TextileExchange
Creating Material Change

CHEMISTRY IN TEXTILE PRODUCTION:

WHY IS IT A CONCERN
& WHAT CAN BE DONE ABOUT IT?

Performance Days, November 13 2012

Our Mission

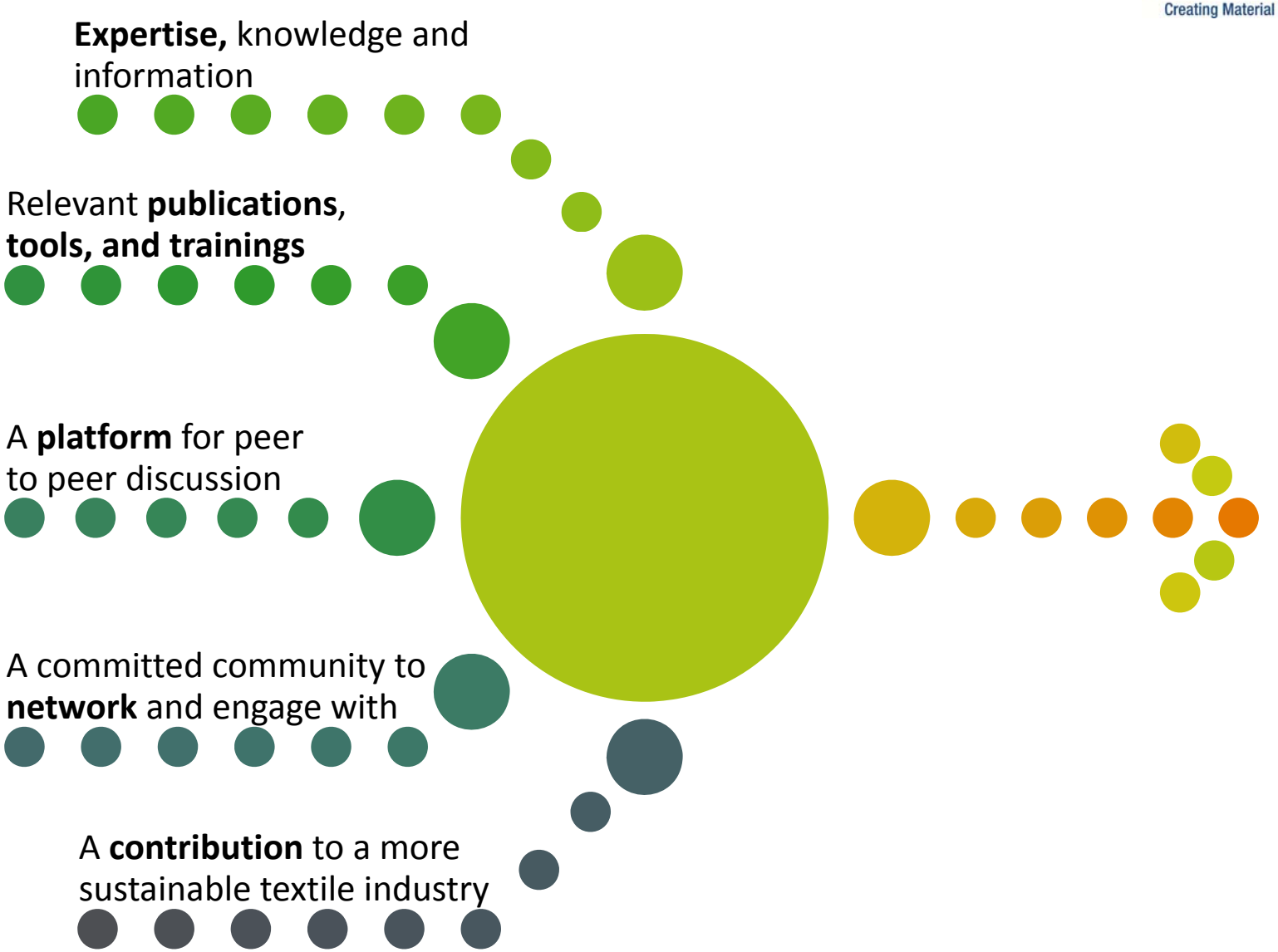
TextileExchange
Creating Material Change






We INSPIRE and EQUIP people to accelerate sustainable practices in the textile value chain.

WHAT WE DO


Expertise, knowledge and information
Relevant **publications**, **tools, and trainings**
A **platform** for peer to peer discussion
A committed community to **network** and engage with
A **contribution** to a more sustainable textile industry

Some of our Members

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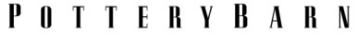


LEADING INFORMING CONNECTING

AGENDA

1 - THE IMPACTS

2 - THE CHALLENGES

3 - THE SOLUTIONS

1. IMPACTS


It takes
2700
liters of Fresh Water
to make 1 cotton t-shirt.


According to the World Bank:
20 %
of Industrial Fresh Water Pollution
comes from textile treatment and dyeing.

