

Cotton vs. Hemp



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First things first...

hemp is NOT marijuana

Although both are varieties of *cannabis sativa*...

Marijuana contains between 3% and 10% THC while industrial hemp contains less than 0.3%

Long, slender, densely-packed stalks of male or monoecious hemp plants are used for hemp

The flowering part of shorter, bushy female plants are used to cultivate the drug



Energy Use

ENERGY REQUIREMENTS

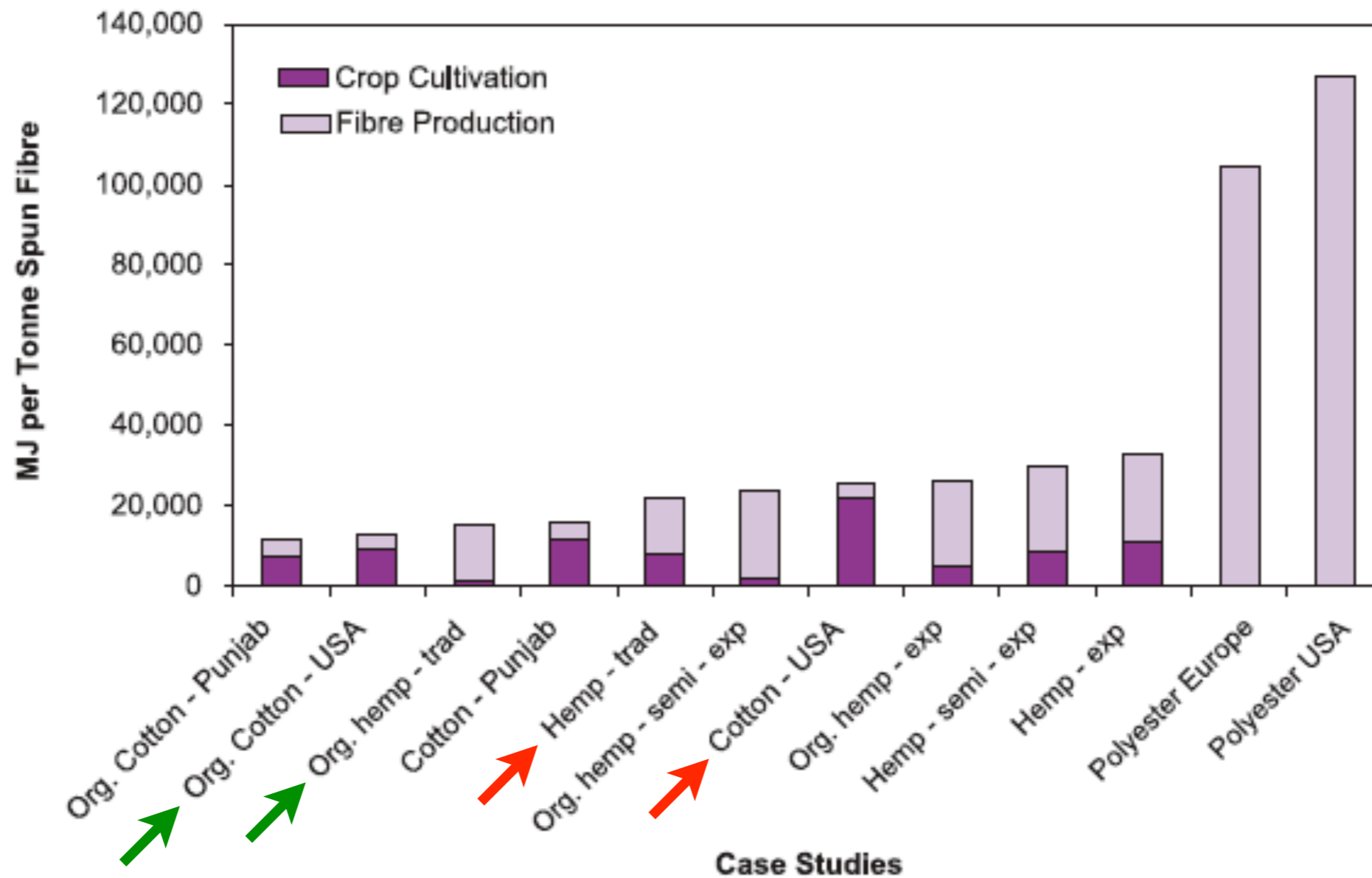


Figure 3. Total energy (in megajoules) required to produce one tonne of spun fibre

