



## Advancing Transparency and Traceability of Sustainable Value Chains in the Garment and Footwear Sector

### Report on the leather value chain, focusing on livestock animal hides and exotic animal skins.

#### Introduction:

This report contains a brief glossary of processes and actors in the leather value chain, together with use case diagrams to illustrate business processes for both a complex value chain (livestock) and a controlled value chain (exotics).

The purpose of this document is to provide a starting point for understanding the leather production landscape and the report is only concerned with the outline of processes necessary to convert the hides and skins from livestock and exotic animals into leather. This report does not look at the risks and sustainability issues arising from the processes but focuses on the identifying the actual process and actors. It is the first report of 3, as outlined below:

- 1. Report to identify the processes and actors within the leather value chain**
2. Report to provide detailed descriptions of processes and the sustainability risks associated with those processes
3. Report on information/data requirements and existing traceability systems to provide transparency and traceability in the leather value chain.

The contents of this report have been compiled to encompass the broadest variability within the production process. It is recognised that not every manufacturer of leather will follow the attached in exactly the same order, however, for the purposes of remaining generally in alignment with the basic production model, this is the recommended standard to work from.

#### **Livestock Hides and Skins:**

The leather value chain for livestock hides and skins can be complex as the manufacturers of the leather (tanneries) can provide different types of production processes. Some tanneries perform the entire transformation process from the raw hide/skin through to the finished material while others will only perform a part of the process. This results in a range of “supporting” actors participating in the value chain. These include: Agent Traders who buy and sell material at different stages; Brand Agents who act on behalf of the brands to buy material from a number of sources to fulfil product manufacturing needs; Sub-contractors who perform transformation processes on behalf of a tannery (they don't own the material but do have a part in the production). These “supporting” actors add a level of complexity to achieving full transparency and accountability from a sustainable production perspective.

#### **Exotic Skins:**

When considering exotic skins, although some value chains may function in a manner similar to that for livestock hides/skins, generally there is a more controlled value chain. This is primarily due to

additional sensitivities and legal issues, but also because exotics skins are more prevalent in luxury items and the luxury brands are more likely to manage their value chain from farm to product. There is also more likelihood that luxury brands will own their own farms, slaughtering facilities and tanneries for exotic leather production.

It is also worth noting that luxury brands are more likely to have mapped their value chain and generally conduct stricter controls over the origin of material and the tanneries used.

There are 3 parts to this report:

Part A: Glossary of leather value chain processes

Part B: Identification and brief descriptions of the actors in the leather value chain

Part C: Use Case Diagrams – Leather Value Chains – Complex and Controlled

DRAFT

## PART A – GLOSSARY OF LEATHER VALUE CHAIN PROCESSES

This glossary contains a description of the process steps involved in the manufacture of leather. These processes are broadly the same whether dealing with livestock hides/skins or exotic skins. This glossary does not focus on the health, social or sustainability risks associated with each process as these elements will be reported upon in Report No.2 as mentioned in the introduction. It is worth noting that not all process steps are followed in every case but this glossary covers the broad remit of leather production.

Within this glossary of processes there are various traceability entry/exit points where identification could be applied to either individual hides/skins or batches of material. Please note that there is no specific process that is mandatory or widely recognised as part of the leather manufacturing process at the present time. When referencing identification there are a number of different identity applications that can be adopted at different parts of the value chain, including: ear tagging of livestock coupled with computerised or manual record systems at slaughterhouses, physical stamping at the slaughterhouse or at receiving tannery, DNA marking of hides at the tannery, ceramic marking of hides at the tannery, laser marking of hides at the tannery, etc. There is no standard system or approach to ensuring onward chain of custody.

The process descriptions are numbered to correspond with the numbered processes in the Use Case Diagrams in Part C of this report.

### Process 1:

#### Birthing and Raising of the livestock

Leather is manufactured from the hide or skin of an animal. There are various farming models:

- Farms that raise animals from birth to end of life
- Private or family small holdings
- Industrial systems that combine the characteristics of birthing farms, rearing farms and finishing yards (sometimes known as feedlots).

