

SOGFASH



Social Growth
for Circular
Fashion



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Materiality Textiles & Raw Materials



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FASHION
REVOLUTION
CZECH
REPUBLIC

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- to gain an understanding into current innovations in sustainable textiles
- to gain a basic understanding of new sustainable materials classification used in fashion industry nowadays
- to help critically analyse problematic factors within the material production and consumption
- to gain an understanding of material value and ability to define its different aspects
- to gain an understanding of pre-consumer fashion waste and problems related to discarded clothes
- to understand what is deadstock and how can be used
- to name different examples of companies using deadstock and industry waste nowadays
- to understand the importance of sustainable material sourcing and sustainable sourcing goals
- to gain a knowledge of what Fairtrade means
- to adopt related terminology such as biodegradable, circular economy, recycled, upcycled, etc.

MATERIALITY / TEXTILES & RAW MATERIALS

Explores current shifts and innovations in materiality, new sustainable textiles and its sourcing for garment manufacturing. This module engages mentees in understanding and adopting principles of circular economy within the area of textile sourcing as a reaction to urgent environmental and ethical crises caused by the fashion industry nowadays.



alginate bioyarn / Martin Benes

This section:

- informs about current innovations in new sustainable textiles and justify their use in the fashion industry
- helps critically analyse problematic factors within the material production and consumption
- describes an importance of understanding different aspects of defying the material value
- offers a basic classification of new sustainable materials for fashion

1.1 BACKGROUND INFORMATION AND INSPIRATION

DEFYING THE PROBLEM - WHAT IS WRONG WITH CURRENT MATERIAL PRODUCTION AND CONSUMPTION?

An estimated 350,000 tonnes of used clothing end up in landfill each year just in the UK (Wrap, 2012). Many of them are made from synthetic materials like polyester which commercial production is constantly growing due to its cheap price. Synthetic textiles are the largest source of both primary and secondary microplastics, accounting for 34.8% of global microplastics pollution, with around 700,000 microfibres being released in every wash cycle.

It has been estimated that 1.4 million trillion microfibres are currently in the oceans and if the fashion industry continues in a business-as-usual scenario, between 2015 and 2050, 22 million tonnes of microfibres are expected to enter our oceans (Fashion Revolution, 2019). From looking at global textile waste polluting all our environments, it is clear that slowing the climate change lays on redefining our relationship with materials we produce and consume.



THE LOST VALUE OF MATERIALS

The cost, value and worth of commodities have become blurred. We are no longer seeing value in our possessions, but instead seeing them as disposable, our relationship to our clothes has been distorted (McCartney, 2019). We have become disengaged with our material environment, losing sight of an object's value and how they have been made (Adamson, 2018). Garments are frequently purchased and discarded without consumers considering the impact on our environment.