Carbon Dioxide Emissions

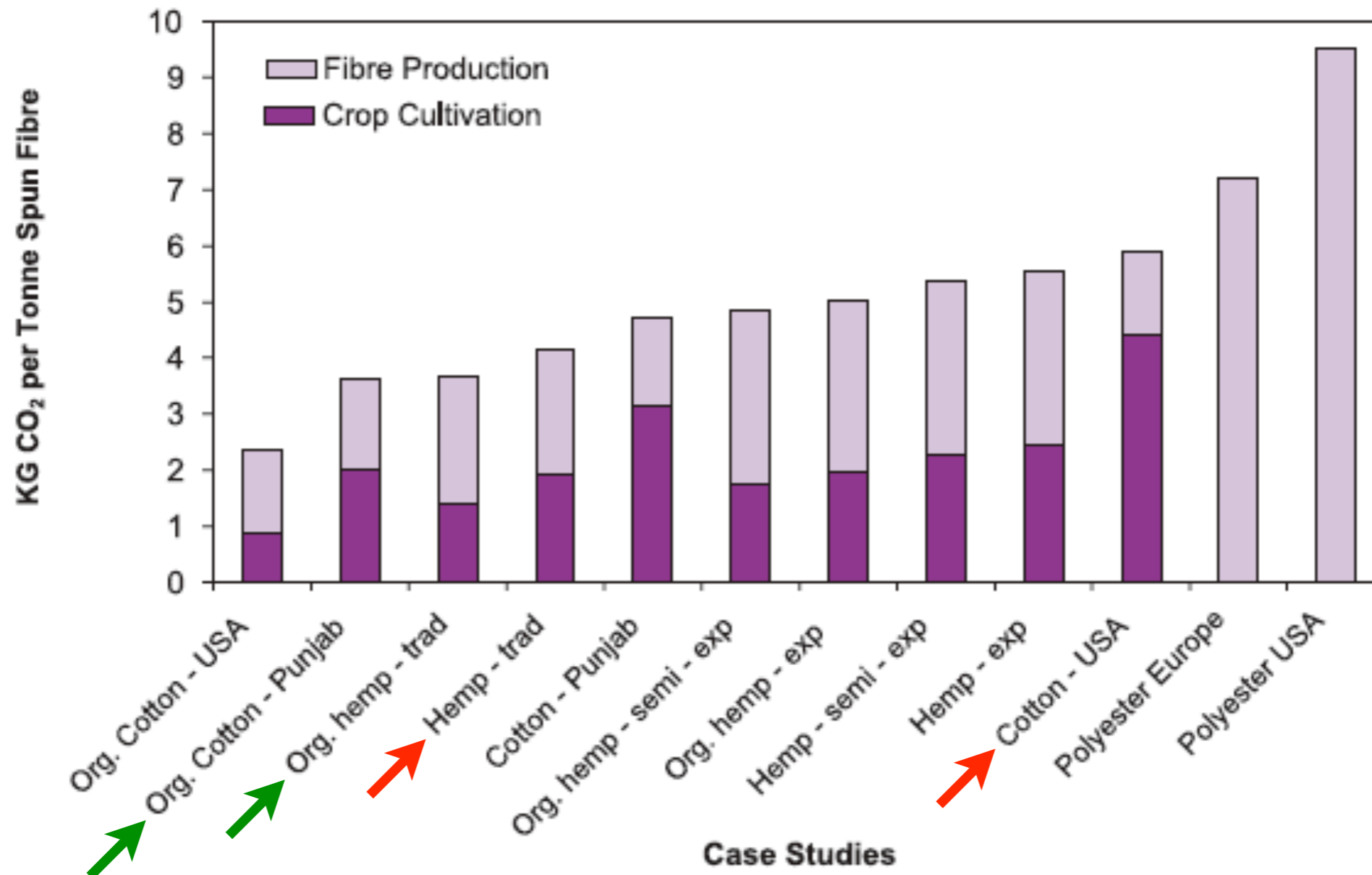
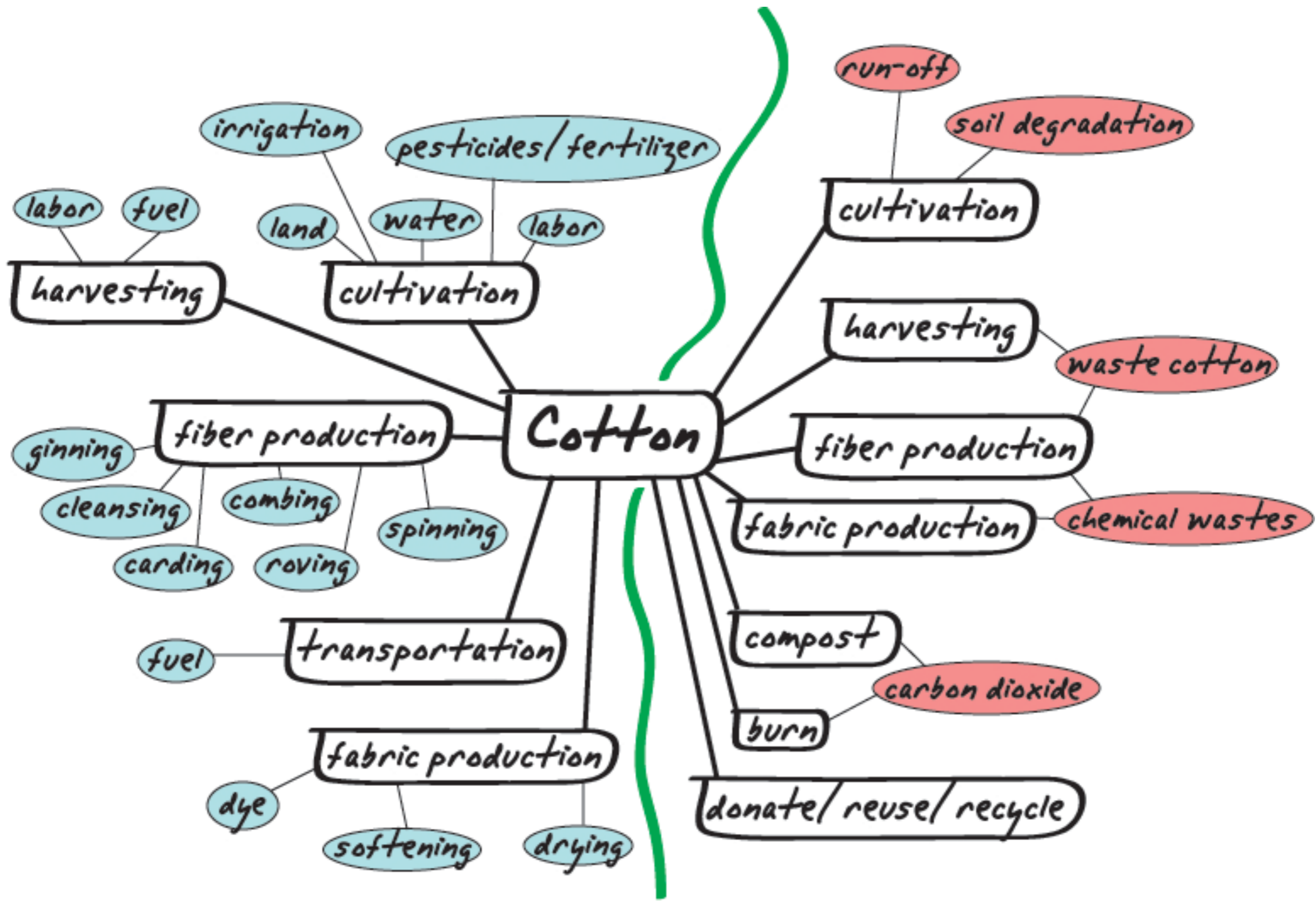