Different factors will affect the type of farming undertaken: social economics, diary & meat industry, exotics farming, religious customs, geographic & regional limitations/restrictions/legal requirements.

Identification of livestock during this process is achieved generally through the use of ear tagging at entry of the livestock to the value chain (birth) and movement is monitored by computerised or manual tracking of the identification number/code on the ear tag. Where this method is utilised, livestock can be traceable from birth to slaughter. Without ear tagging there is the possibility of manual tracing through paperwork and invoicing, but it should be recognised that even this is not always carried out in less developed regions.

### Process 2:

#### Slaughter

The most acceptable form of slaughter takes place in an industrial slaughterhouse or abattoir, where the animal is humanely slaughtered with the meat (from livestock) going to be butchered and the hides sent for leather making.

However, there are countries where smallholdings or individuals slaughter their own animals or where religious slaughter takes place (not always humane).

In addition, it must be recognised that there are some countries where it has been found that bad animal welfare practice prevails, and cruelty of animals is observed. This is an ongoing problem for the meat industry, and it is hoped that this project will help to address and start to eliminate these unacceptable sources. The leather industry can only influence the meat industry through dialogue and purchasing influence, however examples do exist of supply chain co-operation, that works to make sure the source of meat comes from farming systems that have the highest animal welfare standards.

Identification at the slaughterhouse can be recognised as the exit point for the animal's life and the entry point for the production of leather, and can again be recorded via an electronic or manual system. Some slaughterhouses may physically stamp hides/skins with codes that denote the place and date of slaughter before sale to the tannery and this information could be passed to the tannery at point of sale.

Identification could be applied to the hides/skins at any entry or exit point in the processes outlined below, either by a permanent mark that will stay with the material through the process or by individual identification/batch identification being recorded or applied at the different manufacturing sites. Tracking of the identifier could be electronic or manual (through invoices, dispatch notes, bills of lading, etc). However, as mentioned, there is no current standard method or requirement for this so identification is not detailed as a routine process in the glossary from this point forward but will be addressed in more detail in Report No. 2.

## Process 3:

### Hide Preservation

Some slaughterhouses have tanneries attached to them, for example some of the larger meat packing companies will have a production process that integrates slaughter, meat packing and leather making. In this case, the hides will generally be processed as "Fresh" hides where no preservation is necessary, or "refrigerated" hides where ice is used within insulated containers for up to 3 days transportation/storage before transformation processes begin.

However, for the majority of hides there is a longer transportation / shipping time from the slaughterhouse to the purchasing tannery and, therefore, it is necessary to "preserve" the hide from breaking down and deteriorating.

The most common form of preservation for hides and skins is "salt curing" however, other methods used include: "drying", "pickling", "bactericides", and "lowering water activity (reducing water content to inhibit bacterial activity)".

## Process 4:

### Soaking, Fleshing and Liming

The first transformation step in a tannery is to recondition the hide into the optimum state for tanning. The procedure followed will vary slightly depending on the preservation method used. Once optimum hydration through soaking is reached the hides are fleshed where any residual tissue, fat, remnants are removed by manual or mechanical knives. The hides/skins are then "limed" where a combination of chemical and physical processes are used to open up the fibre of the hide and to remove the hair and epidermis. It is important that the liming process is carried out with care to (a) maximise the

surface yield without over relaxing the structure of the hide/skin and (b) to prevent excessive pollutants in the effluent. The liming process can affect the end quality of the leather.

### Deliming and Bating

The residual lime (found in the pelt) used to remove the hair must then be removed / neutralised and this is generally done using ammonium salts or other deliming agents such as carbon dioxide.

The hides are then “bated” where enzymes are used to remove any residual hair/cells and to soften and improve the elasticity of the hide. Different enzymes create different effects in the leather and can be used to achieve different performance qualities for the end product.