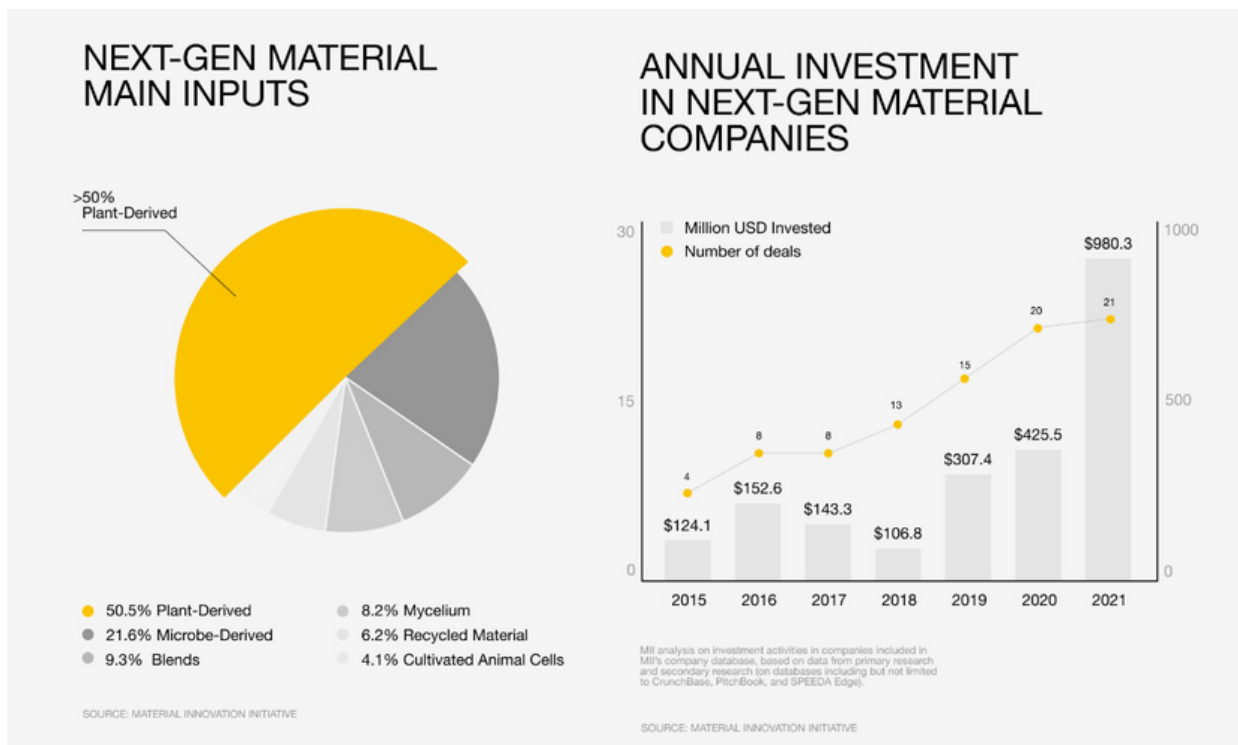
To tackle this disconnection from garments we wear and materials they are made of it is important to list a certain selection criteria. Those include 8 goals of sustainable textile sourcing (see page 17):

- 1.SOURCING FOR CIRCULAR ECONOMY
- 2.SOURCING RESOURCEFULLY
- 3.SOURCING LOCALLY
- 4.SOURCING REASONABLE QUANTITY
- 5.SOURCING FOR FAIR PRICE
- 6.SOURCING TRANSPARENTLY
- 7.SOURCING THROUGH STRONG RELATIONSHIPS
- 8.SOURCING FROM GREEN SUPPLIERS

1.2 BASIC CLASSIFICATION OF NEW SUSTAINABLE MATERIALS

This chapter offers a basic classification of new materials based on their chemical or biological properties as stated in Next-gen materials, industry report for 2021 by Material Innovation Initiative, monitoring the investments into innovative materials market as well as monitoring its product segmentation.

Next-gen materials are more sustainable materials that are both animal-free and more conscious to our planet. They offer direct alternatives for animal derived products like leather, silk, wool, fur and exotic animal skins. These materials are usually plant-based or made with recycled fibers, but can also include mycelium and microbe-derived structures.



next gen materials / MII

PLANT-DERIVATED MATERIALS

| MATERIAL | SOURCE | CHEMICALS USED IN FARMING/ SPINNING PROCESS | WATER CONSUMPTION | ETHICS - SOCIAL, ENVIRONMENTAL AND ANIMAL RIGHTS | MICRO PLASTICS | BIODE GRADABILITY |
|--------------------------|---|--|--|--|----------------|-------------------|
| 1 Conventional cotton | Cotton plant (using pesticides) | very high chemical pesticides and fertilisers pollute soil, water and air. It is on the most pesticides-dependant crops | very high It takes around 2.5 kilolitres of water to make cotton for 1 t-shirt | low standarts high suicide rates, cancer and negative health effects on farmers | no | yes |
| 2 Organic cotton | Cotton plant Organic cotton farming creates a biodiverse crop, that means that other crops can also flourish side-by-side, aiding soil fertility | low almost none of the chemical pesticides and fertilisers are used | high less than conventional cotton but still quite high (the aletnative might be a rain-fed crops) | standart | no | yes |
| 3 Linen | Flax plants | low doesnt require pesticides or fertilisers to grow | low | standart | no | yes |
| 4 Hemp | Cannabis Sativa | low doesnt require pesticides or fertilisers to grow | low | standart | no | yes |
| 5 Tencel | Eucalyptus plant can grow on marginal lands which are not suitable for farming meaning that its production doesnt compete with e.g. the food production. It as a regenerated cellulose fibre made by dissolving pulp and then reconstituting it by dry jet-wet spinning. | low Tencel is produced through a closed loop process, a system in which virtually all chemicals are captured and reused, rather than being emitted into environment as pollutants | low Grows quickly without irrigation and doesnt need a chemical pesticides or fertilisers | standart | no | yes |
| 7 Rayon / Viscose | Wood is linked to deforastation which contributes to climate change | very high A highly polluting process that releases many toxic chemicals into the air and waterways sorrounding production plants | very high to standart The water footprint of viscose varies significantly depending on the type of fibre and production process | low standarts Deforestation and impact on animal populations. linked to higher levels of coronary heart disease, birth defects and cancer in textile workers as well as those who live near viscose factories | no | yes |
| 8 Piñayarn® | Pineapple Leaf Fibre an agricultural waste product, which means that no extra land, water or pesticides are required to produce the raw material. | very low | very low | high standarts Byproduct / agricultural waste - no extra land, water or pesticides are required to produce the raw material | no | yes |



