

TEXTILES AND THE ENVIRONMENT

Environmental impacts can occur at every stage of the textile lifecycle (raw materials, production, use and disposal), irrespective of fiber type.

There are environmental problems associated with the production of manmade fibers, such as intensive energy use and generation of hazardous air emissions. There are also potential environmental problems associated with growing natural fibers, including the use of pesticides and degradation of the land.

The major positive and negative aspects of the main fiber types are summarised below.

The positive and negative environmental aspects are identified as follows:

+ positive environmental aspect

- negative environmental aspect

FIBER	+	-
Cotton NATURAL FIBER	<ul style="list-style-type: none"> • rapidly-renewable resource • local sources are available • fiber is used in its least-processed state • able to absorb and retain Volatile Organic Compounds (VOCs) • biodegradable • reusable and recyclable 	<ul style="list-style-type: none"> • can use large quantities of insecticides and fertilizers • the use of aerial spraying spreads chemicals widely into the environment • intensive farming can lead to land degradation • can use large amounts of water for irrigation • often hazardous defoliant are used to remove the leaves from the plant
Wool NATURAL FIBER	<ul style="list-style-type: none"> • rapidly-renewable resource • abundant local sources are available • sheep can graze on dry, unusable land • fiber is used in its least-processed state • able to absorb and retain Volatile Organic Compounds (VOCs) • naturally fire retardant and antistatic • easily cleanable • biodegradable • reusable and recyclable • holistic sheep farming practices can have a positive impact on degraded land 	<ul style="list-style-type: none"> • often involves the use of pesticides and fertilizers • sheep farming can degrade the land • wool scouring can consume large amounts of water and chemicals, and produce heavily polluted waste-water • insect-resist / mothproofing treatments may cause health problems as well as producing effluent, toxic to aquatic life • often involves the use of water-polluting, heavy-metal dyes <p>NB: The negative aspects of wool are significantly reduced in the design and production of LIFE Textiles®</p>
Flax, Ramie and Hemp NATURAL FIBER	<ul style="list-style-type: none"> • rapidly-renewable resource • can grow with virtually no fertilizers or water • fiber is used in its least-processed state if the plant is cut by hand and left to rot in the ditch, then the environmental load on the planet is minimal • reusable and biodegradable 	<ul style="list-style-type: none"> • mechanical methods of harvesting have adverse effects on the environment • water retting process produces highly polluting wastewater • use of enzymes and water increases biochemical oxygen demand (BOD) and eutrophication of waterways

Environmental Impact of Textiles (continued)

FIBER	+	-
Silk NATURAL FIBER	<ul style="list-style-type: none"> • rapidly-renewable resource • fiber is used in least-processed state • can grow with virtually no insecticides and fertilizers • wild (tussah) silk production involves minimal interference with nature • naturally flame retardant • reusable and biodegradable 	<ul style="list-style-type: none"> • no local sources available for commercial use • commercially available cultivated silk is resource intensive as atmospheres are controlled and rigid growth conditions are employed • extraction of the fibers by steaming kills the silk chrysalis • the cleaning process involves chemicals and the polluted waste water is usually discharged to the ground water
Natural bamboo NATURAL FIBER See also manmade bamboo below	<ul style="list-style-type: none"> • rapidly-renewable resource • can grow with virtually no fertilizers or water • fiber is used in its least-processed state • if the plant is cut by hand and left to rot in the ditch, then the environmental load on the planet is minimal • reusable and biodegradable 	<ul style="list-style-type: none"> • no local sources available for commercial use • mechanical methods of harvesting have adverse effects on the environment • water retting process produces highly polluting wastewater • use of enzymes and water increases biochemical oxygen demand (BOD) and eutrophication of waterways
Manmade Bamboo MANMADE FIBER NB. Most commercial textiles available utilize manmade bamboo	<ul style="list-style-type: none"> • rapidly-renewable (bamboo pulp) resource • reusable and biodegradable 	<ul style="list-style-type: none"> • no local sources available • bamboo grown intensively in inappropriate areas can cause soil degradation and erosion • can generate highly-polluting air and water emissions • can use catalytic agents containing cobalt or manganese processing causes strong, unpleasant odour
Rayon, Viscose and Acetate MANMADE FIBER	<ul style="list-style-type: none"> • renewable (purified wood pulp) resource • reusable and biodegradable 	<ul style="list-style-type: none"> • no local sources available • wood grown intensively in inappropriate areas can cause soil degradation and erosion • can generate highly-polluting air and water emissions • can use catalytic agents containing cobalt or manganese • processing causes strong, unpleasant odour
Polyester (PET) SYNTHETIC FIBER	<ul style="list-style-type: none"> • melt-spun fiber - melt spinning is relatively cleaner than dry and wet spinning 	<ul style="list-style-type: none"> • non-renewable resource • no local sources available • long line of processing • often involves use of carcinogenic chemicals such as benzene, toluene, arsenic, and heavy metals including antimony • allergy-provoking dyes and carriers are added • energy and water intensive • non-degradable • no recycling infrastructure

