UNECE-SDA Bocconi Regional Workshop
21-23 September 2021

SESSION 6/Business Process Analyses – Leather and Textile

22 SEPT, 13:00 – 14:30 CEST

Deborah Taylor
MD, Sustainable Leather Foundation, UNECE Project Expert, Leather Value Chain BPA & Blockchain Pilot

Piera Francesca Solinas UNECE Project Expert, Textile Value Chain

Marco Riccheti CEO Blumine SRL and UNECE Project Expert, Textile Value Chain

Moderator: Virginia Cram-Martos, CEO Triangularity SL

The BPA experience in Leather and Textile Value Chains

- **Processes and Actors**

- **Interactive Polls**

- **Identification Sustainability Risks and Mitigation Strategies**

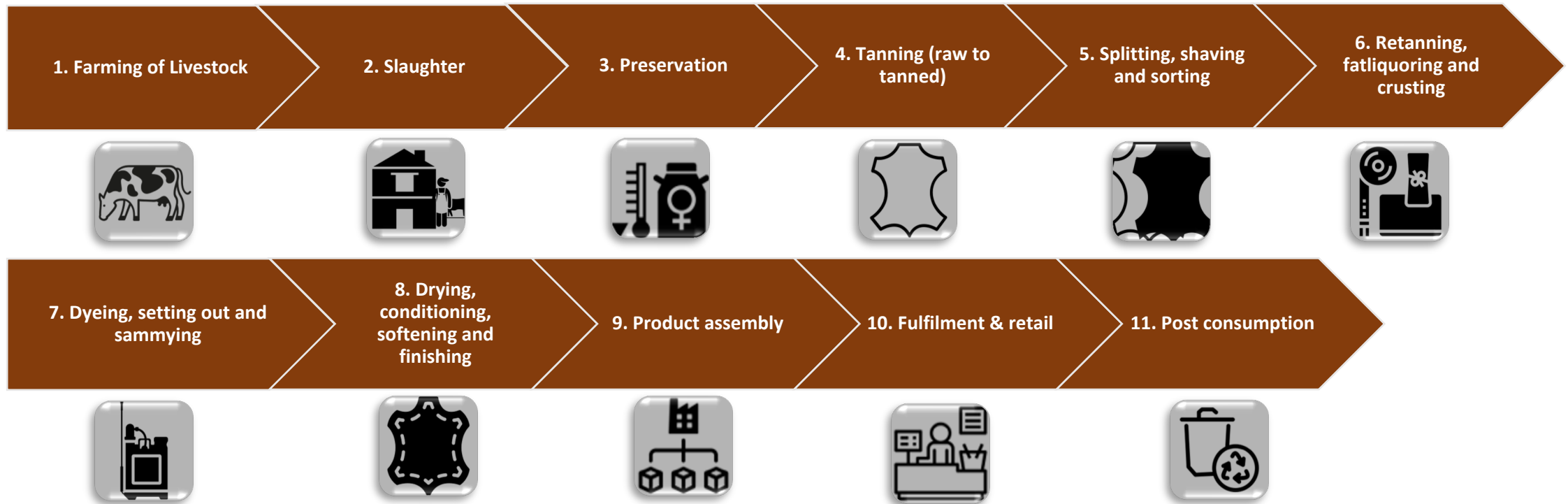- **Data Exchange and Information Requirements**

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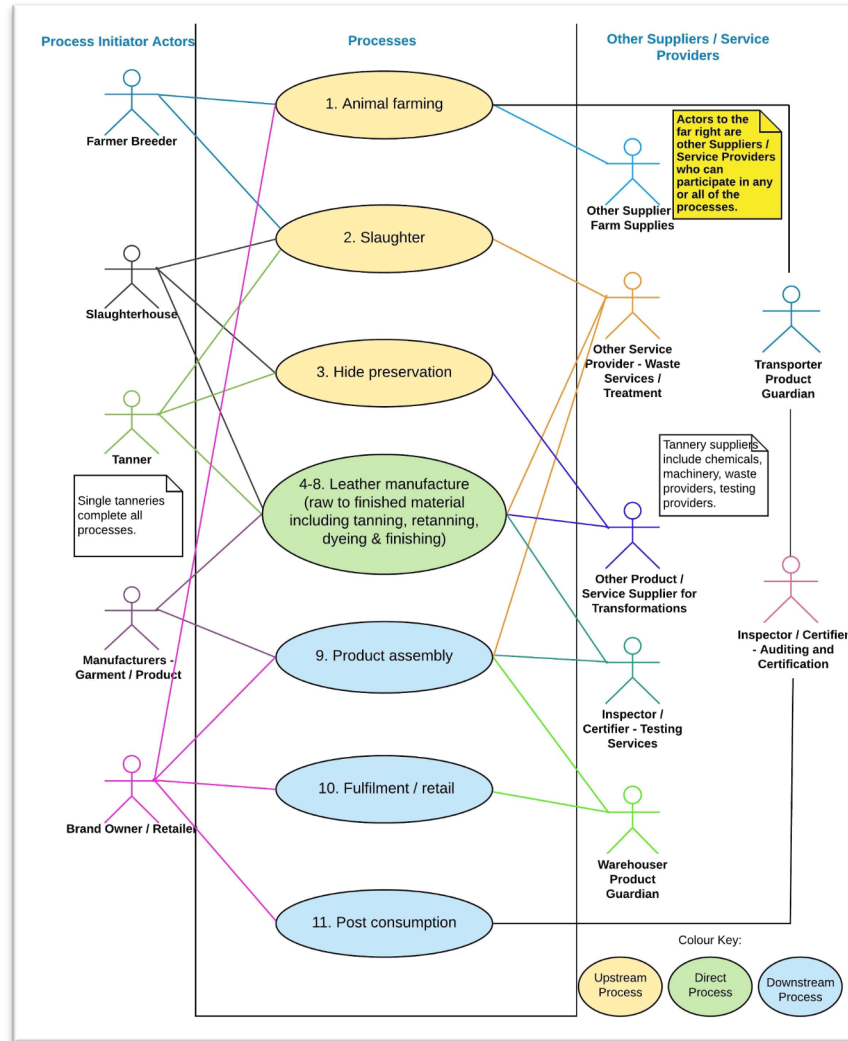United for greater traceability, transparency and circularity in the garment and footwear sector

Identify the Processes – Leather Value Chain

- Identification of standard processes and the actors who perform those processes
- This process required alignment and agreement within the wider group of experts.

1. Farming of Livestock
2. Slaughter
3. Preservation
4. Tanning (raw to tanned)
5. Splitting, shaving and sorting
6. Retanning, fatliquoring and crusting
7. Dyeing, setting out and sammying
8. Drying, conditioning, softening and finishing
9. Product assembly
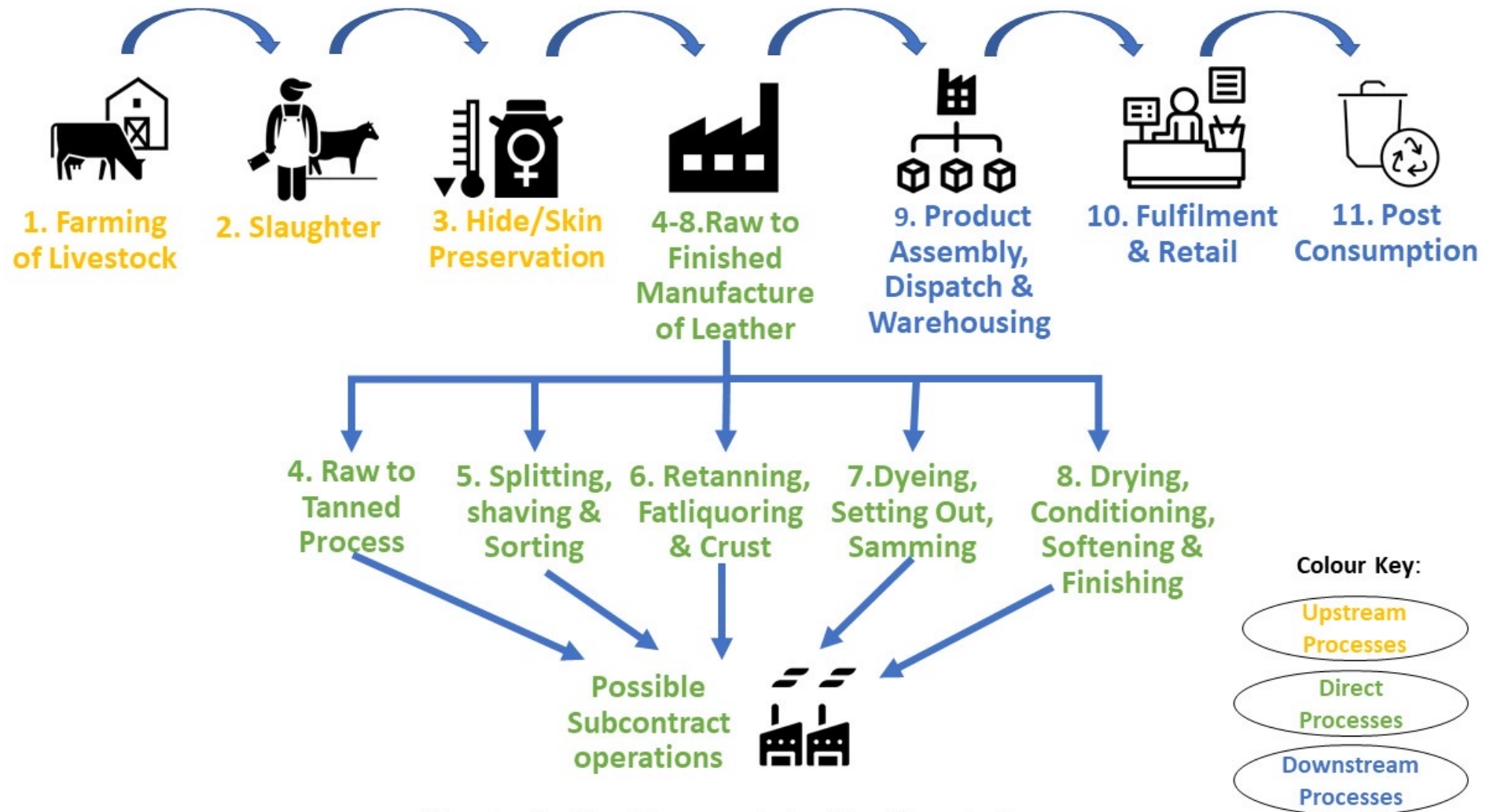10. Fulfilment & retail
11. Post consumption