Figure 4. CO₂ emissions (in kilograms) associated with the production of one tonne of spun fibre



Cotton: The Bad

Cotton is one of the most water- and pesticide-intensive crops in the world

Cotton crops in the USA occupy 1% of the country's farmland but use 50% of all pesticides

Requires about 40 inches of water per season (Cotton Inc.)

Conventionally grown cotton fabric is rated at 17 Okala millipoints/lb; organic cotton fabric is rated at 4-9 Okala millipoints/lb.



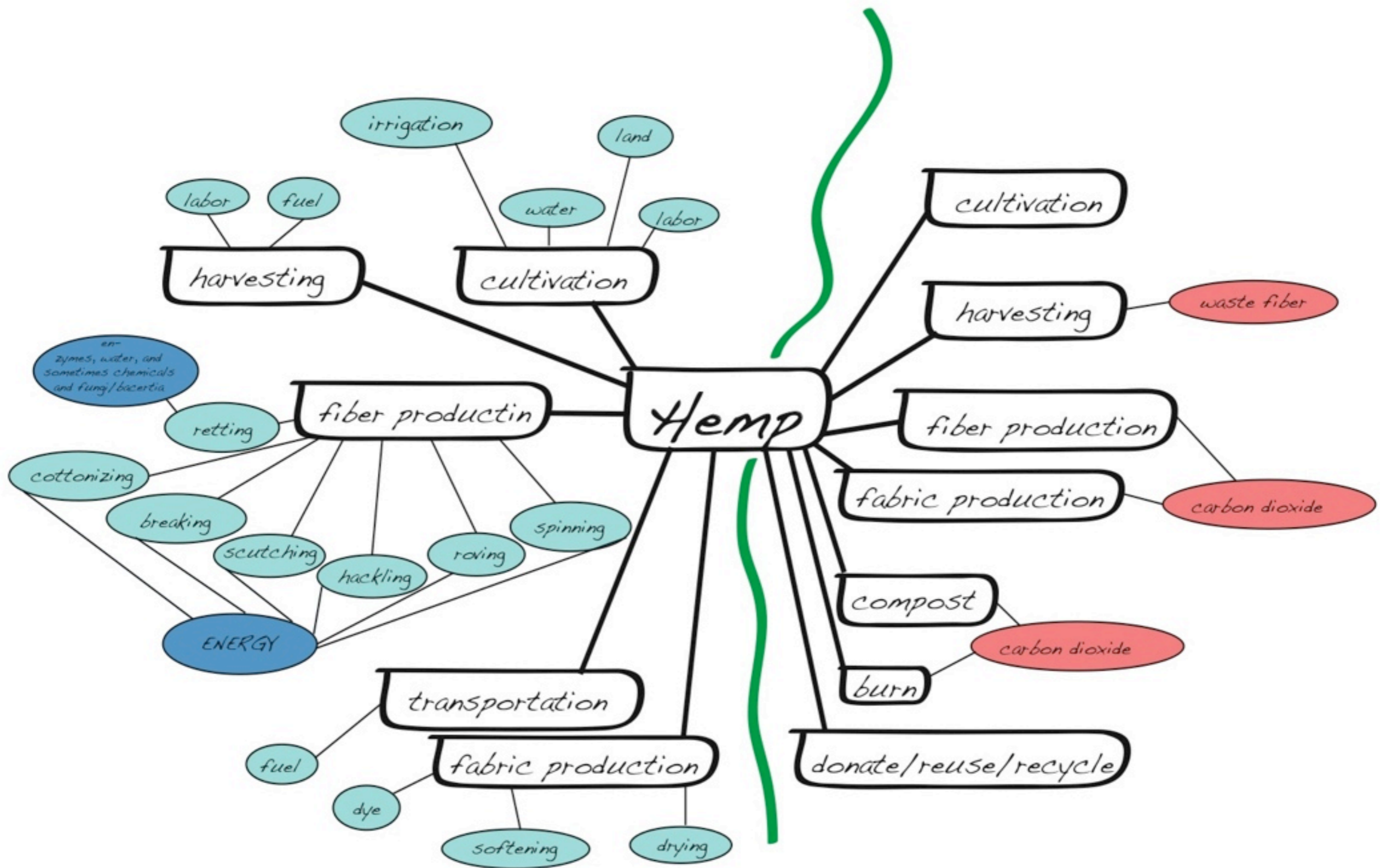
Thinking Positive: Cotton

Growing organic cotton combined with producing fiber and fabric uses less energy than growing and producing hemp - organic and traditional

Organic cotton does not use any synthetic pesticides or fertilizers, meaning no toxic runoff

Naturally colored cotton fibers exist – and with environmental concerns on the rise, they are having a revival: commercially they come in naturally brown, rust, red, beige, and green colors; breeders hope to add blue, lavender, and yellow





Why Not Hemp?

Hemp comprises only 0.15% of the world's agricultural production and is therefore unavailable to most consumers

Water retting uses a lot of energy (it needs to heat water to 30°C) and creates 20 tons of water per ton of straw and ten tons for washing and rinsing

Hemp textiles are usually thicker than cotton, wool or chemical fibres

In order to make hemp more comfortable, i.e. feel more like cotton, it is often “cottonized” through energy intensive methods

Hemp is sometimes called a “pathogen-free” crop; some researchers suggest that essential oils or cannabinoids are responsible for its heartiness BUT it is possible that it is because hemp has been a marginal crop and this may change if it is grown on a greater industrial scale

Currently there are no efficient technologies to harvest hemp (it's too productive for existing technologies!)



Hemp: Miracle Crop?

From planting to harvest takes only 90 days allowing for complementary crop rotation

1 acre of hemp will produce as much as 2-3 acres of cotton

Industrial hemp-fiber yield appears to be roughly three times per acre that of domestic cotton

Because hemp is naturally resistant to most insects and disease, very little to no pesticides or herbicides are needed

Hemp requires between 10 to 14 inches of rainfall or irrigation during the first six weeks of growth, and that much again throughout the growing season. Irrigation needs are less than those of many competing crops

Hemp actually extracts and accumulates heavy metals such as copper, lead, zinc, and cadmium from the soil

The total extracted and fixed copper can reach 377g per hectare; lead - 141 g per hectare

Hemp is very competitive with weeds - it can grow 10mm a day during its fast growth phase

Hemp's nutrients are concentrated in roots, which are left behind at harvesting, and leaves, which can be returned to the fields, thus returning nutrients to the soil