25% OF THE CHEMICALS PRODUCED WORLDWIDE ARE USED DIRECTLY OR INDIRECTLY FOR TEXTILES

Source: Greenpeace Germany

GLOBAL CHEMICAL CONSUMPTION (PER YEAR) APPROX. 1 MILLION TONS DYES AND 7 MILLION TONS CHEMICALS

Source: Huntsman

AMOUNT OF CHEMICALS NEEDED…

Chemicals give our fabrics colour and performance, quality and durability

Synthetics 110 – 820 g

Cotton 350 - 1500 g

Source: Bluesign

WHY SO MANY CHEMICALS?

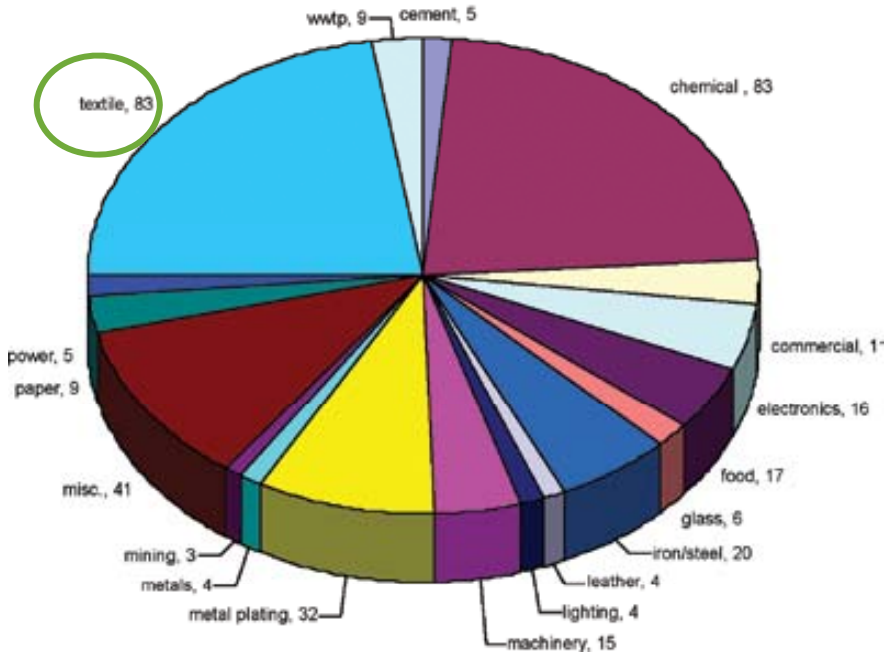
- Chemicals help increase yields and production outputs
- Chemicals give our fabrics colour and performance
- Chemicals increase product quality and durability
- Chemicals make products easy to care for

WHY IS IT A CONCERN?

Pollution

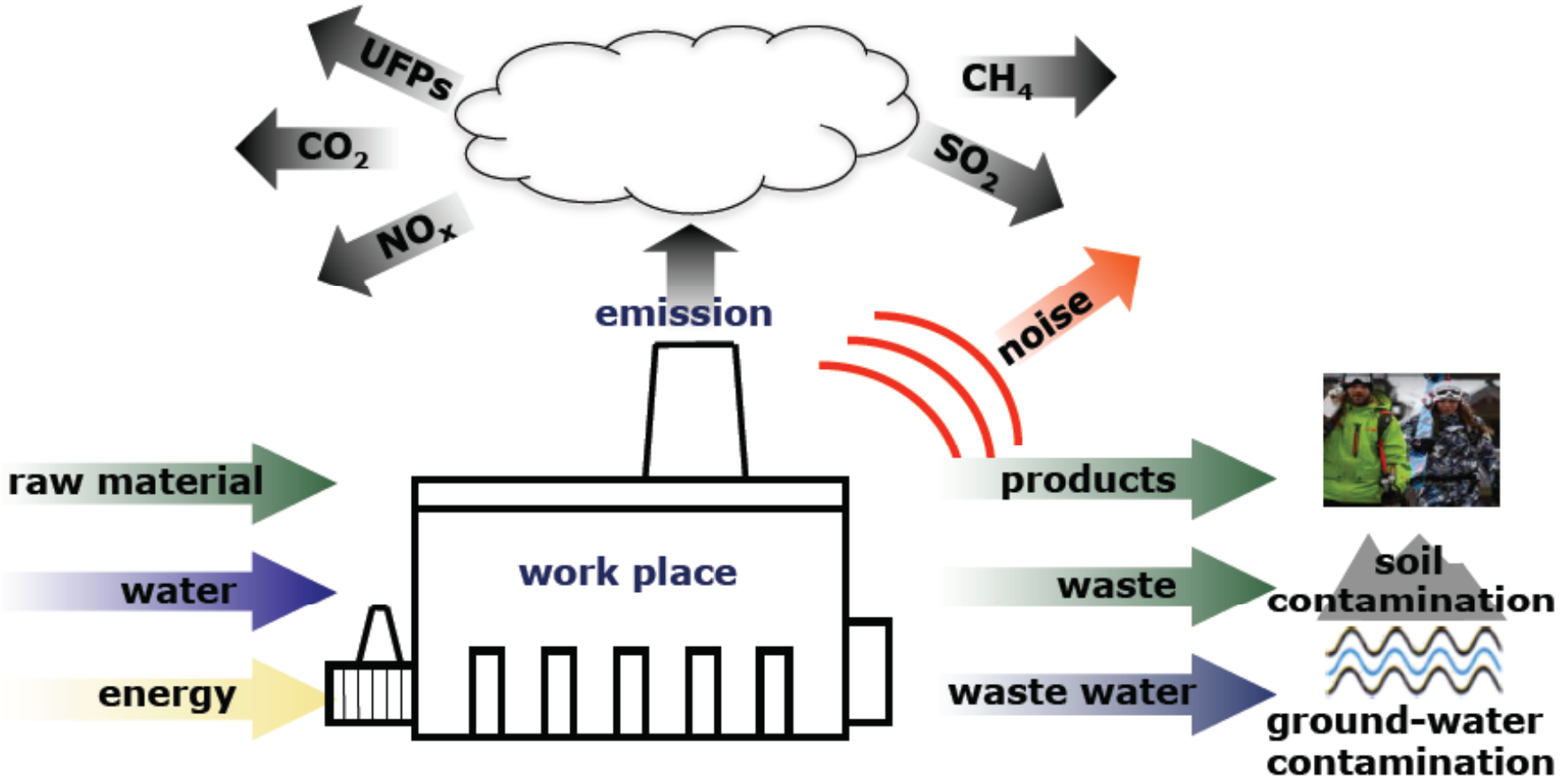
- Air emissions
- Water emissions
- Land contamination
- Waste management