PLANT BASED BLENDS

| MATERIAL | SOURCE | CHEMICALS USED IN FARMING/ SPINNING PROCESS | WATER CONSUMPTION | ETHICS - SOCIAL, ENVIRONMENTAL AND ANIMAL RIGHTS | MICRO PLASTICS | BIODEGRADABILITY |
|------------------------|--|---|-------------------|--|----------------|------------------|
| 9 Seacell | Seaweed mixed with wood pulps (often eucalyptus - tence) | low | low to medium | high standarts | no | yes |
| 10 Ventile Eco Hemp | Hemp fibres mixed with an extra-long staple organic cotton | low to medium | low to medium | high standarts | no | yes |



kelp / SeaCell



seacell composition / SeaCell



MICROBE-DERIVATED AND MYCELIUM BASED MATERIALS

| MATERIAL | SOURCE | CHEMICALS USED IN FARMING/SPINNING PROCESS | WATER CONSUMPTION | ETHICS - SOCIAL, ENVIRONMENTAL AND ANIMAL RIGHTS | MICRO PLASTICS | BIODEGRADABILITY |
|------------------------|--|--|--|--|----------------|------------------|
| 11 Kombucha leather | <p>SCOBY</p> <p>symbiotic culture of bacteria and yeast -cellulose nanofibres spun by bacteria and yeast. Kombucha SCOBY grows thicker over time and can become paper thin or leather like. SCOBY is also a byproduct of brewing kombucha drinks</p> | none | low | high standards | no | yes |
| 12 Mushroom leather | <p>Variety of mushrooms</p> <p>most mushroom leather is made from a compressed solid foam that mushroom mycelium forms naturally, but without engineering. it lacks the same look and feel as other animal and synthetic leathers</p> | low to none | <p>low</p> <p>the process of making mushroom leather saves 99% of water compares to conventional production of animal leather. The 1% includes the water used to grow the mushroom body - the mycelial matter.</p> | high standards | no | yes |