Ecological Footprint

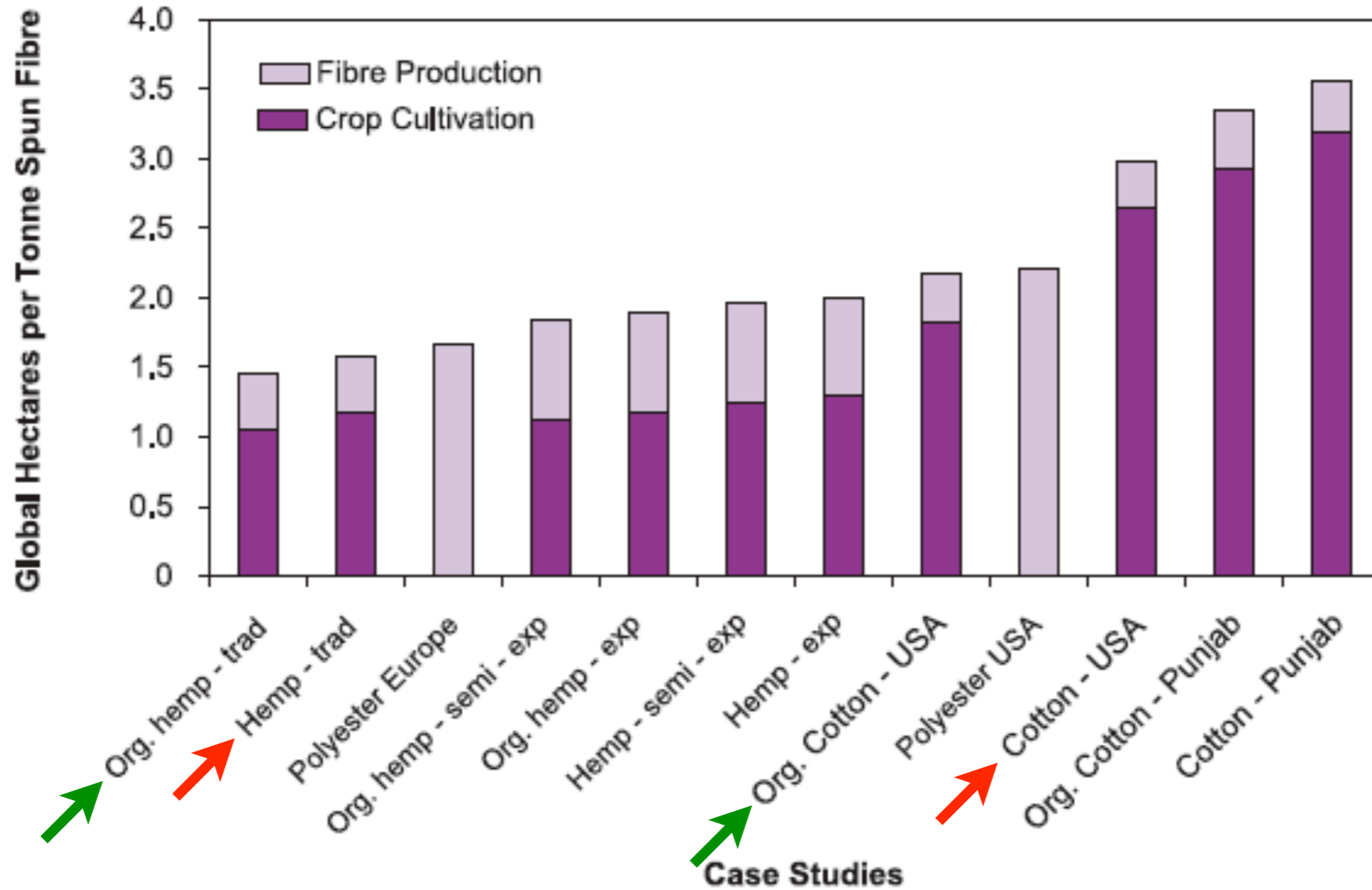


Figure 5. The Ecological Footprint (in global hectares) of producing one tonne of spun fibre

Transportation (UK)