Processes and Actors – Leather Value Chain Example

The **BPA Use Case Diagram** for controlled leather value chains (i.e. where processes 4-8 are undertaken by one party)
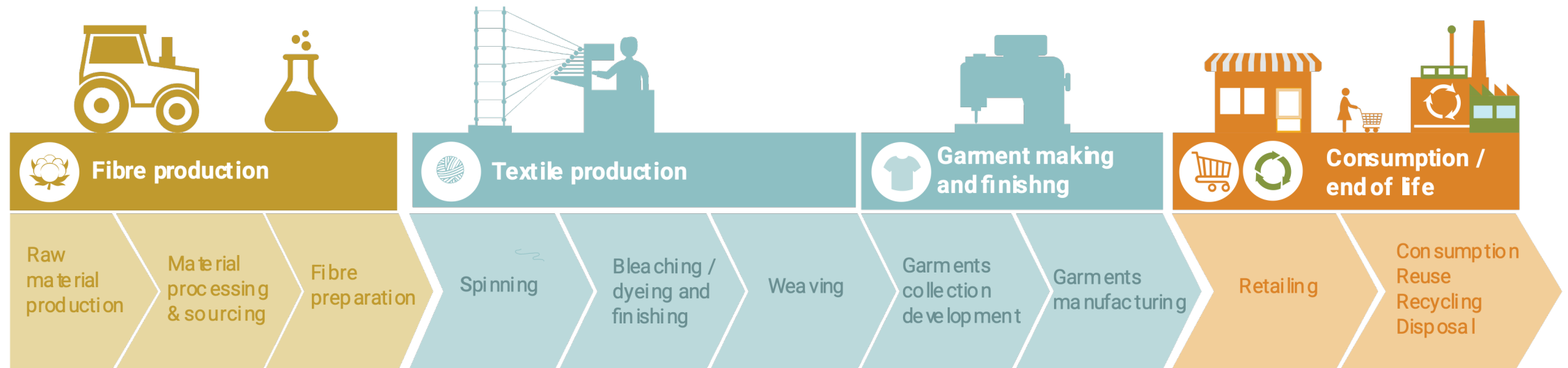

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A simpler visual of the use-case processes

Flowchart of Key Processes in Leather Manufacture

1. Farming of Livestock
2. Slaughter
3. Hide/Skin Preservation
4-8. Raw to Finished Manufacture of Leather
9. Product Assembly, Dispatch & Warehousing
10. Fulfilment & Retail
11. Post Consumption

4. Raw to Tanned Process
5. Splitting, shaving & Sorting
6. Retanning, Fatliquoring & Crust
7. Dyeing, Setting Out, Samming
8. Drying, Conditioning, Softening & Finishing

Possible Subcontract operations

Colour Key:
Upstream Processes
Direct Processes
Downstream Processes
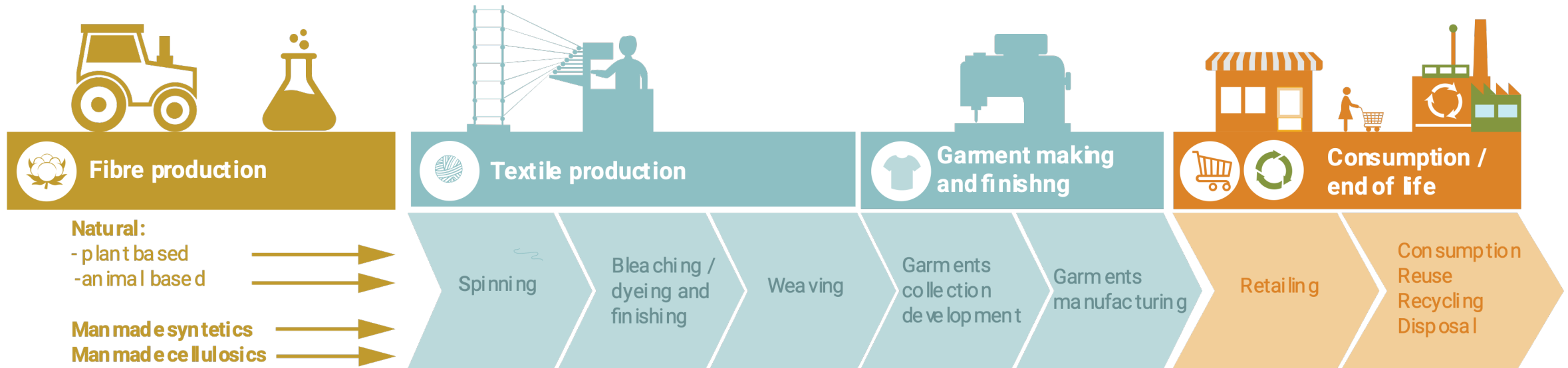
Textile Value Chain Processes

3 broad groups

- **Upstream processes:** preliminary to textile manufacturing, in the agricultural sector or the chemical industry

- **Textile and garment manufacturing:** industry is primarily involved

- **Consumption and end-of-life:** consumers directly involved either as a purchaser or a user
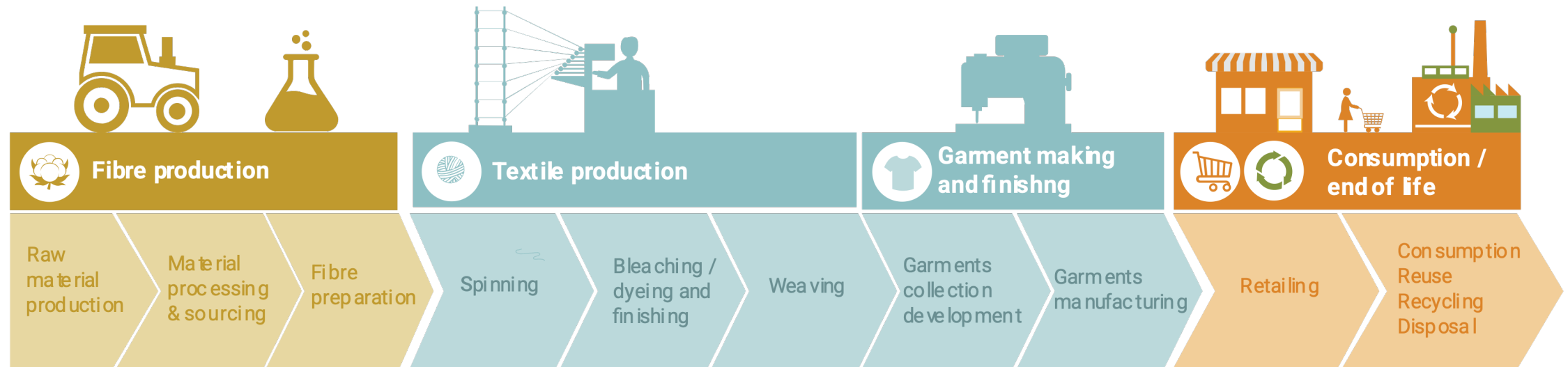

Fibre production			Textile production			Garment making and finishng		Consumption / end of life	
Raw material production	Material processing & sourcing	Fibre preparation	Spinning	Bleaching / dyeing and finishing	Weaving	Garments collection development	Garments manufacturing	Retailing	Consumption Reuse Recycling Disposal

Identify the processes – Textile Value Chain

Fibre production processes can be very different from each other and need to be analysed in detail. This is why you find in the Reports separate BPAs for each fibre. All the fibre value chains converge, after fibre production, in the **Textile and garment manufacturing** group of processes.

Fibre production

Natural:
- plant based
- animal based

Man made syntetics
Man made cellulosics

Textile production

Spinning

Bleaching / dyeing and finishing

Weaving

Garment making and finishng

Garments collection development

Garments manufacturing

Consumption / end of life

Retailing

Consumption
Reuse
Recycling
Disposal

Processes and Actors – Textile Value Chain Example

Many actors take part in the processes along the value chain

Fibre production	Textile production	Garment making and finishng	Consumption / end of life
Raw material production	Spinning	Garments collection development	Retailing
Material processing & sourcing	Bleaching / dyeing and finishing	Garments manufacturing	Consumption Reuse Recycling Disposal
Fibre preparation	Weaving		

FARMERS, TRANSPORTERS,
RAW MATERIALS TRADERS AND BROKERS
GINNERS, SCUTCHERS, SHEARERS
MANUFACTURERS OF MANMADE FIBRES

TRANSPORTERS
SUPPLIERS OF CONSUMABLES,
SUPPLIERS OF CHEMICALS
SPINNERS, WEAVERS, FINISHERS
PROVIDERS OF SPECILISED SERVICES
GARMENT MANUFACTURERS,
DESIGNERS, BRAND MANAGERS

TRANSPORTERS
WAREHOUSERS, WHOLESALERS
RETAILERS, ON-LINE PLATFORMS
CONSUMERS
SECOND-HAND TRADERS
WASTE COLLECTORS/HANDLERS
WASTE RECYCLERS

INSPECTORS, VERIFICATION BODIES / CERTIFIERS, ID PROVIDERS

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The BPA experience in Leather and Textile Value Chains

- **Identification of Processes and Actors**

- **Interactive Polls and**

- **Identification of Sustainability Risks and Mitigation Strategies**

- **Data Exchange and Information Requirements**

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Join The Poll?