MICROBE-DERIVATED AND MYCELIUM BASED MATERIALS



gut feelings/ Alanna Lynch



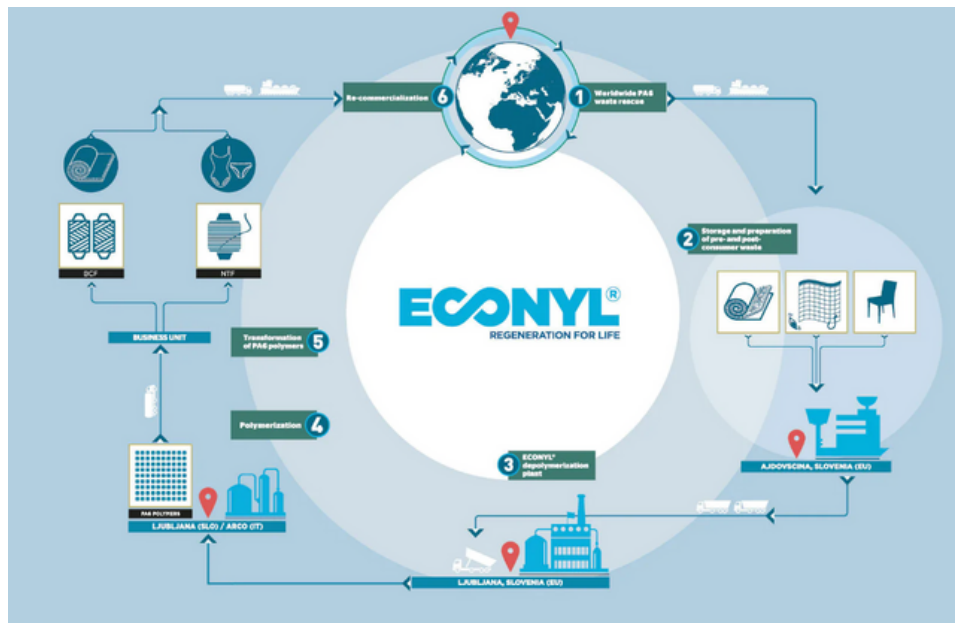
tinder fungus products / ZVNDER



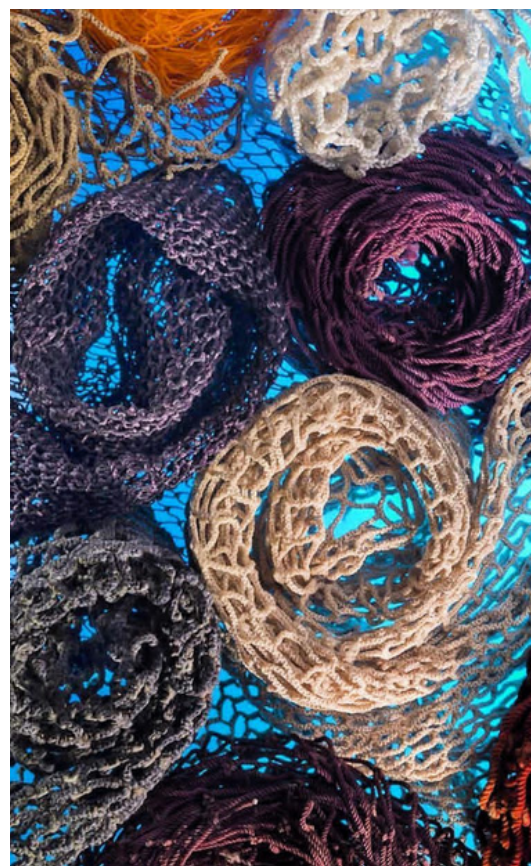
myco leather / Mycel

RECYCLED MATERIALS

| MATERIAL | SOURCE | CHEMICALS USED IN FARMING/ SPINNING PROCESS | WATER CONSUMPTION | ETHICS - SOCIAL, ENVIRONMENTAL AND ANIMAL RIGHTS | MICRO PLASTICS | BIODE GRADABILITY |
|---------------------------------|---|---|-------------------|--|----------------|-------------------|
| 13 Recycled Natural Fibres | Recycled garments, textiles or fibres | low mechanical recycling of cotton is the most established recycling process but only represents a small percentage in volume. Through this process fibre lose its strength and thus needs to be mixed with virgin fibres. | low to medium | medium to high reuses waste, saves land and water although still requires some virgin resources to be added | no | yes |
| 14 Recycled Synthetic Fibres | Recycled garments, textiles, fibres (polyester, polyamid, nylon), plastic bottles, fishing nets, etc. | low -if closed loop reputable companies such as Econyl have developed a closed-loop process for producing recycled post-consumer nylon waste | medium | medium resuses waste | yes | no |



life cycle / Econyl



nets / Econyl



tactality / Econyl

1.3 GOALS AND POTENTIAL SHIFTS

Exercise 1: Exploring the garment's value

(for consumers)

Choose one garment you are wearing today and try to answer the following questions

1. From what materials is the garment made of?
2. What was its price?
3. Where was it made and what was its journey throughout the production to the place where you purchased it?
4. Could its transportation affect the environment?
5. Who designed it and who made it?
6. What do you like about its design and is there something you don't like about it?
7. What sort of longevity does it have?
8. Is it recyclable?
9. Is it biodegradable?
10. Was its production toxic for the environment?
11. Is it toxic for your skin?
12. Is it functional - warm / cooling / easy to wear?
13. Is it comfortable?
14. What are the tactile qualities of the fabric - how does it feel?
15. Is it easy for maintenance - washing, drying, ironing?
16. How often do you wash it?
17. How often do you wear it?
18. Could you answer all of the questions above? Why yes?/ Why not?
19. Can you find any more information about this garment? How difficult is it and where would you search for more information?

OR

(for makers/ crafters/ designers)

Answer questions regarding the most recent garment you created?