### Tanning

This is the first full transformation stage from the hide to leather and results in either wet blue or wet white material.

There are three main methods used for tanning – “Chrome Tanning”, “Synthetic Tanning” and “Vegetable Tanning”.

- Chrome tanning is the quickest and most cost-effective method however, the use of Chrome III, if not processed correctly, can result in the formation of Chrome VI which is a harmful, carcinogenic form. Chrome tanning is achieved using rotating drum vessels with a relatively quick processing time and results in “wet-blue”.
- Synthetic tanning (chrome-free) uses the same process as Chrome tanning but with synthetic substances and vegetable compounds to create the same result but in a white colour, hence wet-white. This process is more costly and requires more controls than Chrome tanning but does not carry the risk of Chrome VI formation.
- Vegetable tanning is achieved using natural tannins from wood, leaves, tree bark and fruits, and is the traditional way of tanning leather. It is traditionally processed in a series of large open vats and can take up to 60 days to carry out. Options for use and colour are more limited and this method is most commonly used for the production of shoe sole leather or other heavy leather applications. Veg tanning produces a brown-coloured leather that can be dyed to another colour.

### Samming

This is the process of passing the tanned material through rollers to remove excess water and to remove wrinkles/folds.

## Process 5:

### Splitting (if necessary)

Some leather can be split to provide a top grain split used for shoes, gloves, purses, clothing, and the flesh split leather (bottom part of the hide), often known as suede, and used for clothing, shoes, gloves, and bags. Whether the leather is split or not depends on the thickness of the original hide/skin and the intended application.

### Shaving and sorting

The material is passed through shaving machines with very precise blades to ensure that there is a uniform thickness of material before sorting into quality grades ready for the next stage.

## Process 6:

### Retanning/Fatliquoring

This important stage will vary according to the end result that is desired. The process is adjusted for different leathers: shoe uppers, split leathers, nubuck, suede, garment, upholstery and bags. Retanning is used to improve the properties for look, feel, buffing and dyeing, water resistance and colour fastness.

Fatliquoring (or oiling the leather) also occurs at this stage to condition the material for appearance, feel and durability.

### Crust Leather (if necessary)

Some tanneries will not need this stage if they are transforming their material from raw hide all the way into finished product. However, if the tannery is only producing wet blue, they may dry the material to a “crust” state before selling on to other manufacturers – this is very often after the retanning and fatliquoring. Tanners may also dry their wet blue / wet white to store it until they have order requirements (especially colour) for specific finishes.

Essentially crust leather is just the dried state of the tanned/retanned/fatliquored material.

## Process 7:

### Dyeing

The leather is dyed using chemical dyes (all colours) and pigments (especially white) to achieve the desired end colour of material. This relies on a good understanding of how dyes work along with strict controls and processes to ensure that colours between batches remains consistent. Rates of exhaustion (amount of dye taken up by the material divided by the amount of dye used) are crucial along with colour fastness and light fastness (resistance to fading when exposed to light or water).

### Setting-out/Samming

Removal of excess water will take place again by passing the re-tanned and dyed material through mechanical rollers.

## Process 8:

### Drying

There are two main methods of drying the leather – air drying where the leather is suspended on racks above the tannery floor (sometimes combined with passing the leather through ovens) or vacuum drying where the moisture is removed by suction. Process 8 can often be done before Process 6 if a crusting strategy is being used but will have to be repeated after the dyeing step.

### Conditioning and softening (including staking and milling)

The leather is then mechanically staked (a pummelling action) to soften and improve the appearance of the material. The machinery used is either a rotary or vibratory staking machine (for staking) or a dry drum for the milling form of softening.

### Finishing

During finishing the leather is given final treatments to suit the end product requirements. This could involve embossing, stamping, adding a shine or dulling down the appearance of the leather. Further shaving could also take place at this stage. The finishing process often involves coating additional surface layers onto the leather to add colour, smoothness, durability, or fashion effects. These

finishing chemicals include colourants (e.g. dyes and pigments), and film-forming materials (e.g. polymers).