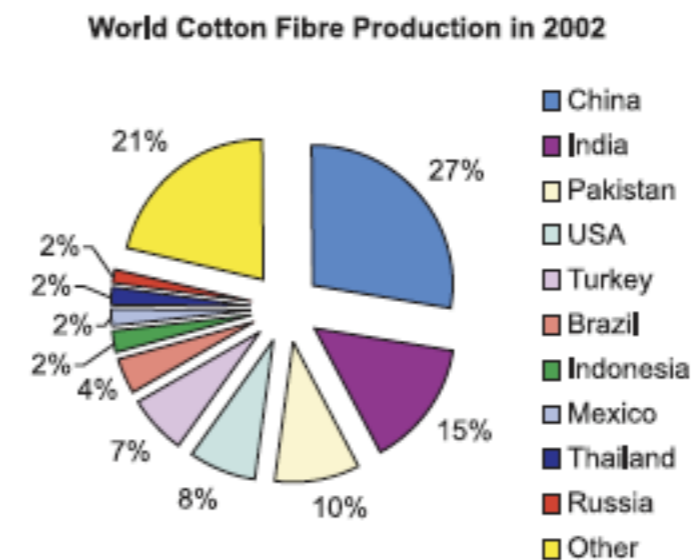
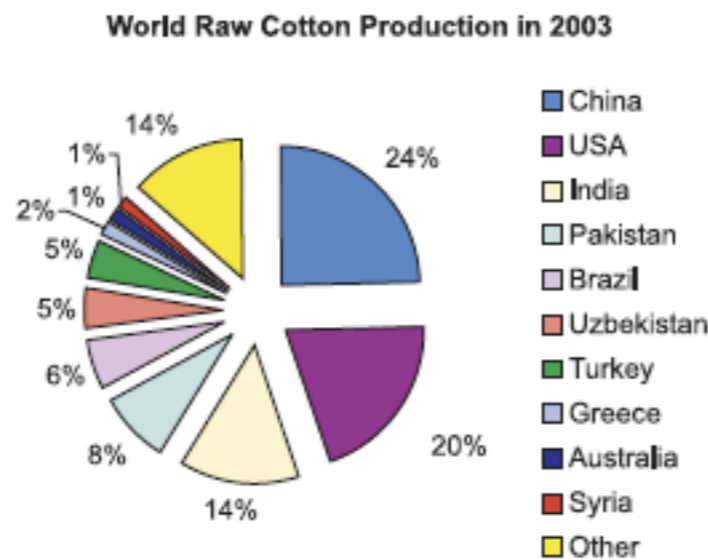