For this session we would like you to consider two key areas when developing your own Business Process Analysis (BPA)

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Poll 1 – Sustainability Risk Evaluation

What do you consider to be your main priority in terms of sustainability?

1. Resource Depletion

2. Hazardous Chemistry

3. Climate Change

4. Water Pollution

5. Health & Safety

6. Labour Rights (Child Labour, Equality, Fair Pay & Working Hours)

7. Human Rights (Slave Labour, Bonded Labour, Discrimination)

8. Animal Welfare

Poll 2 – Data Exchange for Traceability

Question 1: What do you consider to be the minimum acceptable methods for data collection <u>related to raw material sourcing and origin</u>?

1. Text/Email communication

2. Paper Based Evidence (invoice, transport documents)

3. Electronic evidence of batch identifiers

4. Embedded or physical markers e.g. ceramic markers, laser, stamping, DNA, etc.

Question 2: What do you consider to be the minimum acceptable methods for data collection <u>related to sustainability claims and production</u>?

1. Self-declaration

2. Self Assessment Reports (SAR)

3. SAR with second party verification

4. Third party certification / external lab testing

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Risks and Mitigation

- Principle references for the risk definitions
  - Organisation for Economic Cooperation and Development (OECD)
  - International Trade Centre (ITC)
  - United Nations Environment Programme (UNEP)
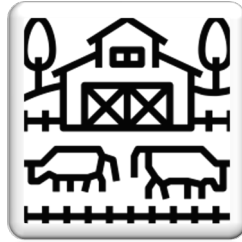 - Research from the United Nations Economic Commission for Europe (UNECE).

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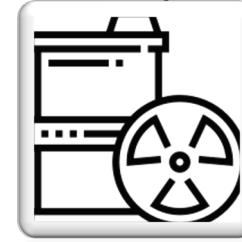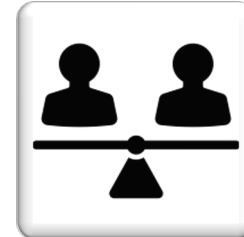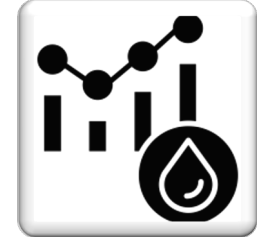
Hotspots along the textile and leather value chain

Climate impact of the global apparel and leather industry is substantial, with **over 3.3 billion mt of greenhouse gases emitted across the just apparel value** chains per year more than all international flights and maritime shipping combined!

The textile and leather value chains are long and complex with many sustainability hotspots

A hotspot is a stage in the life cycle of a product or service that accounts for a significant part of its environmental, social and/or economic impacts

**Understanding where the hotspots are is critical
to identifying corrective actions**

Sustainability hotspots in the pre-textile manufacturing processes

Process	1A.1	1A.2	1A.3	1B.1	1B.2	1B.3	1B.4	1C.1	1C.2	1D.1
Sustainability Risk	Plant cultivation	Plant harvesting	Separate fibre and plant (Ginning)	Raising of animal	Shearing or combing	Cleaning, scouring, washing	Carding and combing	Extraction of cellulose	Transform from cellulose to fibre	Manmade synthetic fibre
A1. Insecticide, pesticide and fertiliser use	●			●				●		
A2. Hazardous and toxic chemical use		●		●		●		●	●	
A3. Water consumption and pollution	●			●		●		●	●	
A4. Greenhouse gas emissions and air pollution	●	●	●	●		●	●	●	●	●
A5. Energy consumption and efficiency	●	●	●			●	●		●	●
A6. Soil and land degradation	●			●						
A7. Biodiversity and ecosystems depletion	●			●				●		●
A8. Deforestation and habitat loss				●				●		
A9. Solid waste			●			●				
A10. Animal welfare				●	●					
B1. Human rights	●	●	●	●	●	●	●	●	●	●
B2. Labour rights	●	●	●	●	●	●	●	●	●	●

Sustainability hotspots in the textile manufacturing processes

Process	2	3	4	5	6	7	8
Sustainability Risk	Spinning	Finishing (*)	Weaving	Garment Collection Development	Garment Manufacturing	Retailing (**)	Consumption, Disposal, Post-Consumption Recycling
A1. Insecticide, pesticide and fertiliser use							
A2. Hazardous and toxic chemical use		●					●
A3. Water consumption and pollution		●					●
A4. Greenhouse gas emissions and air pollution	●	●	●	●	●	●	●
A5. Energy consumption and efficiency	●		●		●	●	●
A6. Soil and land degradation							
A7. Biodiversity and ecosystems depletion							
A8. Deforestation and habitat loss							
A9. Solid waste	●	●	●	●	●	●	
A10. Animal welfare							
B1. Human rights	●	●	●	●	●	●	●
B2. Labour rights	●	●	●	●	●	●	●

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Summary of hotspots along the textile value chain

Fibre Production	• **High use of fossil fuels** • **High use of agrichemicals, land and water to produce natural fibres, especially cotton** • **Unsafe working conditions**
Yarn, Fabric and Textile Production	• High use of fossil fuels for heat and electricity generation in energy intensive textile processes (which involves climate, human health and ecosystem quality impacts) • Use of hazardous chemicals • Release of microfibres • Unsafe working conditions
Use Phase	• High use of electricity in the care of textiles over their lifetime • High use of water and releases of microfibres in washing textiles over their lifetime
End-of-Life	• Low rates of recovery of textiles at end-of-life leading to high material value loss and non-renewable resource depletion

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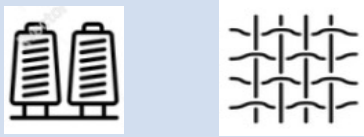
Sustainability Risks in the Leather Value Chain
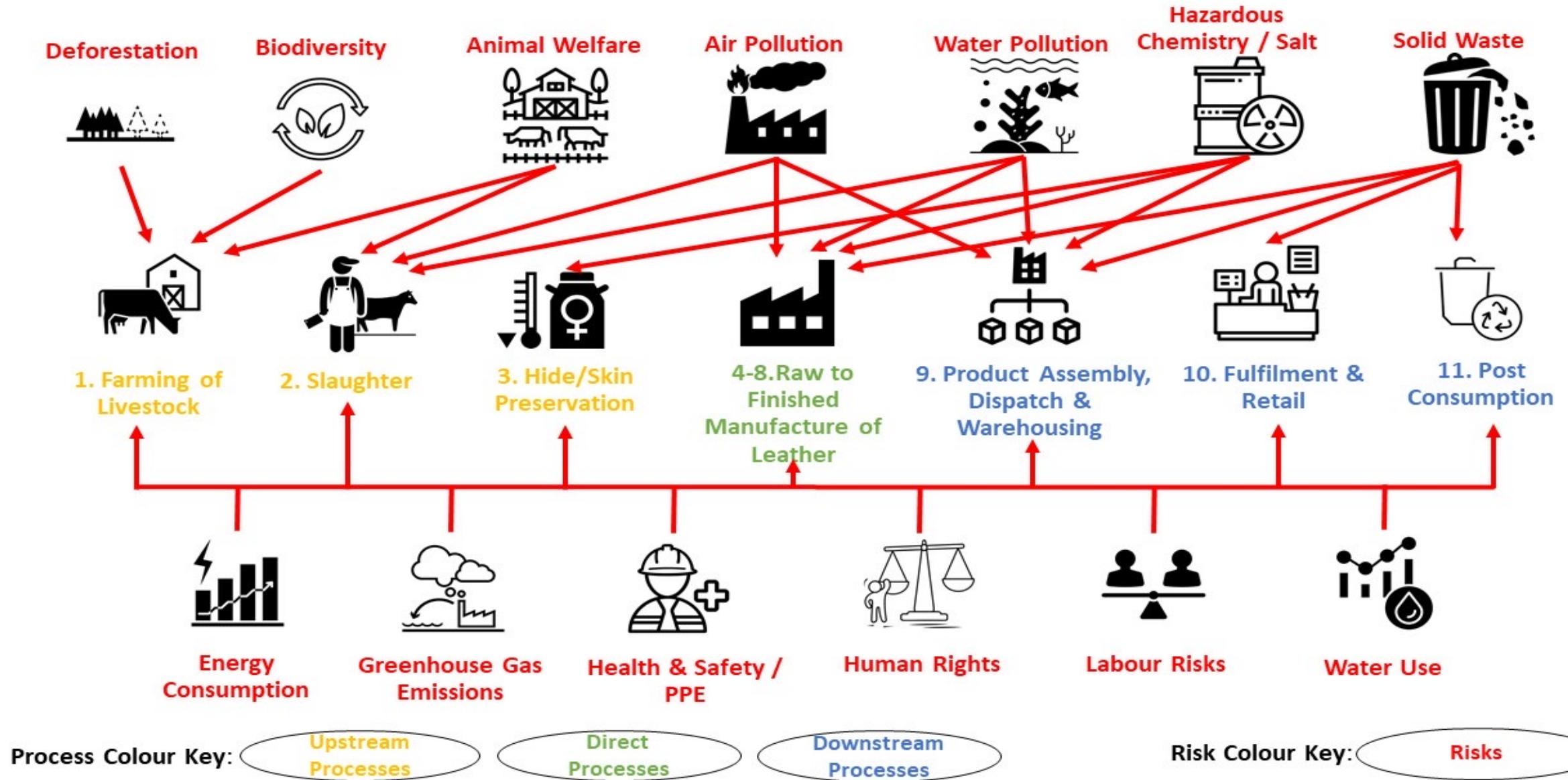
Climate impact across the global apparel value chain