Biggest polluting facilities in Jiangsu Province



Source: NRDC and Greenpeace

WHY IS IT A CONCERN?



Source: Bluesign

WHY IS IT A CONCERN?

Safety

- Workers
- Community
- Consumers

Inefficiencies

- Water
- Energy

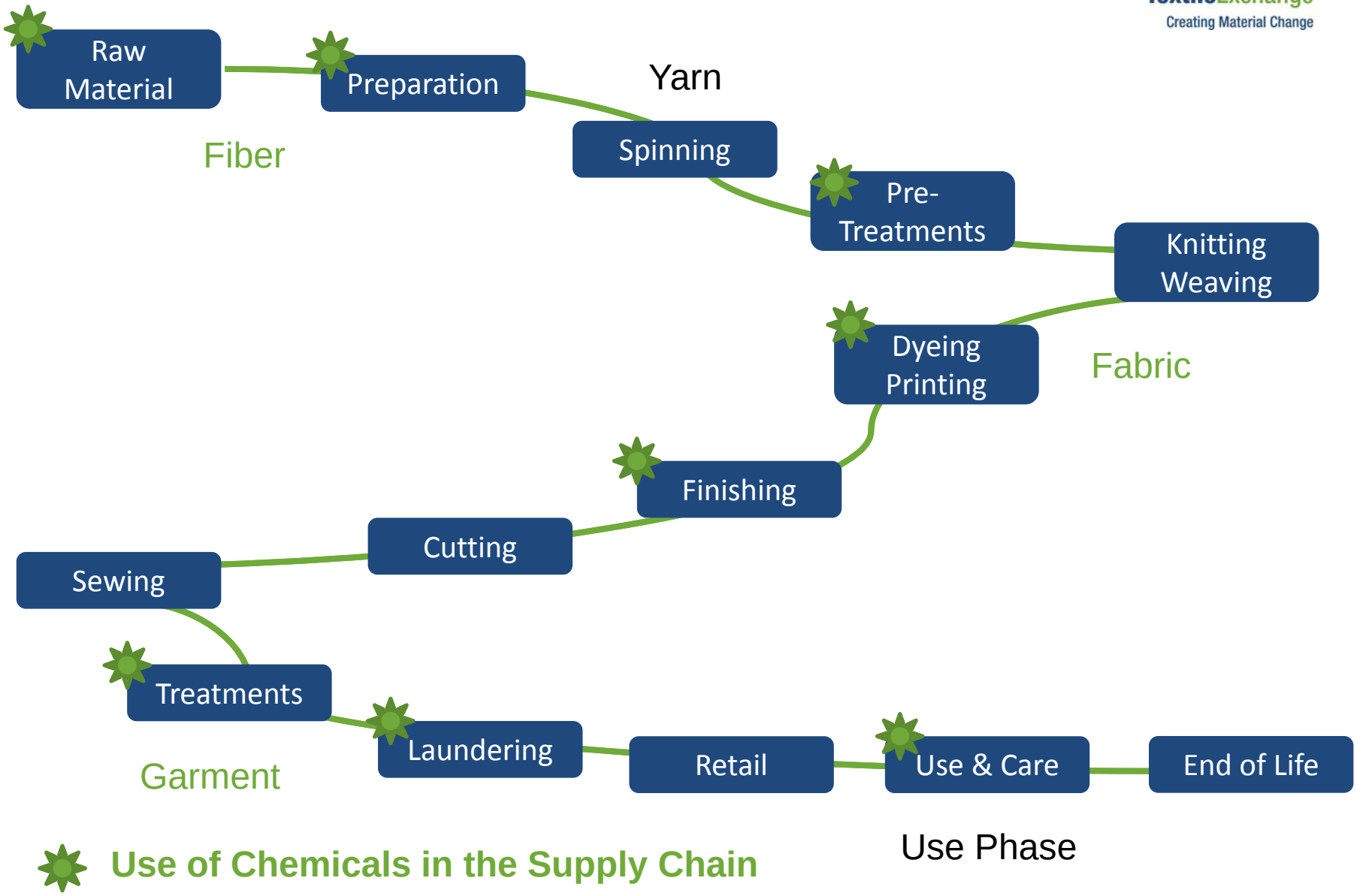
Reliance on fossil fuel

CHEMICALS ARE NOT GENERALLY "BAD"