1. Have you manufactured the garment yourself?
2. What materials were used to make this garment?
3. What was their price?
4. Where were they made and what was their journey throughout the production to the place where you purchased it?
5. Could their transportation affect the environment?
6. Who designed them and who made them?
7. What do you like about their design and is there something you don't like about them?
8. What sort of longevity do they have?
9. Are they recyclable?
10. Are they biodegradable?
11. Was their production toxic for the environment?
12. Are they toxic for skin?
13. Are they functional - warm / cooling / easy to wear?
14. What are their tactile qualities - how do they feel?
15. Are they easy for maintenance - washing, drying, ironing?
16. Could you answer all of the questions above? Why yes? OR Why not?
17. Can you find any more information about these used fabrics? How difficult would it be and where would you search for more information?

- informs about pre-consumer fashion waste and problematics of discarded clothes
- explains what is deadstock and how can be used
- describes examples of companies using deadstock and industry waste

2.1 BACKGROUND INFORMATION AND INSPIRATION

CLOTHES ON FIRE

Fashion retailers are believed to destroy their unsold products to protect the brand's intellectual property and its value. The main reason for that is to prevent their products from being sold cheaply on the counterfeit market or ending up on the grey market with unofficial retailers who fall outside a brand's approved distribution channels. There are still very few statistics about what is discarded at source by both textile and fashion industry. In most cases, the regulations behind brand protection demand that, if previous season's stock is unsold or a garment run in production comes out wrong, it must be destroyed, most often by incineration.

The same is true of the production of the fabric itself. Brands themselves don't have any concrete solutions for the correct disposal of unsold and excess stock. In July 2018, it was reported that Burberry destroyed around £28m worth of garments, accessories, footwear and beauty product per year. In the same year 2018, the brand announced it had stopped the practice of destroying their unsold products. Unfortunately, Burberry is by no means the only brand destroying excess stock and as there is very little transparency in waste management, it is impossible to gather the accurate statistics on how much for pre-consumer fashion-textile waste ends up on fire. (Burberry, 2019)

There is even less transparency in fashion companies over-production at the manufacturing level, another type of industrial waste ending per tonnes in landfills all around the world.

REUSING LEFTOVERS

Deadstock also known as overstock, remnant or surplus fabric, is a leftover fabric that can't be used for its original purpose. It might come from brands who ordered too much fabric or manufactured too many pieces of certain garment, from mills producing incorrect tones of colours or damaged or flawed fabric, or textile stock from cancelled orders.

Some fashion companies are leading the way on upcycling. Their strategy is to reuse and upcycle anything from old industrial fabrics to unsold clothing from other companies. LA-based brand Reformation is an example of a company that source such “deadstock” garments and reuses the materials in its own designs. Nearly 15% of the fabric Reformation uses comes from deadstock. Another example, ready to wear brand Marine Serre, an independent brand, which employs 70 people, many of whom sort deadstock items, building €13.6 million in annual sales and proving that building a new supply chain based on regeneration is possible. Working in 300-square-metre warehouse, Marine Serre staff source materials of garments and leather goods, mostly from France and deadstocks from the European Union. Turning deadstock into luxurious product.



patchwork leather jacket / Marine Serre



denim sorting / Marine Serre

2.2 GOALS AND POTENTIAL SHIFTS

Exercise 2:

(for producers, makers, designers)

PRODUCTION WASTE CHECKLIST

1, Do you keep evidence of all sourced materials (quantity, origin, supplier, product information) - YES / SOME / NONE (specify)

For example: table with a list of materials sourced for the production of the latest collection with columns monitoring the material properties, composition, and quantity as well as its origin and supplier from which was the specific material sourced

2, Do you keep evidence of the total usage of material sources as well as evidence of waste?

YES/ SOMETIME/ NONE (specify)

for example: usage of thread or yarn, usage of components - button, zippers, poppers, eyelets, usage of textiles, usage of energies and technical resources

if YES / SOME

How do you monitor your waste? Do you use any monitoring tool?

(software, online table, monitoring diary or sheet of paper, etc.)

How do you organise your waste? Do you put waste into one place or do you divide it?

(box with fabric scraps, boxes with divided components, etc.)

3, Do you reuse some of your materials not used for its original purpose?