Fiber production comes 3rd

Energy intensive textile stages 1° for climate impact

Use of apparel ranks 2°

- 12%
- 12%
- 10%
- 36%
- 5%
- 1%
- 24%
- negligible (*)

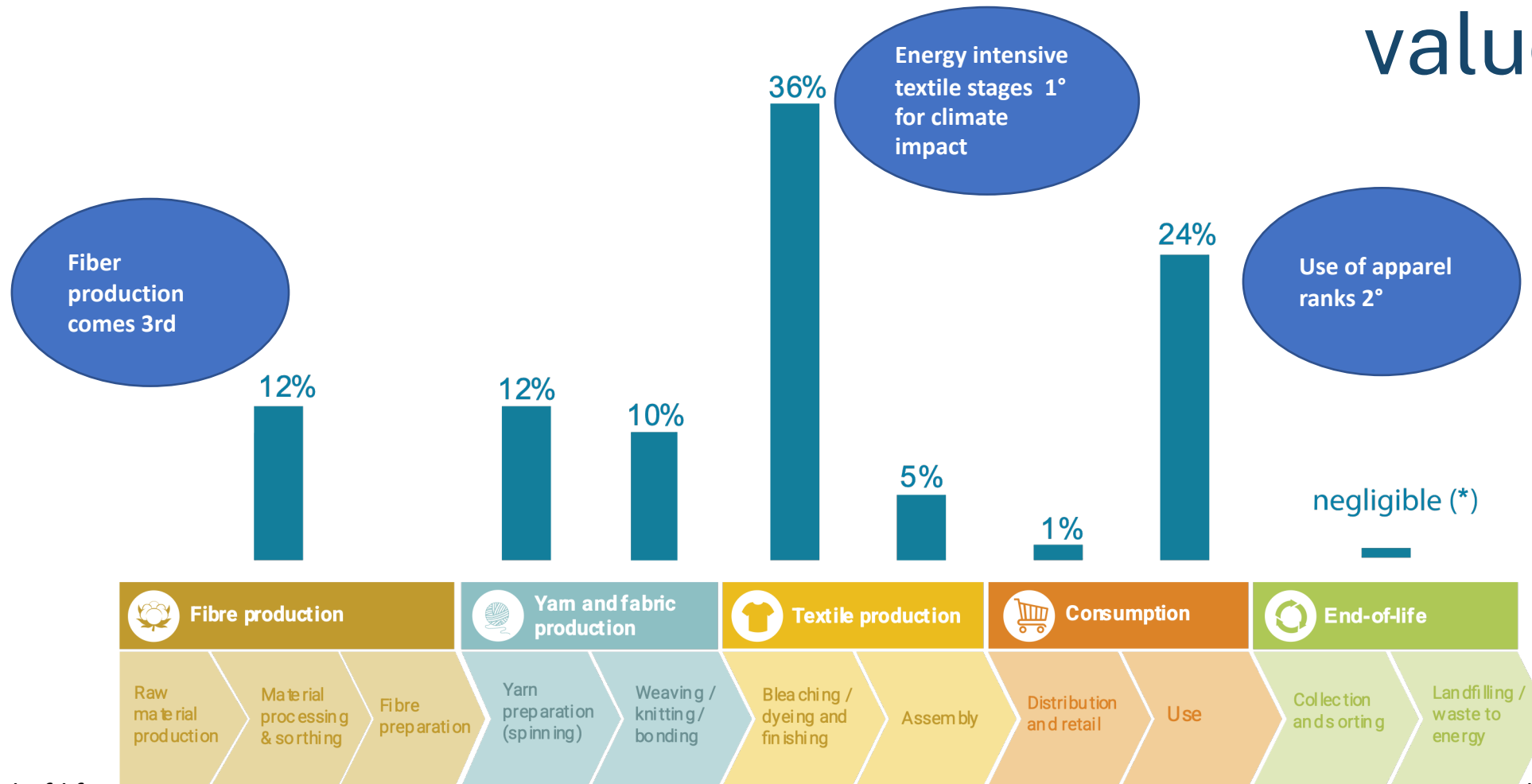| Fibre production			Yarn and fabric production		Textile production		Consumption		End-of-life	
Raw material production	Material processing & sorthing	Fibre preparation	Yarn preparation (spinning)	Weaving / knitting / bonding	Bleaching / dyeing and finishing	Assembly	Distribution and retail	Use	Collection and sorting	Landfilling / waste to energy

Apparel end-of-life makes a negligible contribution to climate impact. Currently only around 13% of clothing is recycled, predominantly to lower value uses, such as insulation and cleaning cloths for which little or no energy intensive processing is required. % represent mt of CO2 eq

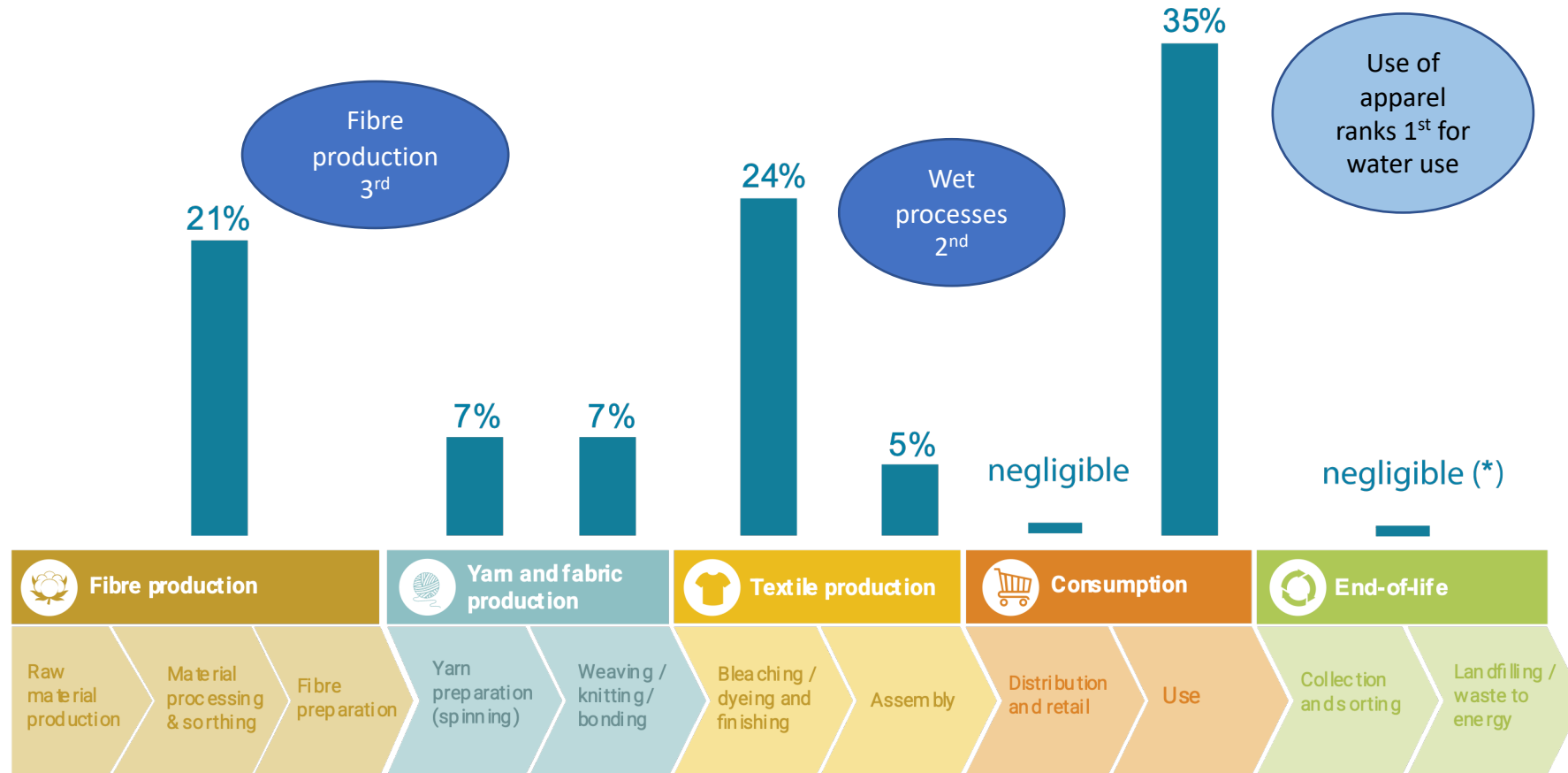*Source UNEP, adapted from Sustainability and Circularity in the Textile Value Chain*

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Impact on freshwater withdrawal across the global apparel value chain

21%

Fibre production 3rd

7%

7%

24%

Wet processes 2nd

5%

negligible

35%

Use of apparel ranks 1st for water use

negligible (*)

Fibre production			Yarn and fabric production		Textile production		Consumption		End-of-life	
Raw material production	Material processing & sorthing	Fibre preparation	Yarn preparation (spinning)	Weaving / knitting / bonding	Bleaching / dyeing and finishing	Assembly	Distribution and retail	Use	Collection and sorting	Landfilling / waste to energy

* Apparel end-of-life makes a negligible contribution freshwater withdrawal. Currently only around 13% of clothing is recycled, predominantly to lower value uses, such as insulation and cleaning cloths for which little or no energy intensive processing is required.

Source UNEP, adapted from Sustainability and Circularity in the Textile Value Chain

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The extraction of resources and..