The leather is then sent for quality control, grading, measurement and packaging before despatch to the product producer / manufacturer / brand.

## Process 9:

### Product Assembly

Transformation into the finished product (handbag, shoes, saddlery, belting, upholstery) may take place at a brand facility or at an intermediary factory. The product assembly can involve re-finishing the leather to add effects or durability.

The leather is cut out, sewn together, backed, punched, etched, or moulded to take on the shape of the final product.

## Process 10:

### Fulfilment at retail facilities / outlets or online

Product sale to consumers and end users. The in-life of leather is characteristically devoid of washing cycles. Leather, unlike textiles, does not generally get washed, so avoids water and energy use in-life.

## Process 11:

### Post Consumption / End of Life

This could be re-cycling, re-use (repurposing) or waste disposal. Leather is a good example of a material that can be recycled and reused and there are organisations who specialise in transformation and restoration of leather.

It is worth noting that leather has historically been manufactured to provide longevity which is why it is seen as high-quality material and why it remains synonymous with luxury. However, new thinking and technology is emerging around the ability to produce leather using formulations that will enable the material to start to biodegrade after a pre-determined period of time, i.e. manufacture for the lifecycle wanted for the product, 5 years, 10 years, 100 years, 200 years. Some tanning types may not be suitable for biodegradability success.

## PART B – ACTORS IN THE LEATHER VALUE CHAIN

This section of the report focuses on the primary actors involved in the leather value chain. It is intended as a top line overview and more detailed analysis of these actors will be prepared in Report No. 2. Not all actors will be used in every value application.

### Farmers:

Breeders, raisers, finishers, small holdings, individuals, and industrial production farmers

### Farm Suppliers:

Suppliers of feed, equipment, animal health.

### Transporters:

Transportation companies are involved throughout the value chain as the animals are moved, hides are shipped and then moved from manufacturer to manufacturer before final dispatch to the consumer. Transportation is also involved in the delivery of chemical supplies to the tanneries, etc.

### Slaughter:

Slaughterhouses, individuals, meatpackers, and hide collectors

### Tanners:

Different categories of tannery include:

- Raw to picked / pre-tanned
- Raw to wet blue/white (tanned)
- Raw to crust
- Raw to finished
- Wet blue/white (tanned) to crust
- Wet blue/white (tanned) to finished
- Crust to Finished

### Agents:

Organisations that buy material from slaughterhouses or tanneries and sell it to other tanneries (sometimes pre-tanned, sometimes part or semi processed and sometimes finished material; or a combination).

### Sub-Contractors:

Organisations who perform transformation operations on behalf of a tannery (sometimes this can also be a tannery with spare capacity that does work for another tannery).

### Suppliers of transformation goods:

Chemical companies and machinery companies (who provide materials/equipment to enable the transformation from hide to leather)



### Suppliers of waste provision and treatment

Waste disposal providers, Common or Municipal Effluent Treatment Plants, Recycling Centres

### Suppliers of Testing Services.

Testing houses that test and certify that the leather produced does not contain harmful substances above legislative limits or that chemicals used to perform the transformation do not contain banned substances.

### Certifiers:

Organisations that audit and certify compliance with traceability, environmental performance and social good practices, in order for the tanneries and brands/retailers to make claims about their products.

### Garment Manufacturers:

Organisations who transform the finished leather into products and dispatch them to brands/retailers.