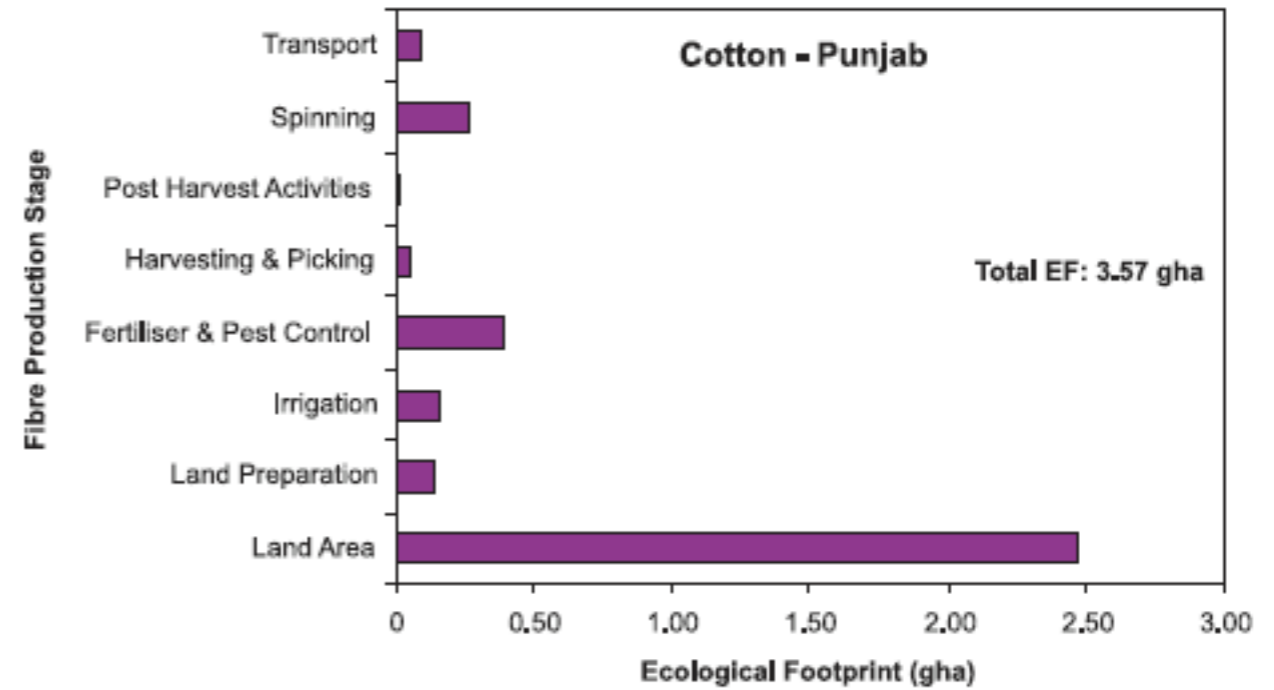
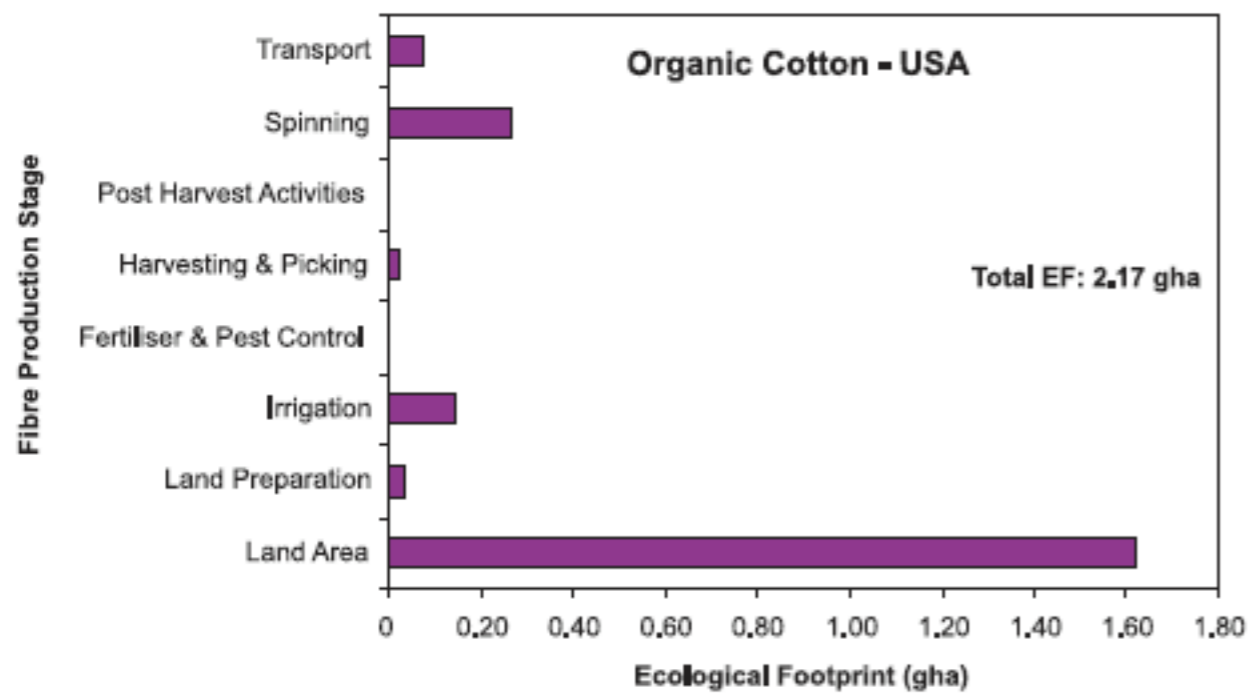