… releases to air, water and soil are quantified at each life cycle stage

Methodological overview of Life Cycle Analysis (LCA) studies informing the hotspots analysis as considered in the Quantis and FICCI

Source UNEP, Sustainability and Circularity in the Textile Value Chain

INPUTS

Raw materials

Water

Chemicals

Energy

OUTPUTS

Emissions to air

Emissions to water

Emissions to soil

Fibre production
- Raw material production
- Fibre preparation

Yarn production
- Spinning

Fabric production
- Knitting
- Weaving

Dyeing & Finishing
- Bleaching /dyeing
- Finishing

Assembly
- Cutting and sewing

Distribution and retail
- Distribution
- Retail

Use
- Washing
- Ironing

Disposal
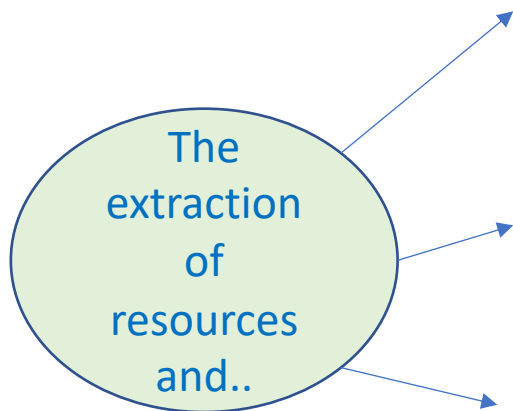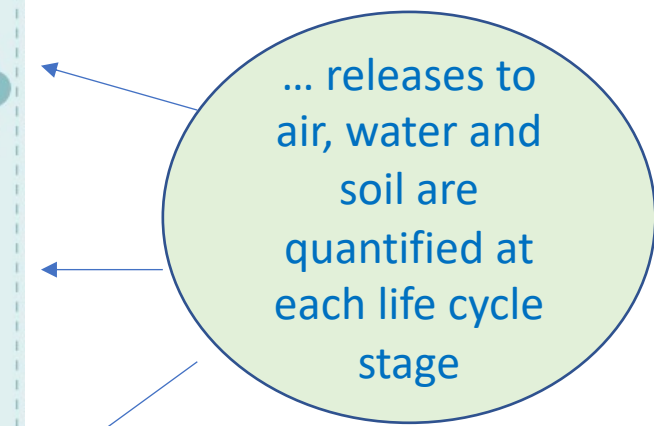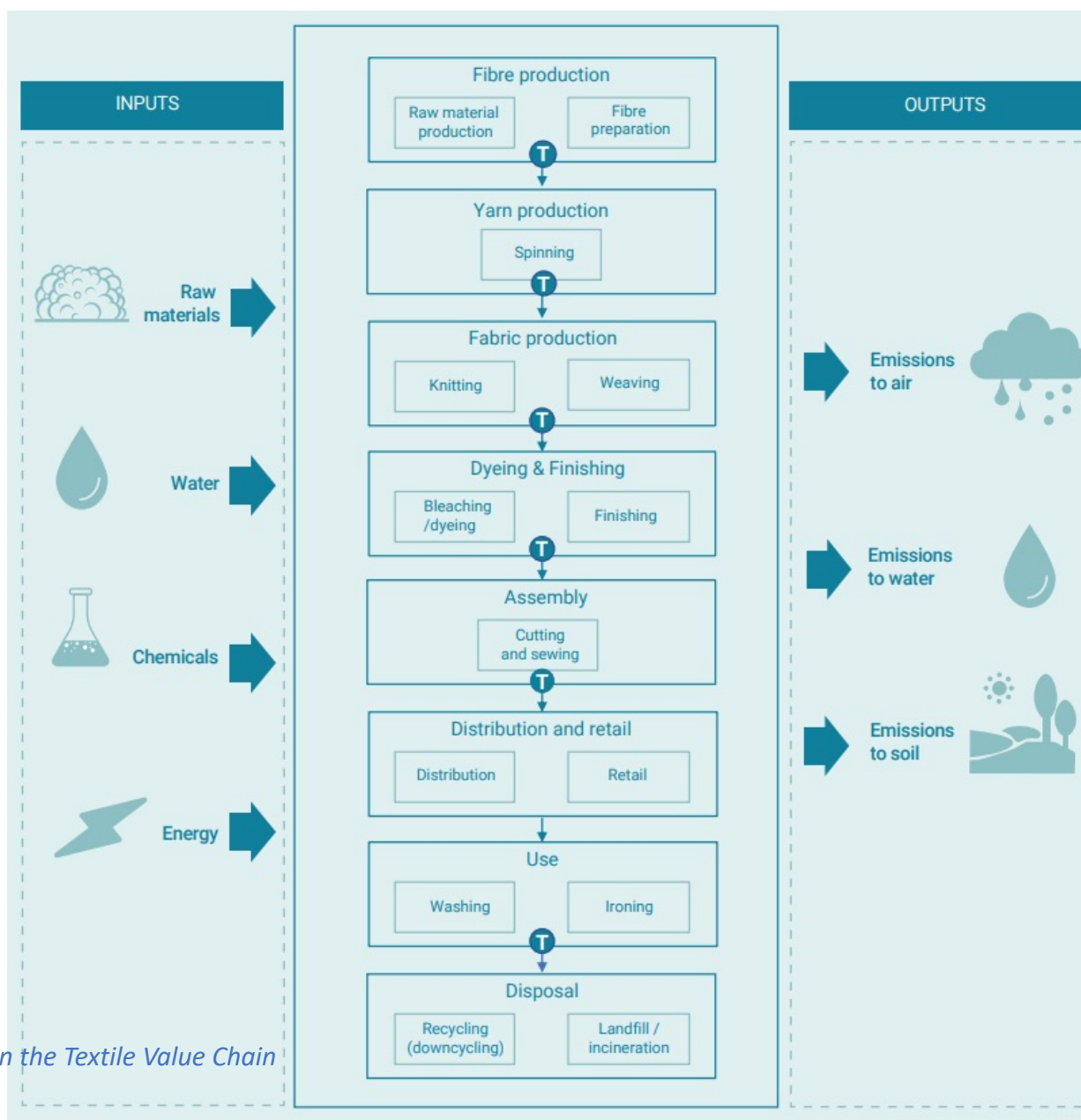- Recycling (downcycling)
- Landfill / incineration

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Social risks across the textile value chain

The garment industry is a substantial contributor to employment in many countries

However**, poor working** conditions, low wages **and child labour** have made cotton cultivation and textile production the focus of NGO and media attention

Natural fibre production (cotton cultivation) is dominant for social risks, followed by yarn and fabric production and garment assembly.

- Average social risk
- Risk of excessive working time
- Risk of injury

Fibre production
- Natural fibre production
- Synthetic fibre production

43% 34% 62%
10% 13% 6%

Yarn and fabric production
- Yarn production (spinning) and Fabric production (weaving/knitting)

22% 25% 18%

Textile production
- Bleaching / dyeing and finishing
- Assembly

7% 8% 4%
18% 21% 11%

Consumption
- Distribution and retail
- Use

End-of-life
- Disposal/ Collection and sorting
- Landfilling/ waste to energy

Source UNEP, Sustainability and Circularity in the Textile Value Chain

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COVID-19 impacts along the textile value chain

Source UNEP, Sustainability and Circularity in the Textile Value Chain

Risk Reduction in the Textile Production Lifecycle - Fibre standards

Initiatives and certifications in this category take a relatively broad scope, incorporating social, economic development and labour rights issues into their standards as well as environmental issues. They allow (with certain limitations) both product and process claims

Risk Reduction in the Textile & Leather Production Lifecycle

Several Initiatives and certifications take a relatively broad scope, incorporating social, economic development and labour rights issues into their standards as well as environmental issues. They allow (with certain limitations) both product and process claims

Textile Certification Organisations

Textile & Leather Certification Organisations

Leather Certification Organisations
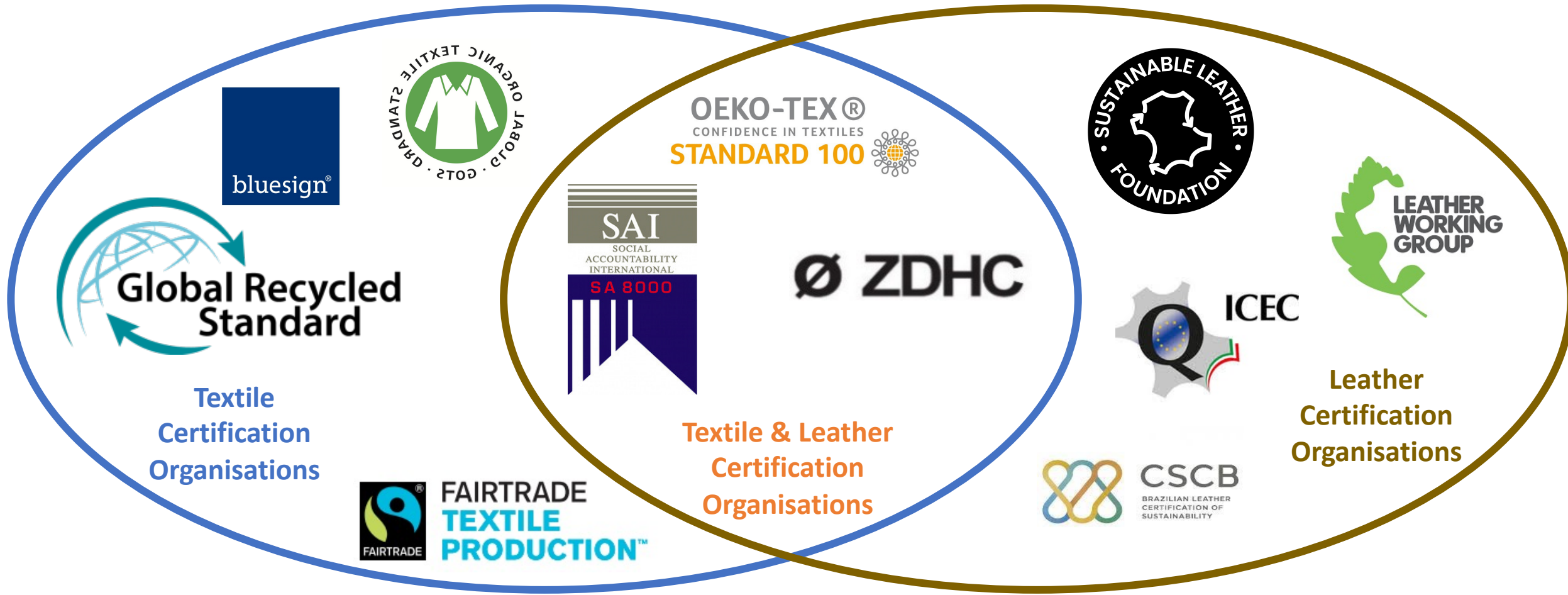
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Traceability and transparency for sustainability