- Chemicals are not "bad", it is the way they are handled that can be harmful
- The uncontrolled use of a "safe" chemical can be more harmful than a controlled process with a "critical" substance
- Not all of chemicals are properly tested for human and eco toxicity
- Many chemicals are not used in isolation but in a recipes; if toxicity is know it is in isolated use but not in a mix
- Chemicals require intelligent processes to minimize emissions

Source: Bluesign, Huntsman

THE TEXTILE SUPPLY CHAIN



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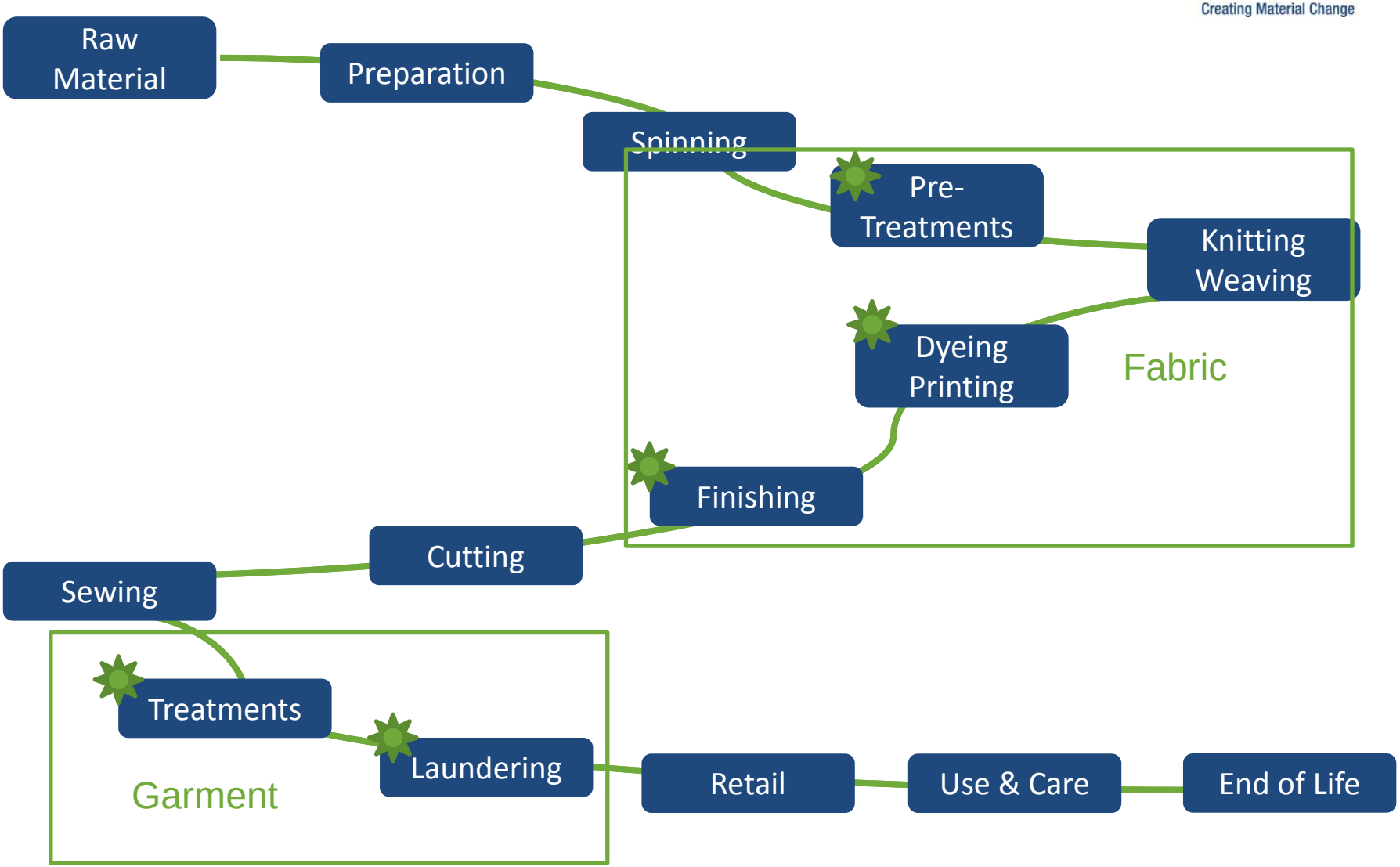
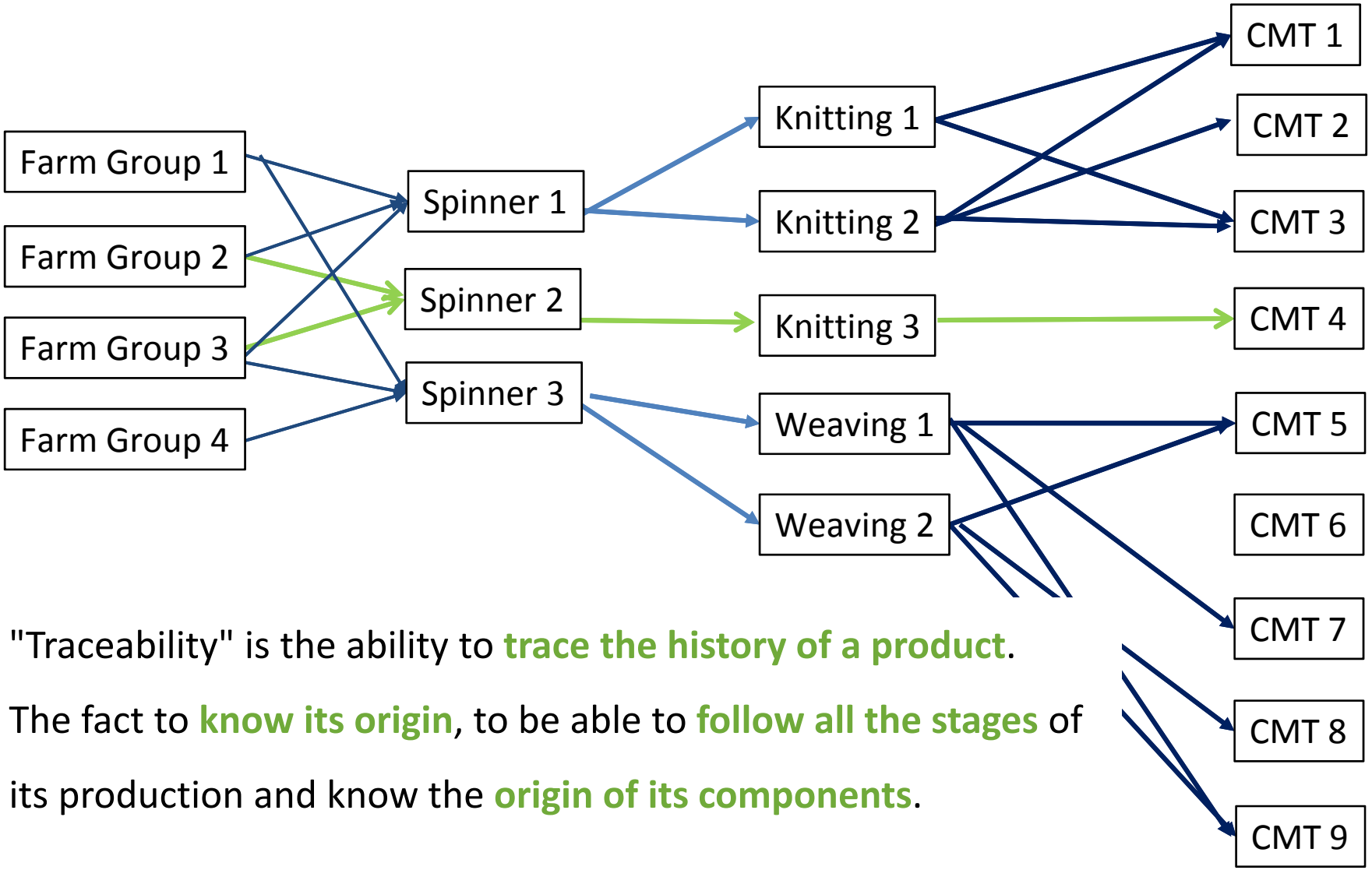