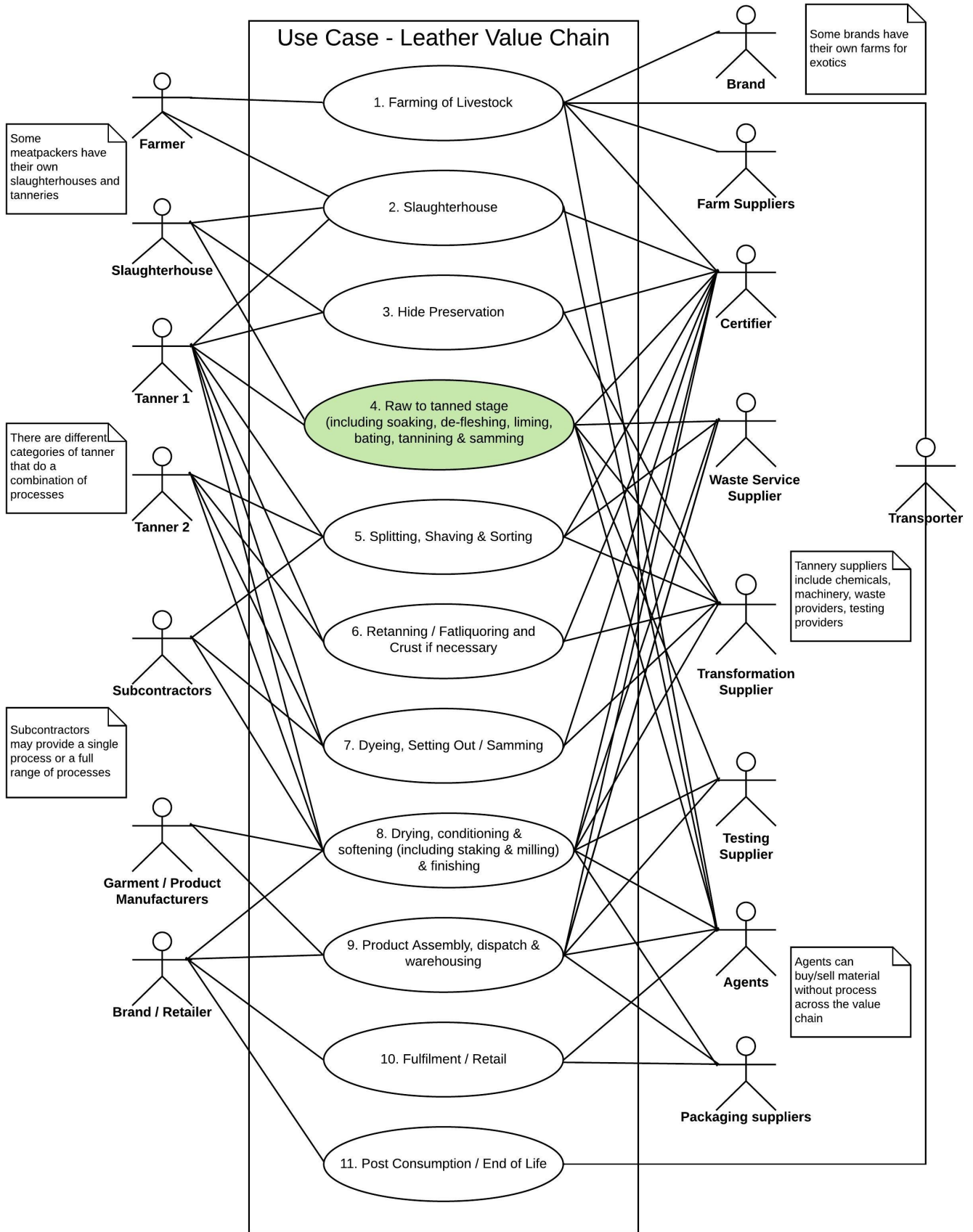
### Warehousing Contractors:

Storage, packing and dispatch of finished goods to the final stores or direct to online customers.

### Brands / Retailers:

Brands and retailers have dual responsibility: at the design and concept part of the value chain, in selecting material and sourcing strategy, and also with the marketing and final sale of goods to consumers. Brands and retailers may also be involved at various stages along the value chain to ensure quality and standards are observed and maintained.

PART C – USE CASE DIAGRAM - LEATHER VALUE CHAIN



## PART C – USE CASE DIAGRAM - LEATHER VALUE CHAIN CONTROLLED / EXOTICS