Origin

Fiber Content

Use of Chemicals

Social and Environmental Performance
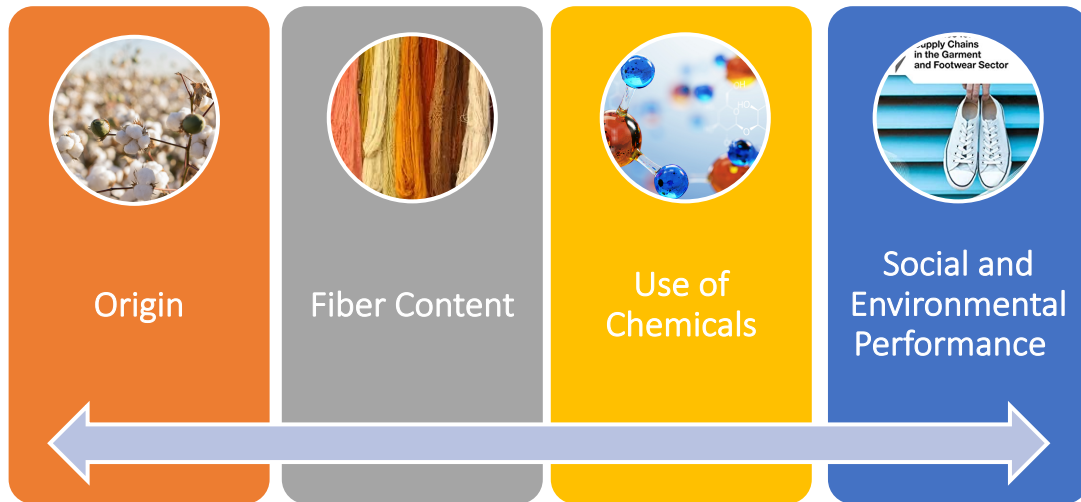
1. **Basic traceability data**
   - Traceability data are records about the product (input-output, output-new input..)
   - Processing (what was done to inputs, outputs and products, when, where and by whom), and, optionally,
   - Chain of custody data (who, at every moment along the value chain, had possession of the inputs, outputs and final products).

2. **Sustainability data** vary according to claims
   - For example, the collection of sustainability data for a claim such as
     "**Made of 100% organic cotton**" will be focused **on raw materials**
   - Data collection for a claim like
     "**Made in factories** that implement **good labour practices**" will be focused on **conditions in factories**.

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5Ws key for traceability and sustainability data to be collected and registered

Standard Cotton value Chain

1. Planting and cultivation of cotton
2. Cotton harvest identification & transfer from farmer to ginner
3. Ginning & transfer to spinner
4. Spinning & transfer to dyer, bleacher, washer
5. Dyeing, bleaching, washing & transfer to weaver
6. Weaving & transfer to fabric finisher
7. Garment or product production & transfer to enablement
8. Product Enablement & packaging and transfer to "retailer"
9. Placement of product in stores or on-line for sale
10. Consumption and disposal
11. Post consumption recycling

Value Chain Selection:

1. Material
2. Partner
3. Process

5 Ws	Definition
WHO	Value Chain Partner
WHAT	Event Type Material
WHY HOW	Verification Criteria & Validation Process
WHERE	Business Location
WHEN	Business Event Time

STANDARD DATA COLLECTION TEMPLATE

Transparency and traceability matrix

"TT TEMPLATE" EXCEL FILE

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What were the results of our Polls?

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What do you consider to be your main priority in terms of sustainability?

1. Resource Depletion

2. Hazardous Chemistry

3. Climate Change

4. Water Pollution

5. Health & Safety

6. Labour Rights (Child Labour, Equality, Fair Pay & Working Hours)

7. Human Rights (Slave Labour, Bonded Labour, Discrimination)

8. Animal Welfare

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Results from Poll 2 – Data Exchange for Traceability

Question 1: **What do you consider to be the minimum acceptable methods for data collection <u>related to raw material sourcing and origin?</u>**

1. Text/Email communication

2. Paper Based Evidence (invoice, transport documents)

3. Electronic evidence of batch identifiers

4. Embedded or physical markers e.g. ceramic markers, laser, stamping, DNA, etc.

Question 2: **What do you consider to be the minimum acceptable methods for data collection <u>related to sustainability claims and production?</u>**

1. Self-declaration

2. Self Assessment Reports (SAR)

3. SAR with second party verification

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The BPA experience in Leather and Textile Value Chains

- **Identification of Processes and Actors**

- **Interactive Polls**

- **Identification Sustainability Risks and Mitigation Strategies**

- **Data Exchange and Information Requirements**

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Detailed Business Process & Data Descriptions

- The Use Case Diagrams that were described earlier formed the basis for the Business Process Descriptions (BPDs), where a detailed analysis of the individual processes was made in terms of:
  - Associating the risks to the processes
  - Identifying what data is already being exchanged as part of each process

- This "layering" of the different BPA components is what enables the recommended standard to be created

Detailed Business Process Descriptions

1a Farming of Livestock - Whole Life Farm
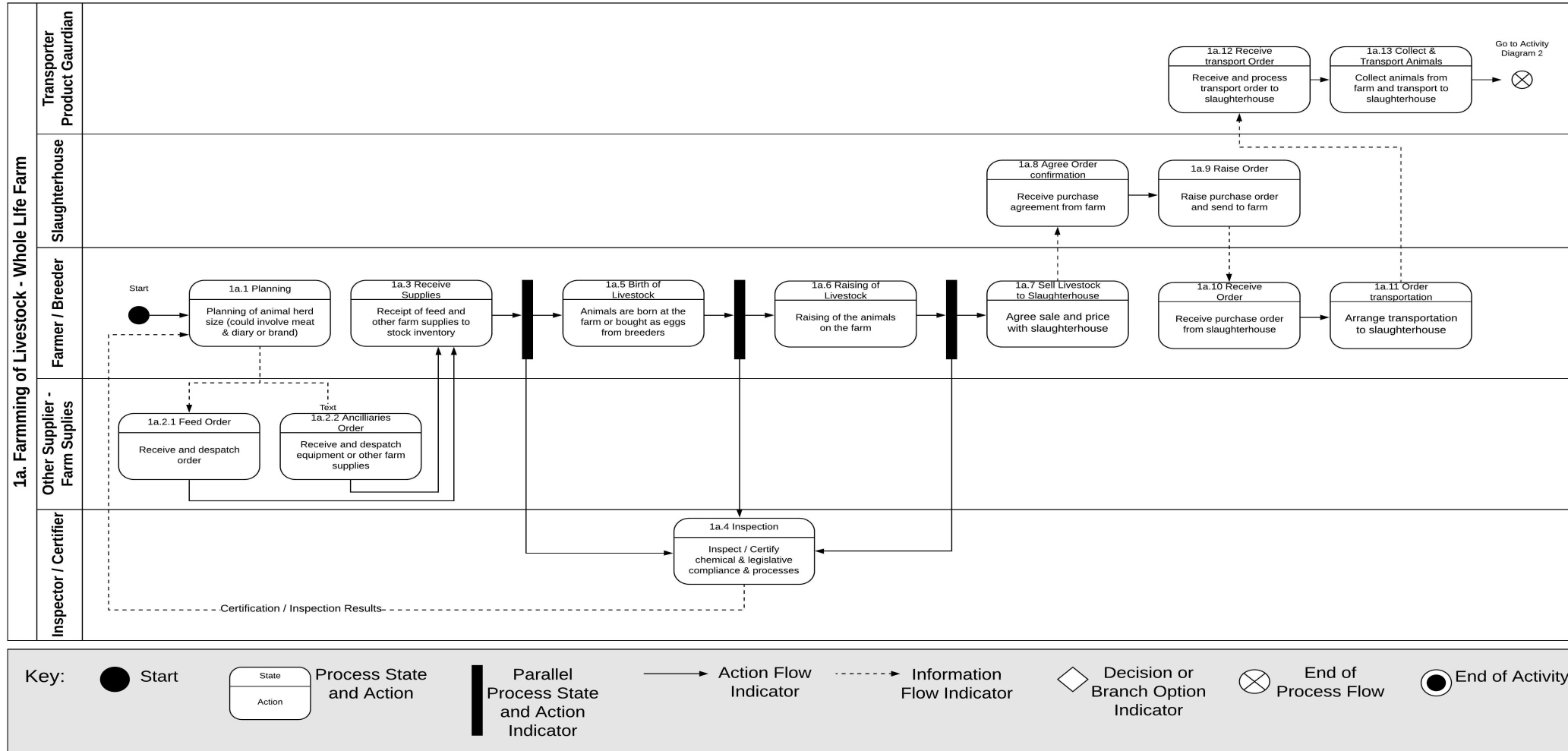
Step 1: Creation of Activity Diagrams for each of the Use Case Diagram Processes

1a. Farming of Livestock - Whole Life Farm

Transporter Product Gaurdian

1a.12 Receive transport Order — Receive and process transport order to slaughterhouse