YES/ SOME/ NONE (specify)

for example: using leftover leather from the last collection, originally meant for a hat, to manufacture bags for the latest collection

Sustainable Textile Sourcing and Fair Trade

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This section:

- informs about the importance of sustainable material sourcing
- interprets the relationship between sustainable sourcing and sourcing fair trade
- defines sustainable sourcing goals and checklist
- emphasises critical thinking regarding the textile sourcing

3.1 BACKGROUND INFORMATION AND INSPIRATION

SUSTAINABLE TEXTILE SOURCING EXPLAINED

Sourcing materials is an initial and crucial part of every manufacturing process within and outside of the fashion industry. The current textiles industry's transition to more sustainable sourcing is crucial to address some of the environmental and social problems faced by both consumers and producers. Sustainable sourcing is defined as a set of practices implemented by an organisation when sourcing raw materials or products from its suppliers while focusing on the environmental and social effect of its supply chain. (Labrechts, 2021)

Sustainable Textile Sourcing and Fair Trade

SOURCING FAIR TRADE

"Fairtrade is a system of certification that aims to ensure a set of standards are met in the production and supply of a product or ingredient. For farmers and workers, Fairtrade means workers' rights, safer working conditions and fairer pay. For shoppers it means high quality, ethically produced products." (Fairtrade, 2022, online)

People who make our clothes are often being abused. By choosing garments or textiles produced under Fairtrade conditions, everyone can support workers to make a decent living in a safe environment or stand up for their rights.

Many workers in the fashion industry earn below living wage level, which unable them to afford food and housing as well healthcare, education or transport. The Fairtrade Textile Standard requires that workers are paid living wages within six years of certification due to the huge gap between their current wage and expected minimum wage.

Textile workers are often kept from organizing collectively or unaware of their legal rights. The Fairtrade Textile Standard include requirements to ensure freedom to unionize, development of criteria for training workers on their rights, as well as criteria regarding internal communication and complaints management.

The Fairtrade Textile Standard also sets criteria for safe workplaces and buildings, as well as for the use of protective equipment and safe handling of chemicals. It also specifies how to safely dispose chemicals in an environmentally friendly way.

Sourcing materials fair trade means sourcing from certified producers or suppliers who are committed to pay their workers minimum wage and protect their safety and human rights in a workplace as well as committed to mind the environment affected by their production.



3.2 GOALS AND POTENTIAL SHIFTS

8 goals of sustainable textile sourcing include:

1. CIRCULAR ECONOMY /

Sourcing materials which are suitable for circular economy (reused and reusable, recycled and recyclable, upcycled and upcyclable) and/or are biodegradable.

2. RESOURCEFULNESS /

Sourcing materials which are suitable for your own skill set, knowledge and technical resources. Understanding the properties of sourced material and its impact on the environment as well as how it was made and where.

3. LOCAL SOURCING /

Sourcing materials as much locally as possible to support local producers and the local economy as well as to avoid additional transportation.

4. REASONABLE QUANTITY /

Sourcing a reasonable and accurate amount of materials.

5. FAIR PRICE /

Paying a fair price for a reasonable quality.

6. TRANSPARENCY /

Emphasising transparency and accessibility of information regarding the sourced materials as well as suppliers themselves.

7. STRONG RELATIONSHIPS /

Building long-term and strong relationships with suppliers and all other partners involved with the production process.

8. GREEN SUPPLIERS /

Working with suppliers who emphasise the environmental and social impact of their business.

3.3 SUSTAINABLE SOURCING CHECKLIST

Use the sustainable textile sourcing goals as a checklist describing your own sourcing strategies within your organisation/ brand/ own production - try to focus on the major supplier or supplier you worked with most recently.

- Sourcing materials which are suitable for circular economy and/or are biodegradable.
- Sourcing materials which are suitable for your own skillset, knowledge and technical resources. Understanding the properties of sourced material and its impact on the environment as well as how it was made and where?
- Sourcing materials as much locally as possible to support local producers and local economy as well as to avoid additional transportation.
- Sourcing a reasonable and accurate amount of materials.
- Paying a fair price for a reasonable quality
- Emphasising transparency and accessibility of information regarding the sourced materials as well as suppliers themselves.
- Building long-term and strong relationships with suppliers and all other partners involved with the production process.
- Working with suppliers who emphasise the environmental and social impact of their business.

Now try to answer following questions regarding your checklist:

For how long are you working with your supplier/suppliers?

How would you describe your relationship?

How transparent is the business of your suppliers?

What information about your sourced materials are available to you?

Where are your sourced materials coming from?