2. CHALLENGES

KNOWLEDGE


Knowledge is power
You can’t change what you don’t know
You can’t manage what you don’t measure

TRACEABILITY

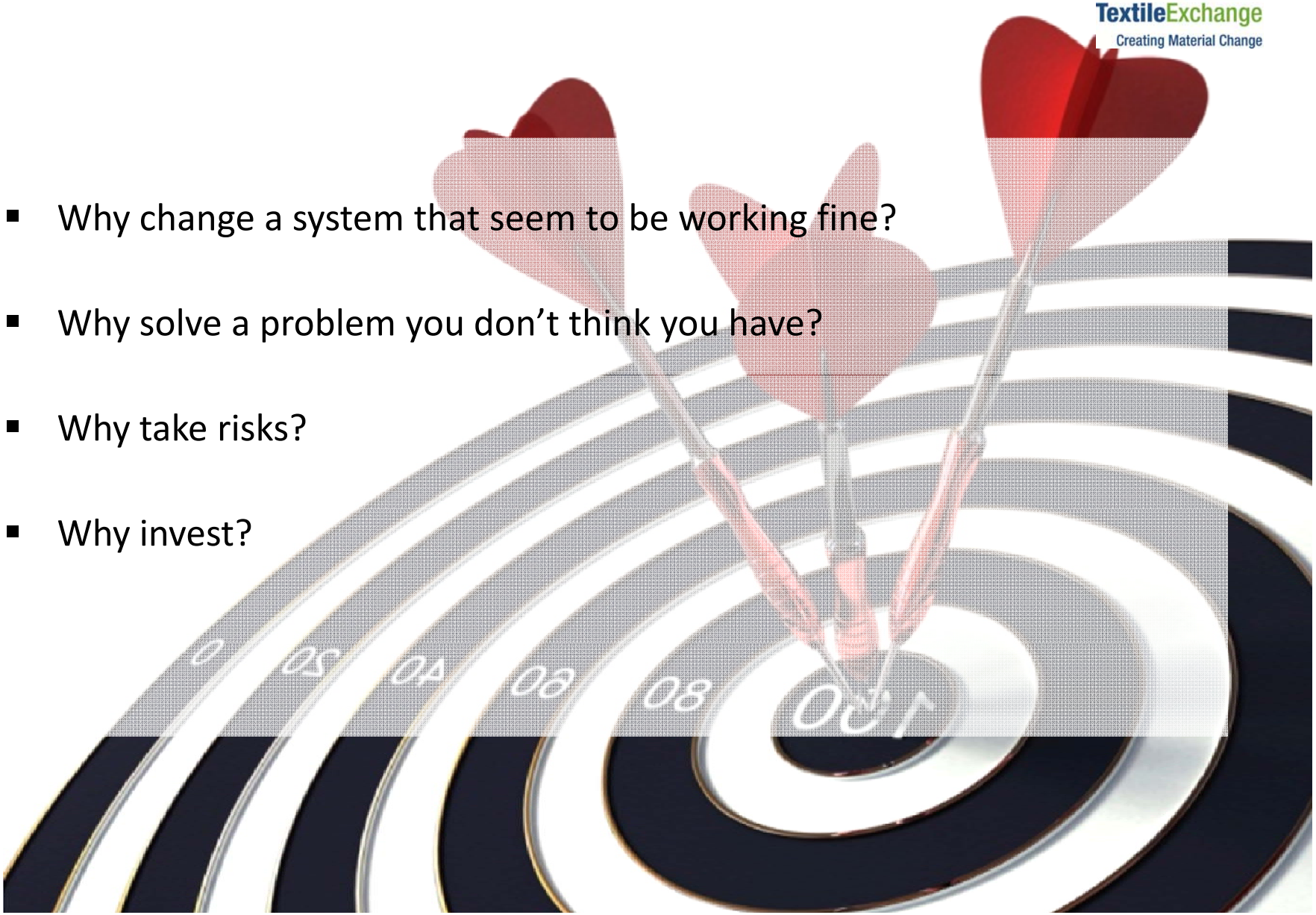


"Traceability" is the ability to **trace the history of a product**.

The fact to **know its origin**, to be able to **follow all the stages** of its production and know the **origin of its components**.

RESISTANCE

- Why change a system that seem to be working fine?
- Why solve a problem you don't think you have?