Figure 1. Global cotton production in 2003, for raw cotton, and 2002, for cotton fibre (Source: USDA, 2004 and ICAC, 2003)

Alternatives: Polyester?

Polyester fiber manufacturing requires six times the average energy required to produce either cotton or industrial hemp fiber

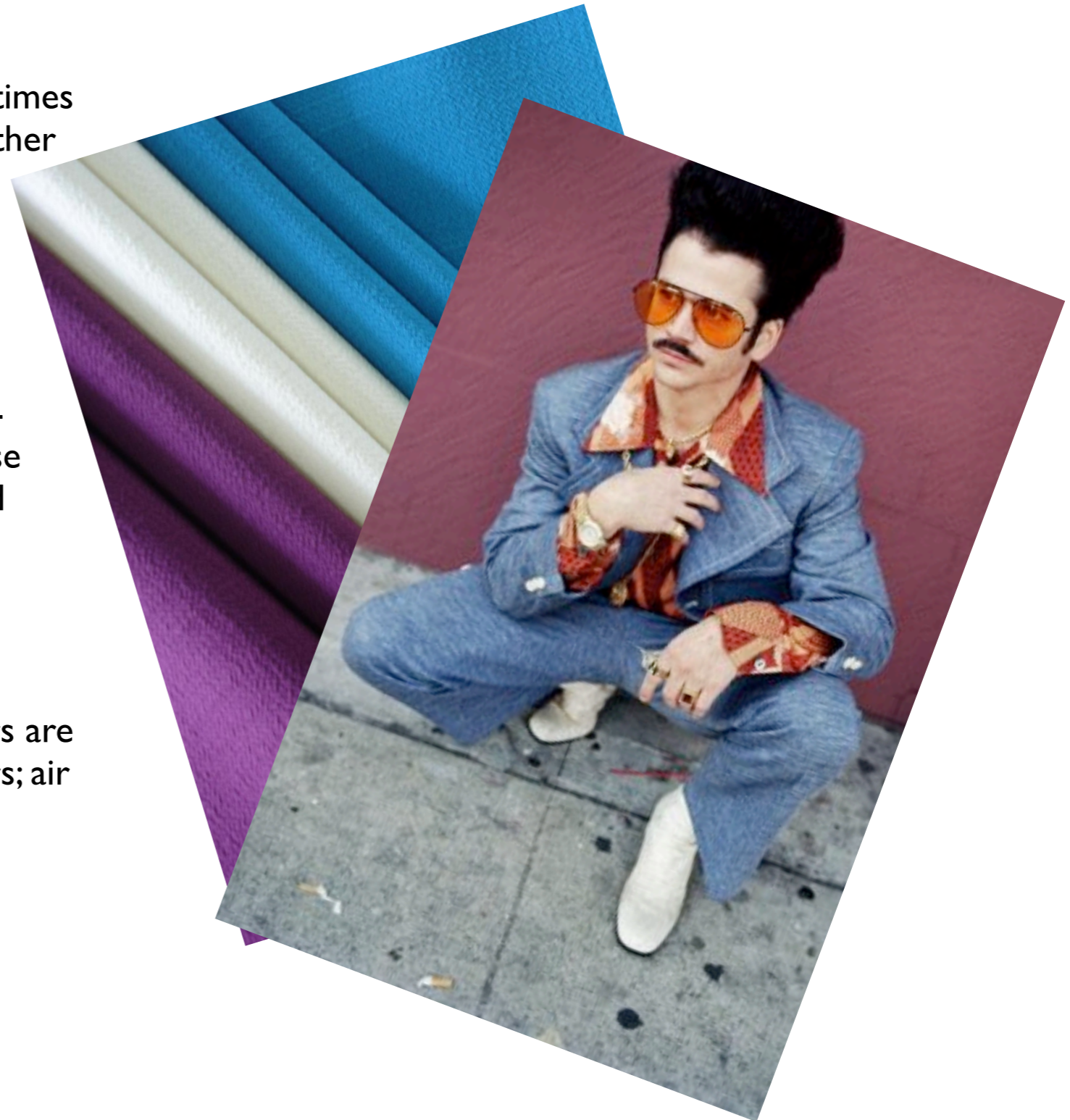
Generates particulate pollution, as well as carbon dioxide, nitrogen oxides, sulphur oxides, and carbon monoxide

It is processed from petrochemicals, a non-renewable resource; although some of these are by-products of oil refineries that would otherwise be considered waste

Okala rating for virgin polyester: 130 millipoints/lb.