What transportation regarding your sourcing was necessary? (from fibre growing to your purchase)

Finally,

How sustainable is your sourcing strategy?

What are you doing correctly? How can you sustain that?

What are you doing wrong? How can you improve on that?

Are there any barriers which make it impossible to achieve standards of sustainable sourcing?

If yes, name them.

Case Study 1

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| | |
|-----------------------|--|
| Name of the Project: | AMADOU - HARVESTING FUTURE |
| Location: | Finland, Romania |
| Year | 2019 |
| Contact: | marikoppanen.com |
| Type of Organisation: | Designer / Start-up |
| Area: | biodesign / textile and material design |
| Field: | Fashion entrepreneurship / Craft and Heritage supporting business Female entrepreneurship / Material Research |

Project Description

Number of employees: 2 employees - designer and manufacturer

What is in it? / What does it contain?

Design Practice, Material research, Ethnography research, Working with local communities (learning traditional crafts)

What is the goal?

"The project emphasises New European Bauhaus' three main values: inclusion, innovation, and sustainability. It delivers a material that is responsible (both environmentally and economically), renewable, and adaptive. It combines cutting-edge design with a novel, long-lasting folkloric material. It accomplishes what designers are supposed to do: it creates projects that are relevant in relation to the surrounding environment and culture. There, they are discussing not only sustainability but also an ethical approach to design practice.

It is important to develop alternative materials to reduce the environmental damage they cause. Plastic and leather are the primary contributors to many environmental issues. Amadou-based products are renewable, all-natural, and biodegradable leather-like materials. Amadou is not intended for mass manufacturing, but rather to be observed with greater sensitivity. It has no toxic or plastic-based binders or coatings, unlike lab-grown fungal material equivalents; it is just a natural creation."

Who are the beneficiaries?

potentially local communities in Romania, conscious customers



amadou samples / Mari Koppanen

Case Study 2

SOGFASH

| | |
|-----------------------|---|
| Name of the Project: | BANANATEX |
| Location: | Taiwan |
| Year: | 2018 |
| Contact: | bananatex.info |
| Type of Organisation: | SME |
| Area: | Textile manufacturing |
| Field: | Fashion entrepreneurship / Material research/ Circular fashion business |

Project Description

Number of employees: 10-30

What is in it? / What does it contain?

Material research, Textile production with a partial supply chain (farming, spinning, weaving, finishing, assembly), business practices such as brand collaborations (COS), Handbags production and sales

Bananatex® is a durable, technical fabric that is biodegradable and fully circular. Cultivated within a natural ecosystem of sustainable forestry the plants require no pesticides, fertilizer or extra water.

What is the goal?

"Grown within a natural ecosystem of sustainable mixed agriculture and forestry, Abacá is sturdy and self-sufficient, requiring no pesticides or extra water. These qualities have allowed it to contribute to reforestation in areas of former Philippine jungle eroded by soil damage due to monocultural palm plantations, whilst enhancing the economic prosperity of its farmers. Once the Abacá fibres have been transformed into yarn in a Taiwanese paper mill, the yarn – in the case of the All Black colourway – is coloured using the yarn dyeing method. This process is more sustainable than the typical roll dyeing alternative, and certified to the highest standard (Oeko-Tex® Standard 100). The Natural White colourway reflects the actual color of the fibers and is accordingly not dyed."

Who are the beneficiaries?