- Why take risks?
- Why invest?



LACK OF CLEAR DEMAND

- Unharmonized approaches making it challenging for the supply chains to focus

- Limited pull from the consumer market:
  - Great interest but lack of awareness
  - Expectation that companies take their responsibility and support the environment

3. SOLUTIONS

THE BEST STRATEGY TO AVOID IMPACTS, IS TO AVOID THE USE…

… IS IT REALISTIC IN ALL CASES?



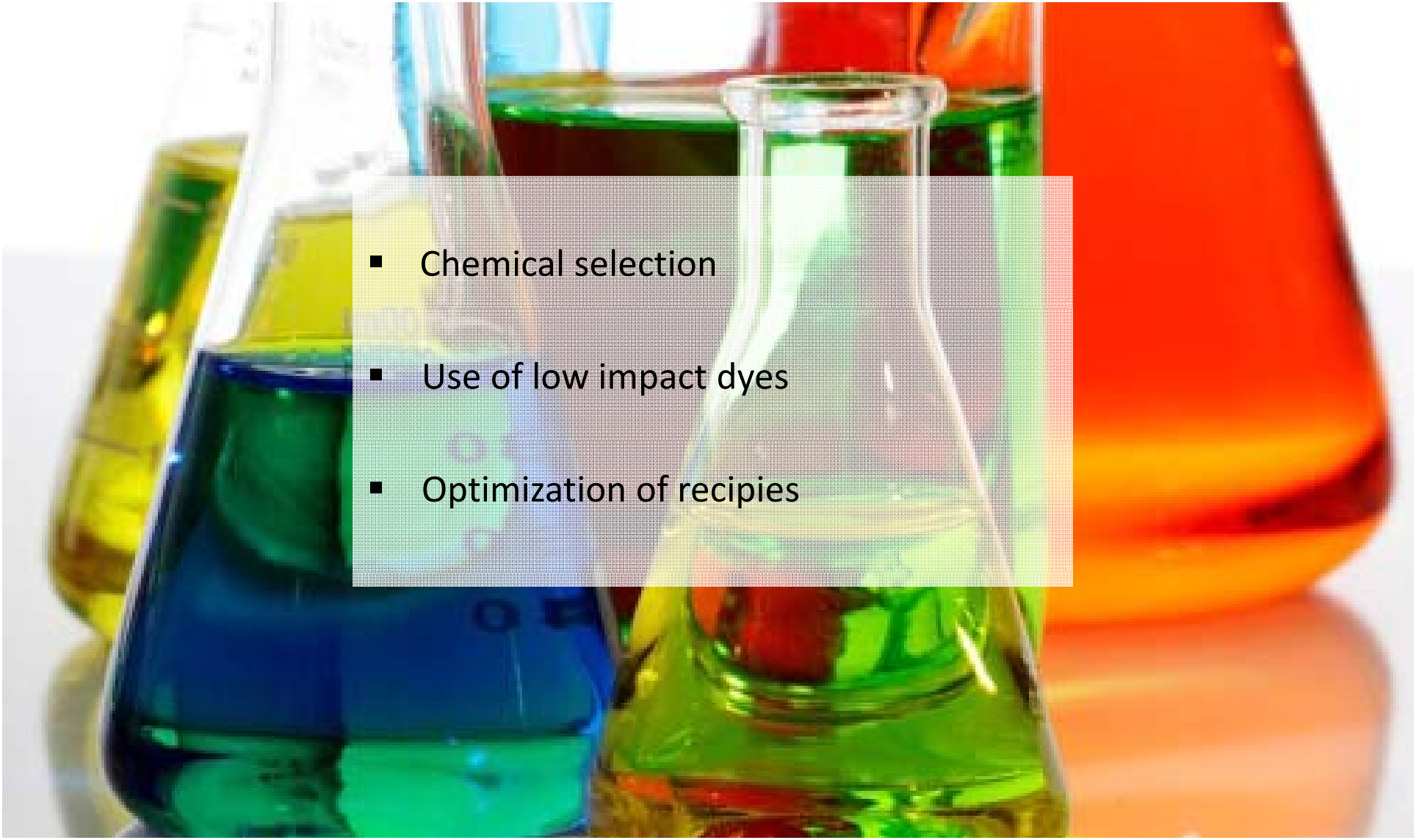
Or shall we be Smarter,
Do it Better, Do more From Less?