An upside of polyester? It is recycled. Fibers are made from bottle-grade recycled polyesters; air pollution can be reduced up to 80%

However, polyester is not biodegradable



Alternatives: Lyocell?

Lyocell belongs to a class of fibers called *manufactured regenerated fibers* which are produced from naturally occurring polymers

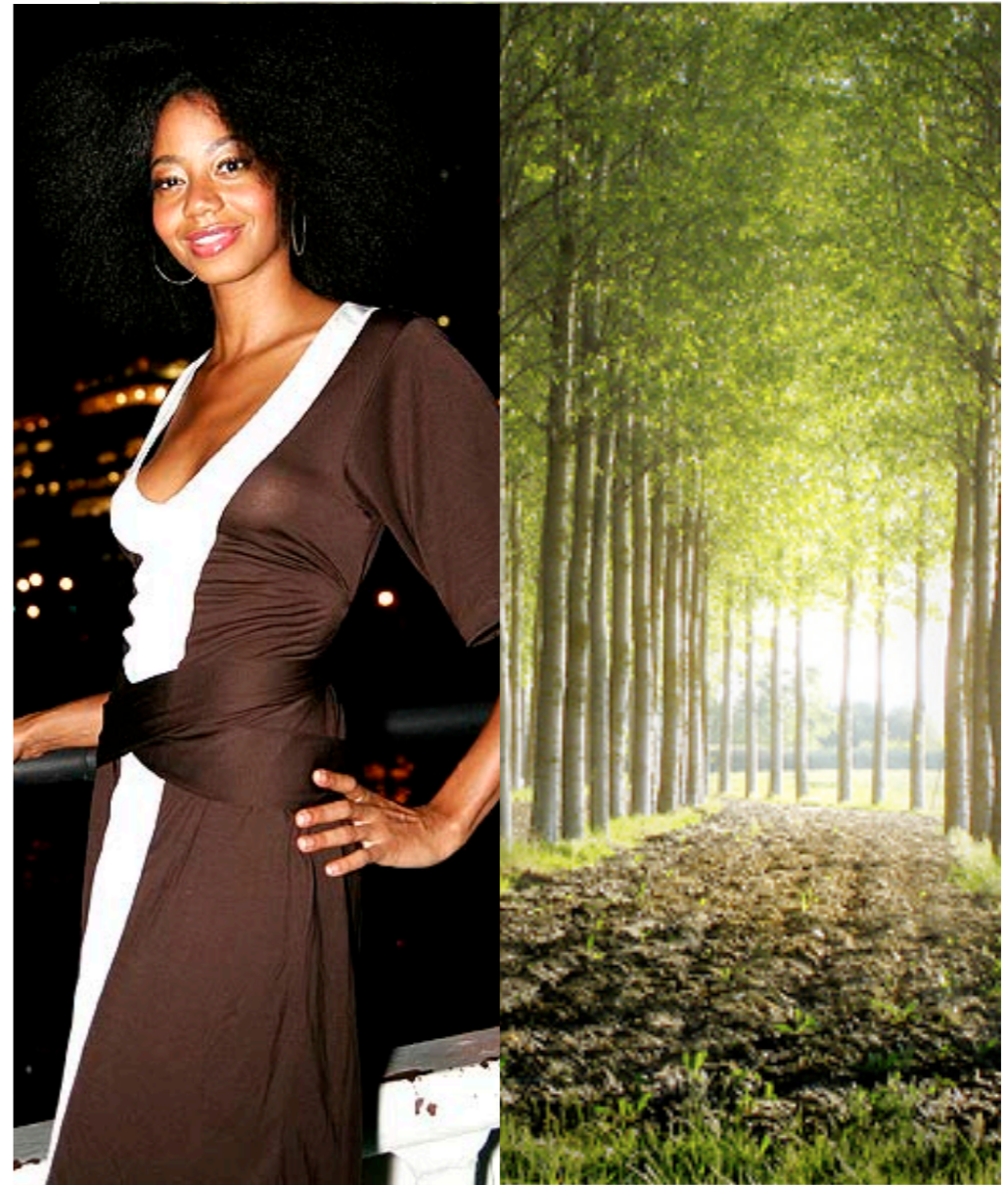
These polymers do not occur naturally as fibers and have to be processed

Lyocell performs more like cotton than rayon, the first mrf that has since been regarded as being environmentally unsound

Lyocell is made by dissolving the cellulose in wood pulp in a solvent that is then recycled and reused in a very efficient cycle (it is therefore a technical nutrient in a closed loop cycle)

As a manufactured fiber, the properties of lyocell can be manipulated according to end use

A study by Lenzing Fibers Ltd. found that lyocell products are biodegradable (Lenzing produces the lyocell brand name fabric Tencel)



Recommendations

- Legalize Hemp!
- Buy Hemp or Lyocell!
- Buy Organic!

