Cotmarsh Tannery

Cattle Hide Vegetable Micro-Tannery – Feasibility Study





#### Attendees



Alice Robinson Fashion Designer

Andy Rummings Farmer

Karl Flowers Leather / Tannery Expert

Katy Warriner Designer / Maker

Sourcing & Rehy Salting & F	Udrating Liming & Deliming Dehairing Deliming De	Drying & Storing				
Drococc	<ul> <li>Hide collection services will store them salted</li> <li>Refrigeration and anti-bacteria gives up to 2 weeks</li> <li>Green bides straight into process skipping salting 16 hours window before degrading starts</li> </ul>	Cost				
Process	Straight to lime	*****				
Materials, equipment,	15kg of salt per hide (unused salt important)	Viability				
	Salt mountain can possibly use for gritting need to find an answer may need treating to remove	****				
Waste	the bacteria. Don't reuse. Can go into landfill					
Alternatives	Refrigeration instead of salting, 72 hours before it degrades Freezing gives thawing damage	*****				
	Preservatives an option					
	Will an abattoir salt? Abattoir and hide collector will need paying					
Comments	Feedback to farmers for hide improvement schemes Wet salted hide stored for up to 6 months Hides can be held at the pickling stage for months					

Sourcing & Rehy Salting & Fl	Vdrating Liming & Deliming Dehairing Deliming De	Drying & Storing
Process	<ul> <li>Washing drum for removing salt.</li> <li>Can only fill half full</li> <li>1kg of hide takes up roughly 1 litre, 1 cubic meter is roughly 1000 litres</li> <li>If not salting soaking is a shorter process – wash out blood and dirt and makes it softer. 2 hours, soapy water with possibly enzymes and alkaline (soda or wood ash) to swell. Drum or pit over night</li> </ul>	Cost ★★☆☆☆ Viability
Materials, equipment, chemicals & labour	Fleshing machine for <b>side</b> , rather than full hide, £10k	****
Waste	Animal by-product category 3, bins of it. £20 per big bin.	Value ★☆☆☆☆
Alternatives		
Comments	Jack's drum size is roughly 10-15 hides but needs to be <b>direct driven</b> rather than belt driven. <b>Fleshing and splitting can be done after lime</b> If green fleshing then dung can be an issue <b>Can use paddles to soak</b> <b>Could round at the soak as won't get rounding if liming in the pit</b>	

Sourcing & Rehy Salting & & Fl	drating Liming & Deliming Dehairing Deliming Deliming Bating & Tanning Fatliquor	Drying & Storing				
Process	Pit liming (takes longer) can stack in pit, possible 2 lime pits or drum (separate soaking drum and liming drum required unless plastic drum which can be cleaned)Lime pit doesn't need sharpening agent so no sharpening agent and no smell (drum does) Removed hair and epidermis from hide, dehairing by handTrim and round after liming into at least halves (reduces fleshing and splitting machine size) Option to flesh and split in the lime					
Materials, equipment, chemicals & labour	Hydrated lime – British Sharpening agent if in drum Splitting machine £20k+	viability ★★★★☆				
Waste	Used lime, would need to go through waste management	Value				
Alternatives	Darmstad process, paint hair with (sulphide and) lime and push the hair off Get Thomas Ware to lime and flesh, Alister needs them in packs of 50 (likely to be unrealistic)	*****				
Comments	Scud is epidermis that hasn't been removed properly pH has to be above 12.5 to remove the hair You will get some salt coming over into the liming process, contaminates a lime pit over time, can get 10 cycles before need to refresh lime liqueur Can bellies if removed and discarded, go to dog chews? Animal by-product ends after liming Split in the lime to have a product that is usable 50 hides is 1.3 tonnes = 33kg of hair (2.5%)					

Sourcing & Rehy Salting & & F	Udrating Liming & Deliming Del	Drying & Storing
Process	<ul> <li>Ammonium salt to bring the pH from 12.5 down to 8, m</li> <li>Might not be the easiest to use</li> <li>90 minutes</li> <li>Waste more of an issue</li> <li>(NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>(aq) + Ca(OH)<sub>2</sub>(s) → CaSO<sub>4</sub>(s)↓ + 2H<sub>2</sub>O(I) + 2NH<sub>3</sub>(aq)</li> <li>Carbon dioxide         <ul> <li>lower that ammonium salt</li> <li>From cylinder into drum as mixing</li> </ul> </li> </ul>	Cost ★★★☆☆ Viability
Materials, equipment, chemicals & labour	Drum for deliming, bating, pickling and pre-tan	×★★☆☆☆ Value
Waste	Ammonium sulphate use as fertilizer or accelerate for compost. 600 litres per 50 hides, 13kg of ammonium salts in that 600 litres	**
Alternatives		
Comments	Deliming reduces the swelling from liming Can use other acids including vinegar Traditional bran was used to produce the carbon dioxide Have load cell on drum	