CHOOSING PARTNERS WITH CARE

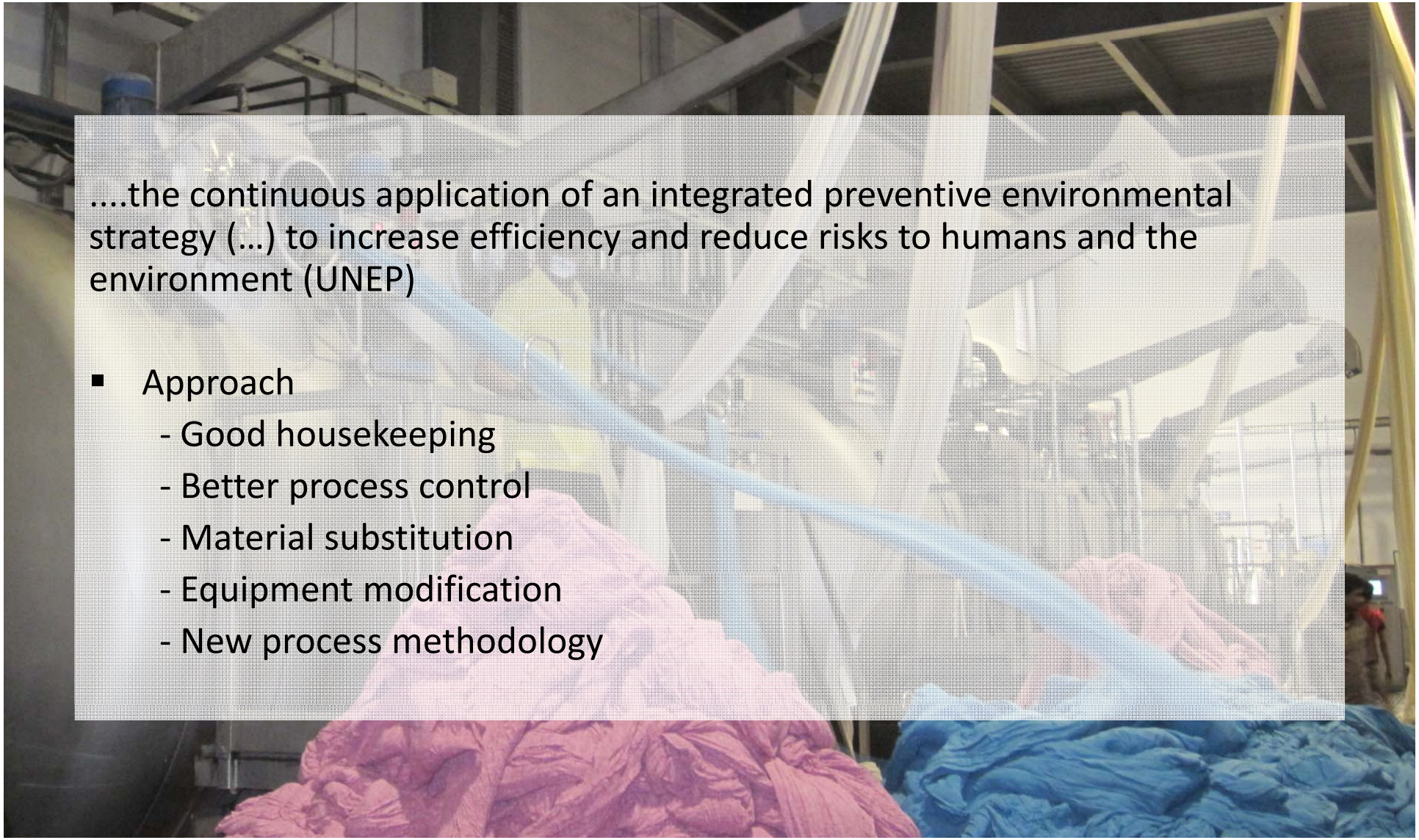
- **Understand your suply chain**
  - Where are fabrics and products dyed and finished
- **Assess factories**
  - Identify poor performers/violators
  - Clarify and enforce environmental requirements
- **Promote best practices**
  - Reward mills using these techniques
- **Provide support, technical assistance and knowledge**