conscious consumers



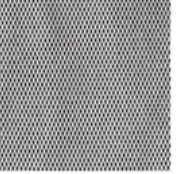


Case Study 2

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raw fibre / Bananatex

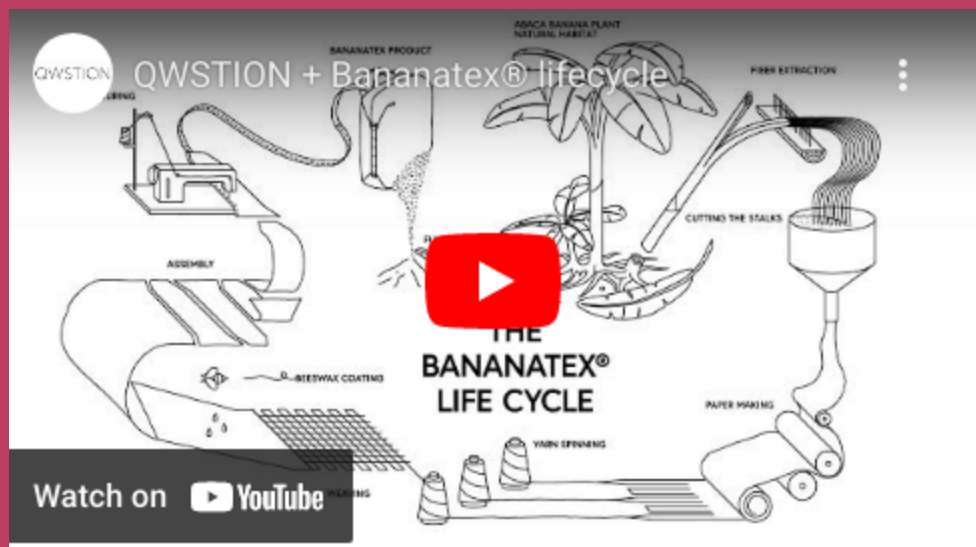


woven samples / Bananatex

| | | |
|---|---|--|
|  |  |  |
| <p>Bananatex® Natural White</p> <p>Product Code: BTX-01u Composition: 100% Abacá, uncoated Width 1.53 m Weight: 120 g/m2</p> | <p>Bananatex® All Black</p> <p>Product Code: BTX-02u Composition: 100% Abacá, uncoated Width 1.53 m Weight: 450 g/m2</p> | <p>Bananatex® Gravel</p> <p>Product Code: BTX-03u Composition: 100% Abacá, uncoated Width 1.53 m Weight: 440 g/m2</p> |
|  |  | |
| <p>Bananatex® Classic Navy</p> <p>Product Code: BTX-04u Composition: 100% Abacá, uncoated Width 1.53 m Weight: 450 g/m2</p> | <p>Bananatex® Limestone</p> <p>Product Code: BTX-05u Composition: 100% Abacá, uncoated Width 1.53 m Weight: 450 g/m2</p> | |



bags / Bananatex



life cycle / Bananatex



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Additional resources

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Examples of fashion biomaterial initiatives, companies and manufacturers:

VEGAN LEATHER AND PLANT BASED EXOTIC SKINS:

Desserto (Mexico): The Adriano Di Marti company cultivates nopal cactus in the state of Zacatecas, and it is the source of a new fashion material launched in 2019. Nourished by rainwater, the plant's leaves are cut just twice a year, while no toxic chemicals are used in manufacture.

Vegea (Italy): Grape skins, seeds and stalks discarded during wine production have been used by this company to make vegetable leather since 2016. Its website states that no toxic solvents or heavy metals are involved in its processes.

Mylo (USA): Biotechnology company Bolt Threads has developed a textile derived from mycelium, the root structure of fungi, and processed into leather-like sheets. Mylo is certified 50-85% bio-based, though it still employs chemicals in the tanning and dyeing process.

Malai (India): This company collects coconut water discarded by processing plants that use only the white flesh from the tropical fruit. This natural liquid, once disposed of in the local sewage system, causing destructive soil acidification, is now sterilised and serves as food for a bacterial culture. This growth process results in a sheet of cellulose jelly, which is later reinforced with natural fibres and resinous ingredients, making a product similar to leather.

YARNS AND MOULDED TEXTILES:

Alga-Life (Germany): Founded in 2016, this firm makes threads and textile dyes by purifying proteins from algae, which are then blended with natural ingredients such as pomegranate rind and juniper needles. The system only needs sunlight and water to operate, and the process creates no waste.

MycoTEX (Netherlands): NEFFA makes customised clothing by growing a compostable mycelium textile, which, once harvested, can be shaped within a 3D mould into finished apparel. Once dry, the garment is ready to wear, having eliminated multiple traditional manufacturing steps such as the spinning of yarns and weaving of cloth. The process uses only 0.5% of the water consumed in conventional cotton production.

ANIMAL-FREE WOOL:

WOOCOA (Colombia): A group of students from the University of the Andes, in Bogotá, developed a substitute for wool that is 100% biodegradable, winning the 2018 Biodesign Stella McCartney and PETA Prize for Animal-Free Wool. They used coconut and hemp fibres, treated with enzymes extracted from oyster mushrooms, to create a bio-based regenerative animal-free wool.



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Mycel

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SeaCell

- duvalli.com/portfolio/seacell

ZVNDER

- zvnder.com



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