Sourcing & Rehy Salting & F	Udrating Liming & Deliming Del	Drying & Storing
Process	<ul> <li>Bating softens the hide</li> <li>Pickling pulls the pH down ready for tanning</li> <li>Can use vinegar but won't take pH below 4.5 <ul> <li>Going to struggle to get veg tan in thick leather at 4.5</li> <li>pH ideally 3.8 / 3.6</li> </ul> </li> </ul>	Cost ★★★☆☆
Materials, equipment, chemicals & labour	<ul> <li>Drum, pancreatic bates, warm water (35 deg)</li> <li>Cold water bring temp down for pickling</li> <li>Pickling in pit</li> <li>Sulphuric acid (not fun to work with) will remove the colour</li> <li>Acidic acid (vinegar, chip shop vinegar) about 1% up to 3% to get though thicker hide (vinegar needs 50% float in drum, 1000% if in a pit)</li> </ul>	Viability ★★★☆☆
Waste	Store pickling in a IBC and reuse and restrengthen	value ★☆☆☆☆
Alternatives		
Comments	Bating is complete when pressing finger leaves print, should be whiter and feel smooth Check baume before putting acid in. Acid through the side as the drum turning to stop burning Need to add salt into the liqueur as the pH goes down, particularly below 4.5 to stop the swelling In pickling now susceptible to mould Can do a pre-tan with the pickle to make the hide workable to split before tanning	

Sourcing & Rehy Salting & Fl	Adrating Liming & Deliming Del	Drying & Storing
Process	<ul> <li>For drums, tan liqueur goes it pickle in drum</li> <li>For pits can use pickle pit and then move into colour pit</li> <li>After shaving black stains need clearing</li> <li>EDTA – more expensive, not the nicest to work with</li> <li>Oxalic acid – won't remove stubborn, in drum for 30 mins (remove dispose of float)</li> </ul>	Cost ★★★☆☆
Materials, equipment, chemicals & labour	Drum or <b>pits</b> (colour & 4 tanning pits) Use willow, oak, alder etc to produce a tea Process to produce bark, dry, shred and then brew tea Splitting machine £20k - splitting can be done in the lime (preferred), here or after wetting back the crust (technically difficult) <b>Samming machine to squeeze water out £10-12k (water down to 35%)</b> Shaving machine £20k	Viability ★★★☆☆
Waste	Sludge and trimming Spend bark and wood	Value
Alternatives		★★★★☆
Comments	Counter current flow tanning liqueur and hides through pits Cover pits to keep heat in if heating up to 35 deg C. Cold pit hides are in 6 months and needs more pits up to 8 Warm pit hides are in for 2-3 weeks might get away with 5 pits Start in a colour pit, weaker solution, last pit in previous cycle. After colouring pits remove the squeeze water out, split and then shave Hides go into last strong concentration into a rinse in colour pit before remove 8 hours in a drum to tan hide, hot pit 3 weeks Bark required is 2.5 x weight of hide Can split after a pre-tan before going into pits, only for thick leather that you want to keep thick	

Sourcing & Rehy Salting & Fl	Adrating Liming & Deliming Dehairing Deliming De	Drying & Storing
Process	<ul> <li>Clearing <ul> <li>In drum</li> </ul> </li> <li>Stripping</li> <li>Removes surface tannins, removes unevenness and stops it cracking</li> <li>Raise temperature (45 – 50 deg). Raising pH, Sodium bicarbonate</li> <li>Retan</li> <li>Gets consistent tanning</li> <li>Different properties <ul> <li>Veg tans don't hold dye well or intensely. Adding a mordant agent, like Aluminium to give high dye fastness</li> <li>Can raise the shrinkage temperature, for shoe lasting etc</li> </ul> </li> <li>Fatliquor <ul> <li>Addition of an oil that is emulsified, fine droplets will penetrate into fine material</li> <li>Tallow, olive oil &amp; birch fat, or lanoline)</li> <li>Tumble fatliquor for an hour (depends on soft you want it)</li> <li>Could add filling step to make firmer leather (clay)</li> </ul> </li> </ul>	Cost  Cost  Viability  Viability
Materials, equipment, chemicals & labour	Drum, some chemicals to raise and lower pH (vinegar, bicarbonate, wood ash etc).	
Waste	fatliqour	
Alternatives		
Comments	Strip to get tannins off the surface as makes grain crack.	