CHEMICALS MANAGEMENT



- Chemical selection
- Use of low impact dyes
- Optimization of recipies

CLEANER PRODUCTION



....the continuous application of an integrated preventive environmental strategy (…) to increase efficiency and reduce risks to humans and the environment (UNEP)

- Approach
  - Good housekeeping
  - Better process control
  - Material substitution
  - Equipment modification
  - New process methodology

ENVIRONMENTAL CERTIFICATION

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bluesign®

TEXTILES VERTRAUEN
Umweltfreundliche Betriebsstätte
nach Öko-Tex Standard 1000
Prüf-Nr. 000000 Institut

GLOBAL ORGANIC TEXTILE STANDARD · GOTS ·

SYSTEM CERTIFICATION
ISO 14001
SGS

BLUESIGN

- Comprehensive standard built around 5 principles
  - Resource productivity / efficiency
  - Consumer safety
  - Air emissions
  - Water emissions
  - Occupational health and safety
- The standard examines the complete environmental performance of a factory through a screening process
- Improvement measures are identified and managed in all relevant areas
- Harmful substances are eliminated before production begins
- The bluesign® standard only certify products and product ranges, but not companies

Source: Bluesign

COLLABORATIVE INITIATIVES

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RØADMAP TO ZERO DISCHARGE OF HAZARDOUS CHEMICALS

adidas GROUP · C&A · G-STAR RAW · H&M · Jack Wolfskin · LEVI STRAUSS & CO. · LI-NING Make the change · NIKE · PUMA

OUTDOOR INDUSTRY ASSOCIATION
SUSTAINABILITY WORKING GROUP

Chemicals Management Working Group

Source: http://www.outdoorindustry.org/responsibility/chemicals/index.html
http://www.roadmaptozero.com/

TECHNOLOGICAL ADVANCEMENTS

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Pre- treatments

- Enzymes

Dyeing

- Innovative dyeing technologies
- Solution dyed synthetics
- $C0_2$ dyeing

Finishing

- Laser finishing techniques
- Enzyme treatments
- Plasma technologies

DYEING

AVITERA™ SE AND ERIOPON® LT

Next generation of reactive dyes

COMMODITY	BAT today	AVITERA™ SE
		
60-80 L	30-40 L	15-20 L
		
7 h	5.5 h	4h

For 1 kg of cotton

- 50% water saving
- 50% process time saving
- 70% less energy

Source: Huntsman

CO_2 DYEING

- Using supercritical fluid CO_2 for dyeing textiles instead of water
- Available for Polyester today, Nylon in 2012, and Cotton in development
- Using pure disperse dyes: surfactants and auxiliary chemicals are eliminated
- Dye utilization is very high with very little residue dye
- Unused dyes can be recaptured. After one batch (150kg) only 400mL of chemical waste (oil/water/dye) is generated
- Dye reuse options are being explored

Photo Courtesy: Dyecoo

Source: Dyecoo

FINISHING

PLASMA TECHNOLOGY

- Surface modification of different kinds of fibres to provide intrinsic effects on textiles
- Possibility of using one system for modification of different kinds of fibres (natural or synthetic) and textile constructions
- Appropriate choice of gas (O_2, N_2, H_2, air, Ar, He, NH_3, hydrocarbons, fluorocarbons) and control of plasma operating conditions (treatment time, power, pressure, gas flow rate) provide intrinsic effects on textiles
- Plasma processing is a dry treatment, it is a very energy efficient, and uses very low quantities of chemical compounds
- Because the desired material behavior is achieved by modifying only the surface of fibers, bulk characteristics of the material, such as its mechanical strength, are unchanged
- Plasma treatment allows achieving surface characteristics that are beyond the reach of traditional wet chemistry finishing

SUMMARY: PROCESSING STRATEGIES

1- Chemical Management

- Managing inputs

2- Cleaner Production

- Optimizing production

3- Environmental Certification

- 3rd party certification

4- Innovative Technology

- Pushing boundaries

CONCLUDING THOUGHTS

- Controlling the inputs by selecting appropriate chemicals and managing the processes using proper process controls is fundamental to minimise toxics and their emission in the supply chain
- Options are commercially available
- It is important to choose your partners with care
- Know your supply chain and ensure your suppliers work responsibly and with responsible suppliers/partners
- Ensure environmental considerations are part of both product creation and sourcing considerations
- Create ideas and solutions collectively rather than in isolation

Charline Ducas
Textile Sustainability Specialist
charline@textileexchange.org

www.TextileExchange.org

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