Environmental Impact of Textiles (continued)

FIBER	+	-
Recycled Polyester (Recycled PET) SYNTHETIC FIBER	<ul style="list-style-type: none"> produced from manufacturing waste or consumer waste 	<ul style="list-style-type: none"> no local sources available often involves use of carcinogenic chemicals such as benzene, toluene and heavy metals including antimony allergy-provoking dyes and carriers are added non-degradable no recycling infrastructure
Nylon SYNTHETIC FIBER	<ul style="list-style-type: none"> melt-spun fiber - melt spinning is relatively cleaner than dry and wet spinning 	<ul style="list-style-type: none"> non-renewable resource no local sources available long-line of processing many carcinogenic chemicals such as benzene and hydrogen cyanide gas (nylon 6,6) are added manufacture creates nitrous oxide, a greenhouse gas 296 times more potent than carbon dioxide for producing global warming high-embodied energy, compared to other synthetic fibers energy and water intensive non-degradable no recycling infrastructure
Olefin - Polypropylene and Polyethylene SYNTHETIC FIBER	<ul style="list-style-type: none"> melt-spun fiber - melt spinning is relatively cleaner than dry and wet spinning lower-embodied energy compared to other synthetic fibers 	<ul style="list-style-type: none"> non-renewable resource no local sources available long-line of processing many carcinogenic chemicals such as lead based pigments are used additives such as anti-oxidants (to resist discolouring and loss of mechanical properties), UV stabilizers and flame retardants (because PE and PP undergo combustion more readily than any other common synthetic fiber) energy and water intensive non-degradable no recycling infrastructure

Environmental Impact of Textiles (continued)

FIBER	+	-
<p>Acrylic SYNTHETIC FIBER</p>		<ul style="list-style-type: none"> • non-renewable resource • no local sources available • dry-spun fiber and therefore more polluting • long-line of processing • many carcinogenic chemicals such as vinyl acetate (on priority lists for EPA) , acryl amide (unknown carcinogen), N,N-dimethyl-formamid (classified as dangerous to the environment) and acrylonitrile (also known as vinyl cyanide) • non-degradable • no recycling infrastructure
<p>Polyvinylchloride (PVC) SYNTHETIC FIBER</p>	<ul style="list-style-type: none"> • lower-embodied energy compared to other synthetic fibers 	<ul style="list-style-type: none"> • non-renewable resource • no local sources available • long-line of processing • produced by wet or dry spinning, which is more polluting than wet spinning • many carcinogenic chemicals such as phthalates are added. Phthalates are known endocrine disrupters • PVC production produces dioxins, highly toxic substances that are linked with cancer. Dioxins are a global health threat because they persist in the environment and in mammals • non-degradable • PVC is harmful to the environment after disposal