1a.13 Collect & Transport Animals — Collect animals from farm and transport to slaughterhouse

Go to Activity Diagram 2

Slaughterhouse

1a.8 Agree Order confirmation — Receive purchase agreement from farm

1a.9 Raise Order — Raise purchase order and send to farm

Farmer / Breeder

Start

1a.1 Planning — Planning of animal herd size (could involve meat & diary or brand)

1a.3 Receive Supplies — Receipt of feed and other farm supplies to stock inventory

1a.5 Birth of Livestock — Animals are born at the farm or bought as eggs from breeders

1a.6 Raising of Livestock — Raising of the animals on the farm

1a.7 Sell Livestock to Slaughterhouse — Agree sale and price with slaughterhouse

1a.10 Receive Order — Receive purchase order from slaughterhouse

1a.11 Order transportation — Arrange transportation to slaughterhouse

Other Supplier - Farm Suplies

1a.2.1 Feed Order — Receive and despatch order

Text
1a.2.2 Ancilliaries Order — Receive and despatch equipment or other farm supplies

Inspector / Certifier

1a.4 Inspection — Inspect / Certify chemical & legislative compliance & processes

Certification / Inspection Results

Key:

- ● Start
- Process State and Action (State / Action)
- ▮ Parallel Process State and Action Indicator
- → Action Flow Indicator
- ┄► Information Flow Indicator
- ◇ Decision or Branch Option Indicator
- ⊗ End of Process Flow
- ◉ End of Activity

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Name of process	1a Farming of livestock – whole life farm: birthing and raising of livestock to end of life			

Business process short description	Leather is manufactured from the hide or skin of an animal. There are various farming models:
	
	  a. Farms that raise animals from birth to end of life
	  b. Private or family small holdings
	  c. Industrial systems that start with birthing farms, before moving livestock to rearing/raising farms and then moving the livestock to finishing yards (sometimes known as feedlots).
	  d. Exotics systems that combine egg breeders/collectors, hatchling farms and finishing farms
	
	Process 1a cover the processes for models a. and b. above. Process 1b covers models c. and d.			

Process participants	Farmers, Breeders, Other Suppliers - Farm supplies, Transporter Product Guardians, Slaughterhouses (Abattoirs), Inspectors / Certifiers			
Input & criteria to enter/begin the process	Planning of livestock herd (this could involve liaison with Brands or could be part of the meat & diary industry)			
Parallel Processes	**1a.4 Inspection:** Inspection / Certification of chemical & legislative compliance & processes can take place at the farm at different parts of the process.			
Description of Activities A step-by-step description of what happens in the process. If parallel or overlapping steps much be finished before the next step, the first two digits of the number should be the same with a third digit added.	DESCRIPTION	Required DOCUMENTS	Required OTHER INFORMATION / communication method	TRACEABILITY Actions & Data required
	1a.1 Planning: Planning of animal herd size (could involve meat & diary or brand)			
	1a.2.1 Feed Order: Place order with suppliers	Purchase Order to Feed Supplier Invoice from Feed Supplier	Any feed requirements? (i.e. no GM or similar) Order from farmer: email, mobile phone SMS, WhatsApp	Record of receipt of feed supplies
	1a.2.2 Ancillaries Order: Place order for equipment or other farm supplies	Purchase Order to Feed Supplier Invoice from Feed Supplier	Order from farmer: email, mobile phone SMS, WhatsApp	Record of receipt of feed supplies
	1a.3 Receive supplies: Receipt of feed & other farm supplies to stock inventory	Despatch notes confirming goods received	Order confirmation from supplier: email, mobile phone SMS, WhatsApp	Inventory of feed & materials to be registered at the farm.

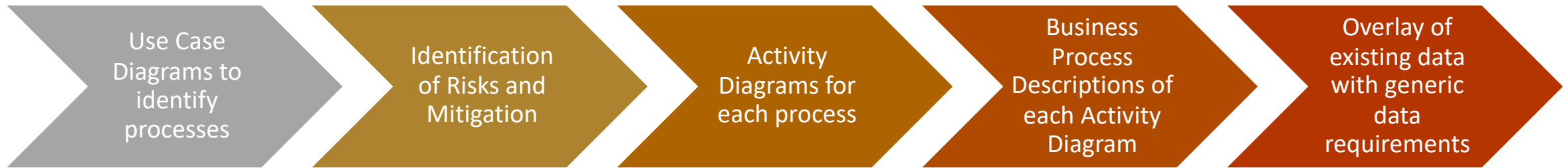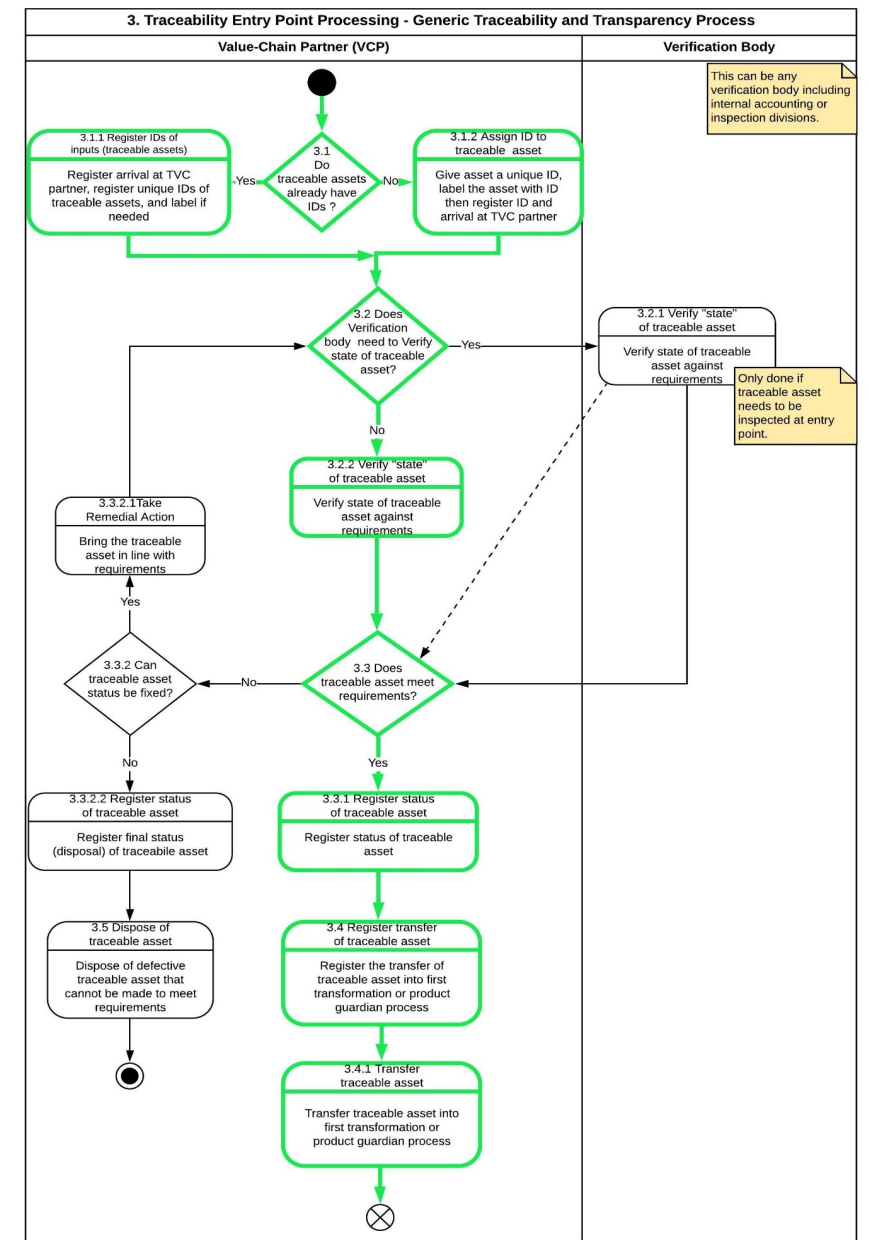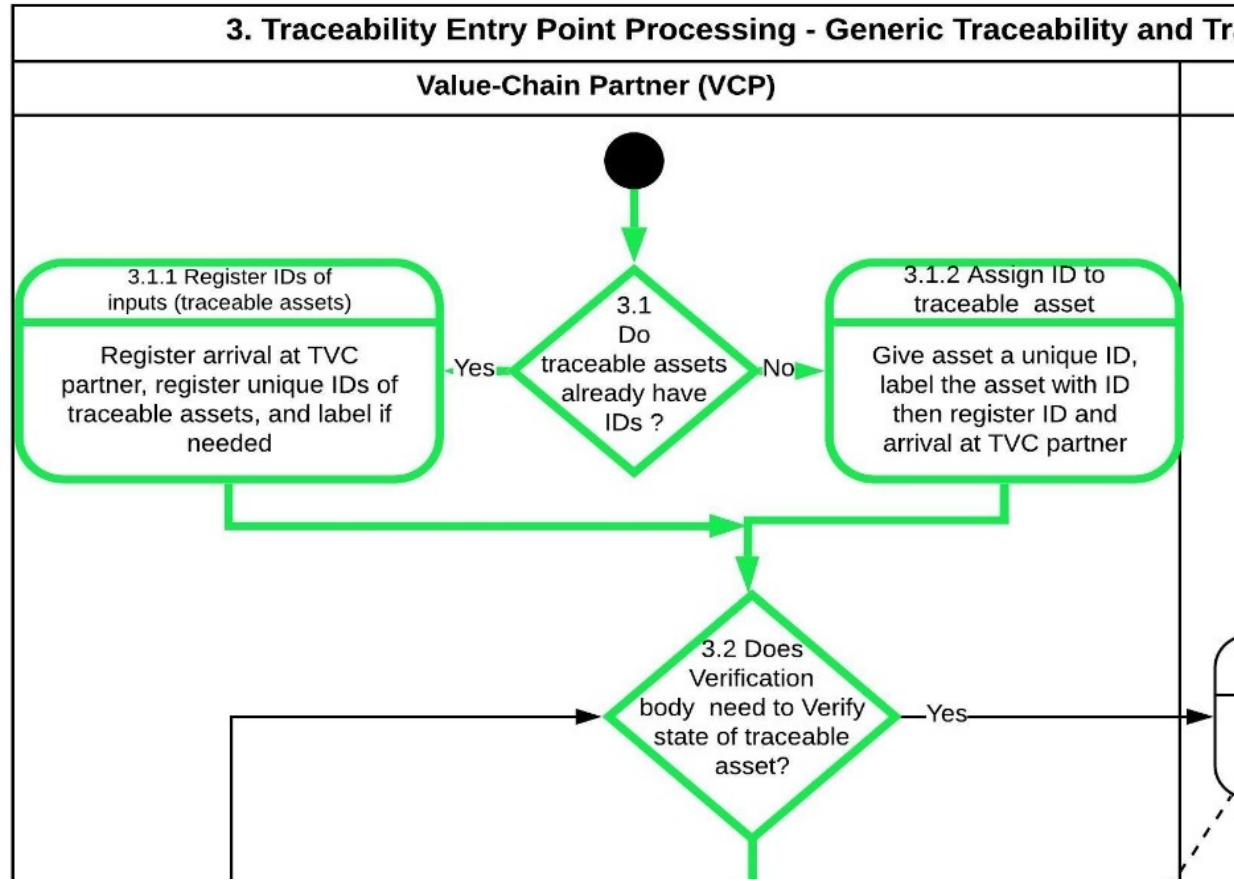Step 2: Creation of Business Process Description

