 t	350,000 t
Granulates, injection moulding	2,000 t	10,000 t	> 20,000 t

Source: Carus & Eder et al. 2014

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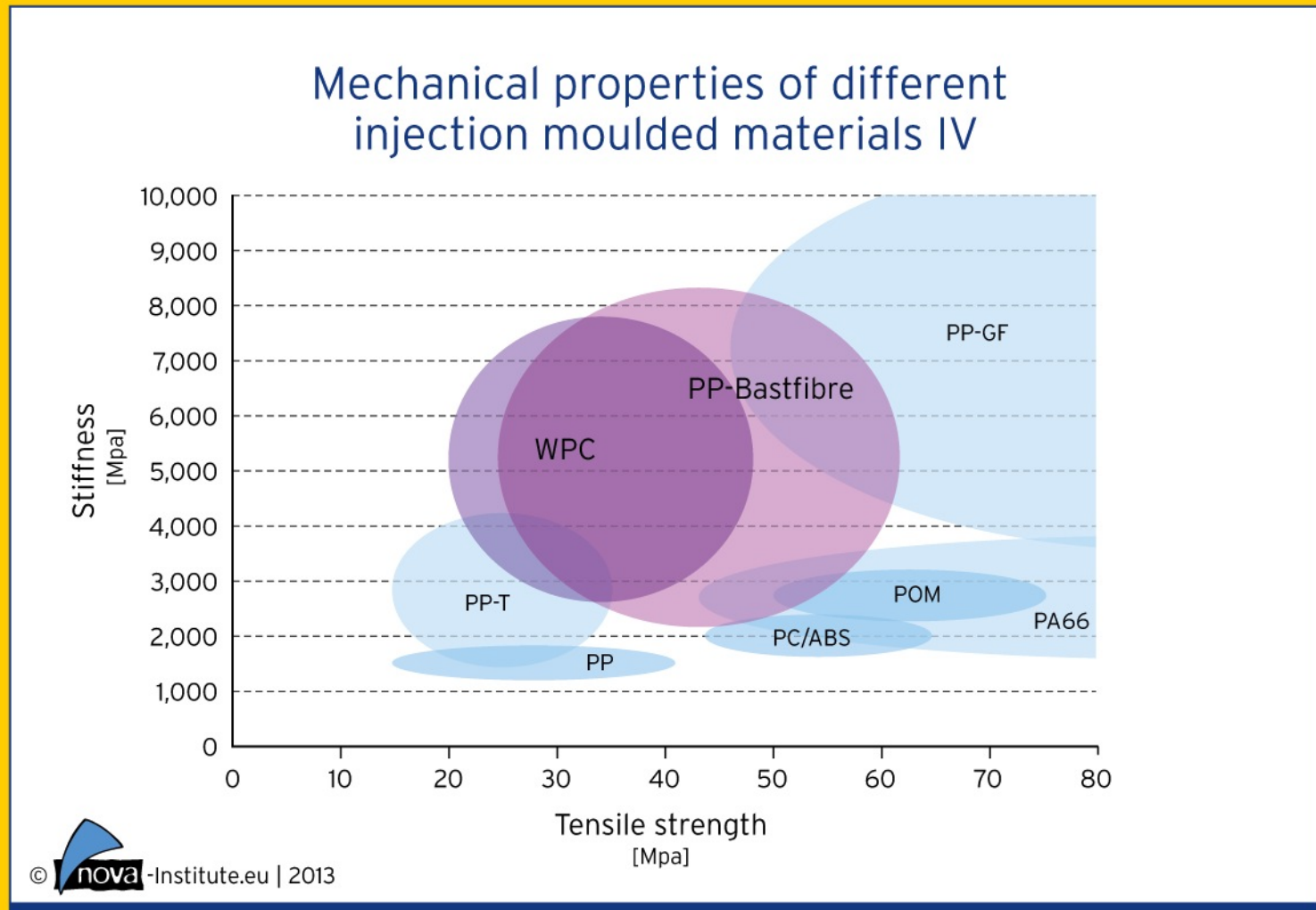


WPC & NFC Injection Moulding

The sleeping giant?



Cellulose- and wood-based Composites – with UPM, Mondi, Weyerhaeuser and Sonae big players entering the market



Source: Carus & Eder et al. 2014



But not only WPC – also Hemp entered a new step in injection moulding

The big tier-one supplier **Faurecia** presented in November at the Los Angeles Auto Show different new natural materials, especially “**NAFiLean, a material employing hemp-based fibers that reduces weight by 20-25 percent compared with standard injection-molded parts.**” (Faurecia 2013)

“Auto supplier Faurecia SA has launched production of an injection molded bio-composite **combining hemp and polypropylene** in Europe, and is looking for opportunities to expand the technology to North America. ... Faurecia’s NafiLean is an injection molding material, which can be used on existing equipment, decreasing the costs of bringing it to market.

Hemp also offers an improved density level over glass or talk, so Faurecia can produce a thinner walled part with the same structural capabilities. In the case of the 308, **it is saving 400 grams per door panel**, he said.

Faurecia is continuing to test NafiLean’s prospects in other parts, especially instrument panels, and is looking at **beginning production in the U.S.** It is lining up material suppliers as well, including sources for hemp.

In testing, hemp has been the best natural material for bio-composites because it works best with the PP chemistry.” (Miel 2013)



Thank you for your attention!



Michael Carus, CEO

Division Head “Bio- and CO₂-based Economy”

Tel.: +49 (0) 2233 – 48 14-40

E-Mail: michael.carus@nova-institut.de



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