Sourcing & Rehy Salting & R	drating eshing Dehairing Deliming Deliming Deliming Deliming Deliming Bating & Tanning Fatliquor	Drying & Storing
Process	Drying leather When dry topcoat oiling (by hand) Store to avoid mould	Cost ★★☆☆☆
Materials, equipment, chemicals & labour	Hot table for setting for flattening Toggle frame (clips £1.50 each) Drying room, with big fans pushing air through with heaters Air-conditioned room for storing to avoid mould,	Viability ★★★★☆
Waste		Value
Alternatives		<u>★★★</u> ☆
Comments	Can add fats on the drying frame Heavier the leather the slower to dry, 2 or 3 days for heavy, 12 hours for thinner Shelf racking with covers top and bottom of stacks Horse after removing from fatliquour	

### Tannery Rhythm

	Labour
Collect (outsource to hide collector to deliver)	2 x 2.5h
<ul> <li>Soak / clean – in drum or with paddles (few hours)</li> </ul>	2 x 1.5h
<ul> <li>Liming – pit (above or below ground) (week)</li> </ul>	1 x 0.5h
Dehair (short)	1 x 0.5h per hide
<ul> <li>Fleshing – fleshing machine (short)</li> </ul>	1 x 2m per hide
<ul> <li>Trimming, rounding &amp; inspect – rounding table (short)</li> </ul>	1 x 15m per hide
Possibly split	1 x 2m per hide
<ul> <li>Relime (overnight – few days)</li> </ul>	1 x 0.5h
<ul> <li>2 warm washes (mins) deliming</li> </ul>	2 x 1.5h
<ul> <li>Delime 35° – don't drain float (2 – 4 hours)</li> </ul>	10m
• Bating – 90 mins	10m
Cold wash (mins)	10m

• Pickle – water and salt, check the baume (pit day or two) 2 x 1.5h

		Labour
•	Tanning – warm pit (liritan) (x weeks)	Daily visit 2 mins
Ca	in outsource from here	
•	Samming	1 x 2mins per hide
•	Shaving	1 x 2mins per hide
•	Clearing	2 x 1.5h
•	Stripping	?
•	Retan	1 day
•	Fatliquor	10 mins?
•	Drying	2 x 15mins per hide
•	Quality inspection and oil	1 x 45mins per hide
•	Remove and store	1 x 2mins per hide

Key Partners What can we not do so it can focus on its Key Activities? Who are our Key Partners?1	Key Activities What are the activities we perform every day to deliver our proposition?	Value Prop What is the value we customers? What is t that our value propo	OOSITIONS e deliver to our the customer need sition addresses?	eliver to our e customer need tion addresses?		<ul> <li><b>Customer Segments</b>         Who are our customers?     </li> <li><b>Small Scale Consumers</b>         Traditional makers x 4         Hobby leather workers         Farmers (tan &amp; return) x 2         Locals (finished products)     </li> <li><b>Companies</b>         Brands         Small fashion brands x 2         Micro-tannery services     </li> </ul>	
Micro-Tannery Association x 3 Pasture for Life x 2 British Pasture LeatherMentor Workshop attendees Leathersellers Leather UK Leather industry Tannery Technicians Finishers Leather Merchants Hide Collectors	6	Story Traceable x 5 Sustainable x 3 Provenance British Organic Pasture for Life High quality prod Unique product Approachable Fresh and funky	uct				
Abbattoirs Farmers x 2 Local Planning Agency Environment Agency Marketing / media support x 2 Soil Association Textile exchange / sustainable angle	Key Resources What are the resources we need to deliver our value proposition?	<b>Financial</b> Revenue for farm Employment Increase value of Create leather inc Maintain heritage	hides dustry interest e skills x 4	Channels How are these prop sold and delivered? In Person Events / Markets Tannery open da Belt vending mad	oositions promoted, / Trade shows x 3 ys / shop x 3 chine (Avebury)	Educ Scho Fash Cour Tour	cation ools ion education (brands) rses (sell knowledge) rists
8	7	<b>Education</b> Safe accessible se	etup	<b>Online</b> Website x 5 Social m x2 Mail order	Leather community Wholesalers x 2 Leather merchanter Independent sho		
Cost structure What are the important costs we make to d	eliver to value proposition?		Revenue Sti How does the busine	ream ss earn revenue from	the value propositions?		Tanneries Contract tanning
			<b>Education</b> Courses x 3 Team days	<b>By-products</b> Dog chews Leather scra	x 2 B2B Hides x 5 ps x 2 Back to farm	iers x 2	Tannery services (chemical) B2C
		(9)	Tours x 5 Knowledge share	Hair x 2 Compost	Funding		Finished products x 2 'Make your own' kits Balm

## Since Workshop

### Tannery Rhythm

Collect Soak Clean ½ day	De F Rou ½	ehair lesh unding a day	Wash Delime Bate Wash Pickle 1 day			Samming Shaving Clearning Retan Fatliquour Hang	I	nspect Oil Store ½ day
Lime	(7)	Lime (3)		Pickle (2)	Tanning Pits (19)		Drying (3)	

#### Tannery Rhythm



#### Courses, Experiments & Visit







# Next Steps





### Churchill Fellowship

- Oregon USA Improve tanning knowledge
- Italy Visit the tannery district
- Norway Visit a reindeer micro-tannery

### Tannery Plan



# Design, Funding & Build

## Thank You & Questions

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