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Output & criteria to exit the business process	Slaughterhouse is in receipt of fully grown cattle ready for end-of-life process before the hide / skin is separated from the meat & carcass, ready for leather manufacturer (see BPD 2).
"Common" exceptions/problems	Identification not always transparent. A rearing / raising farm may be receiving quantities of young cattle from a number of different birthing farms. A finishing farm may be receiving quantities of part-raised cattle from a number of different rearing / raising farms. Different systems of identification may be adopted by different farms Transportation legislation may differ across countries or states which could impact animal health & welfare
Circular Economy related observations	Waste from the food industry can be used as animal feed. Manure from animals can provide fertiliser (both on and off farms) Rotation of crops and livestock farming help to preserve biodiversity and health of soil
Other Observations, in particular related to traceability needs for different activities	**Farm Models:** There are many different farming models globally, ranging from industrial systems as outlined in this BPD, to more simple whole life farms as illustrated in BPD 1a. Additionally there are global variances that must be recognised & in some instances protected within a transparent system, in order to preserve social economies & cultures.
Related laws, rules, regulations	Different regulations & laws are applicable in different countries & regions.

Sustainability Risks, Criteria and Verification If the list is too long this section can be moved to an annex.	Sustainability risks (hot spots) within this process	Sustainability criteria and standards to address the risk	Verification methods for criteria and standards
	A9. Health & Safety, including Personal Protective Equipment (PPE) A10. Human Rights A11. Labour Risks	B3. The International Labour Organisation (ILO) Fundamental Convention B7. Ethical Trading Initiative (ETI) B18. Sedex B19. SGS SA8000 Social Accountability Audit B20. Social Accountability International (SAI)SA8000 Social Accountability Audit	3rd party audits Self-assessment / self-evaluation Certification Programmes
	A2. Animal Welfare	B1. CITES B4. AGW (A Greener World)	3rd party audits Self-assessment / self-evaluation

Step 2: Creation of Business Process Description

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Data and Information Exchanges

The final stage of the BPA is to then overlay the generic traceability and transparency requirements (as explained in the first part of this Module) over the now identified existing business processes as outlined in the BPDs.

|				
Use Case Diagrams to identify processes	Identification of Risks and Mitigation	Activity Diagrams for each process	Business Process Descriptions of each Activity Diagram	Overlay of existing data with generic data requirements

Traceability Process Overlays

The first step is to take the generic process and identify the pathway that leather and textile value chains would take through that generic flow of information

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Traceability Process Overlays

- Layering of generic traceability requirements and exchanges onto the related Activity Diagrams

- Identification of the gaps

- Recommendation for the solution

These nodes represent the corresponding generic traceability activity from the previous slide

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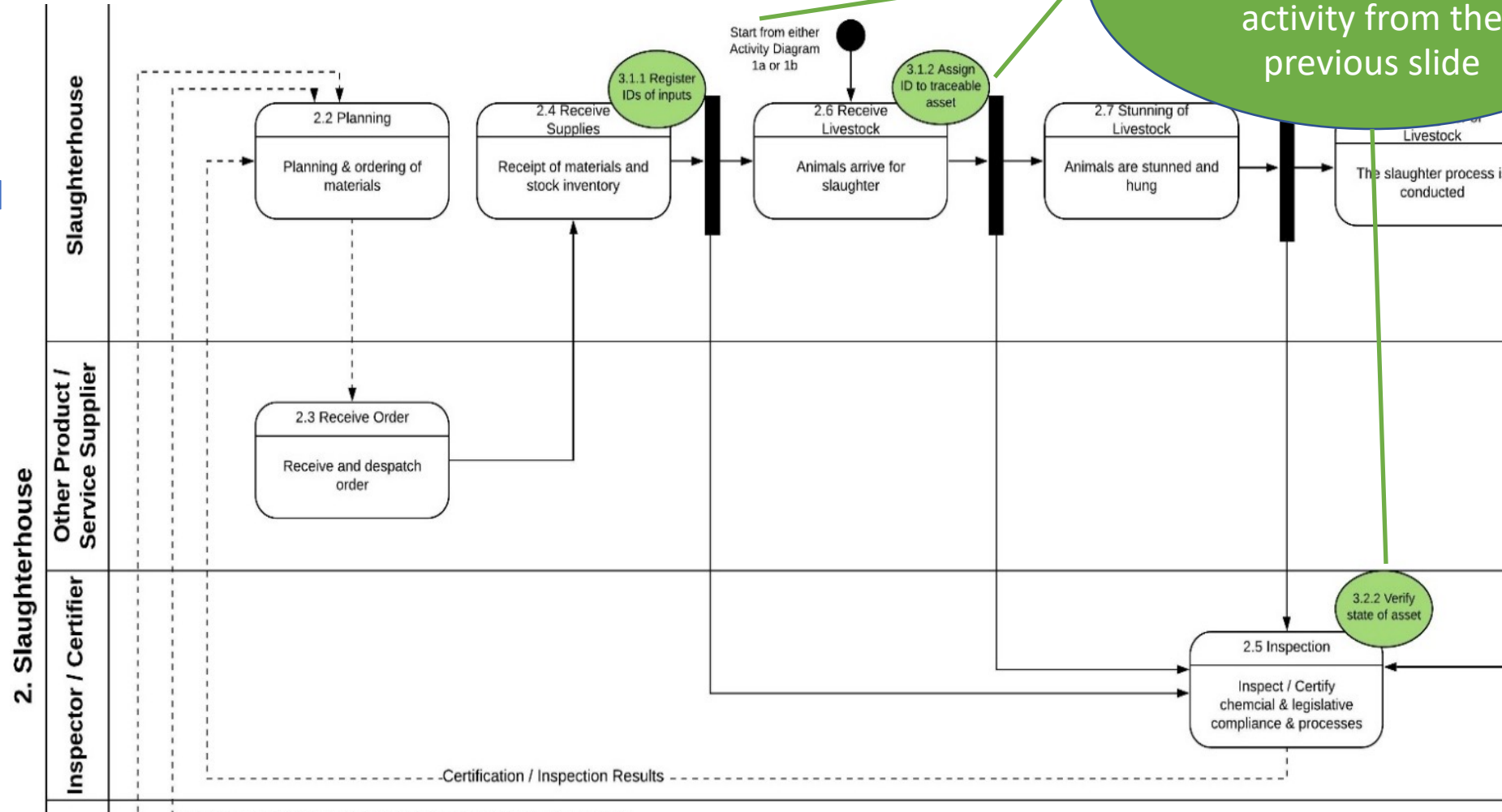
Data and Information Exchanges Conclusion

The potential for good **data availability** is present throughout the leather and textile value chains.

Where **gaps in data availability** exist, they are generally in the farm or fibre sources through to the first transformation facilities (tannery, ginning mill or spinner). In the following processes, the gaps are generally related to the recording of data.

Gaps are often the result of missing mechanisms for the consistent transfer and **sharing of traceability and transparency data**.

BPAs can help identify where **risks and information gaps** exist as well as where the data to fill existing information gaps might be collected.

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- Tomorrow's discussion will include how the work of the BPAs is used practically within the blockchain pilot system to create traceability and transparency in value chains

BPA Work

1. **Established value chain processes and actors**

2. **Established risks and mitigation options**

3. **Established information and data required**

Block-chain Pilots

4. **Use the above within a proof of concept blockchain system of traceability & transparency to provide a more sustainable value chain**
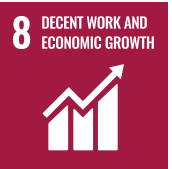
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Deborah Taylor
MD, Sustainable Leather
Foundation, UNECE
Project Expert, Leather
Value Chain BPA &
Blockchain Pilot

Piera Francesca
Solinas UNECE
Project Expert, Textile
Value Chain

Marco Riccheti
CEO Blumine SRL
and UNECE Project
Expert, Textile Value
Chain

Moderator: Virginia Cram-Martos, CEO Triangularity SL