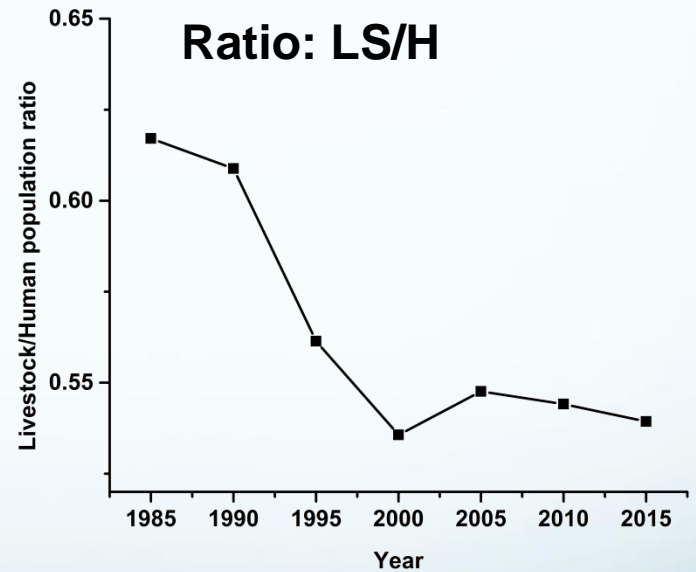
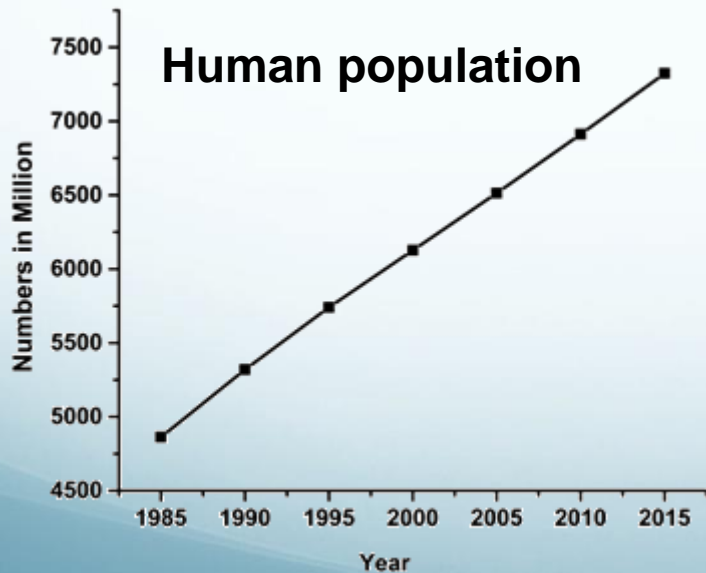
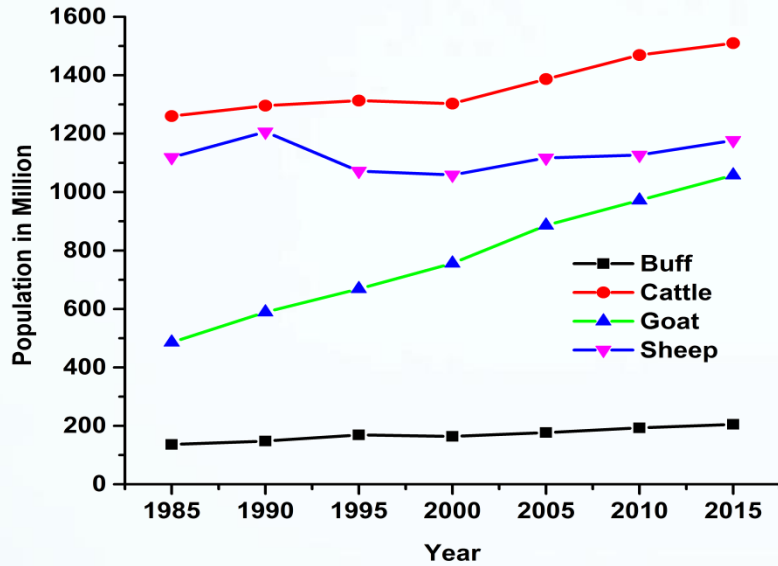


Plausible Shifts Beyond Leather

Dr B. Madhan
Senior Scientist
CSIR-CLRI

Live stock Vs Human population



**Leather Demand - Raw Material
Supply: A Tug of War?**

Conventional Applications in Leather

Foot wear**Apparel****Goods & Fancy****Upholstery****Heavy & Industrial
Leather****Glove****Sports****-Shoe sole****-Lining****-Belt****-Automotive
Industry****-Harness****-Industrial
Glove****-Cricket Ball****-Shoe Upper****-Leather Coat****-Watch Strap****-Furniture
upholstery****-Belting****-Fancy Glove****-Hockey Ball****-Shoe Lining****-Leather Pant****-Wallet****-Aircraft
upholstery****-Apron (Spinning)****-Boxing Glove****-Foot Bal****-Boots****-Umbrellas****-Honing Leather****-Driving glove****-Volley Ball****-Bunwar****-Hand Bag****-Stropping****-Sports glove****-Rugby Ball****-Kattai****-Pouch****-Loom Leather****-Military Shoe****-Key Chain****-Gill Box Leather****-Sports Shoe****-Leather
Parchment****-Twisting Leather****-Suit Case****-Mesh Leather****-Brief Case****-Picking Band****-Cap****-Picker****-Steering Cover****-Chamois leather****-Hand Band****-Friction Ring****-Carpet****-Conveyor Belt****-Bed Cover****-Hydraulic/
Pneumatic**

Are Synthetics Dominating?

- **Competed with Leather**
- **Partnered Leather**
- **Will they outsmart leather?? At least in volume terms**

2011;
Global trade in leather – 160 billion US\$
& footwear
Leather Footwear – 53 billion US\$
Non-Leather Footwear – 50 billion US\$
Source: CLE Website

2012;
Synthetic Footwear – 61.1%;
Leather Footwear – 38.9%
Source: Dr. Mwinyihija
Advances in Business Management and
Administratio, Jan 2014

Geographical Shifts in Leather Manufacture



Migration towards Asia 1980-2000

Present/Future Migration Pattern: Towards Africa

Factors for migration

Shift in focus towards **high value technologies**

Cost of Labor

Environmental issues

Leather to move towards Niche Segment



Un-conventional
thinking



Conventional
thinking



+

**Collagen
biomaterials**

Keratin Biomaterial

**Smart
Biopolymeric
application**



+

**Solid waste/
low utility**

Composition of Trimmings Wastes*

- Moisture : 28 – 35%
- Salt : 30 – 35%
- Collagen : 18 – 25%
- Hair : 4 – 7 %
- Fat : 2 – 7 %
- Others : 0.5 – 1%

* Generalized based on composition of major
hides/skins

Composition of Valuable Constituent in 1 ton of Trimmings

- Collagen : 180 – 250 Kgs
- Hair : 40 – 70 kgs
- Fat : 20 – 70 kgs

High Value Products from Trimming Wastes

Collagen

- Gelatin
- Pure collagen for biomedical applications
- Collagen hydrolysate for biomedical applications

Hair

- L-Cysteine amino acid
- Keratin biomaterials
- Keratin based auxiliaries

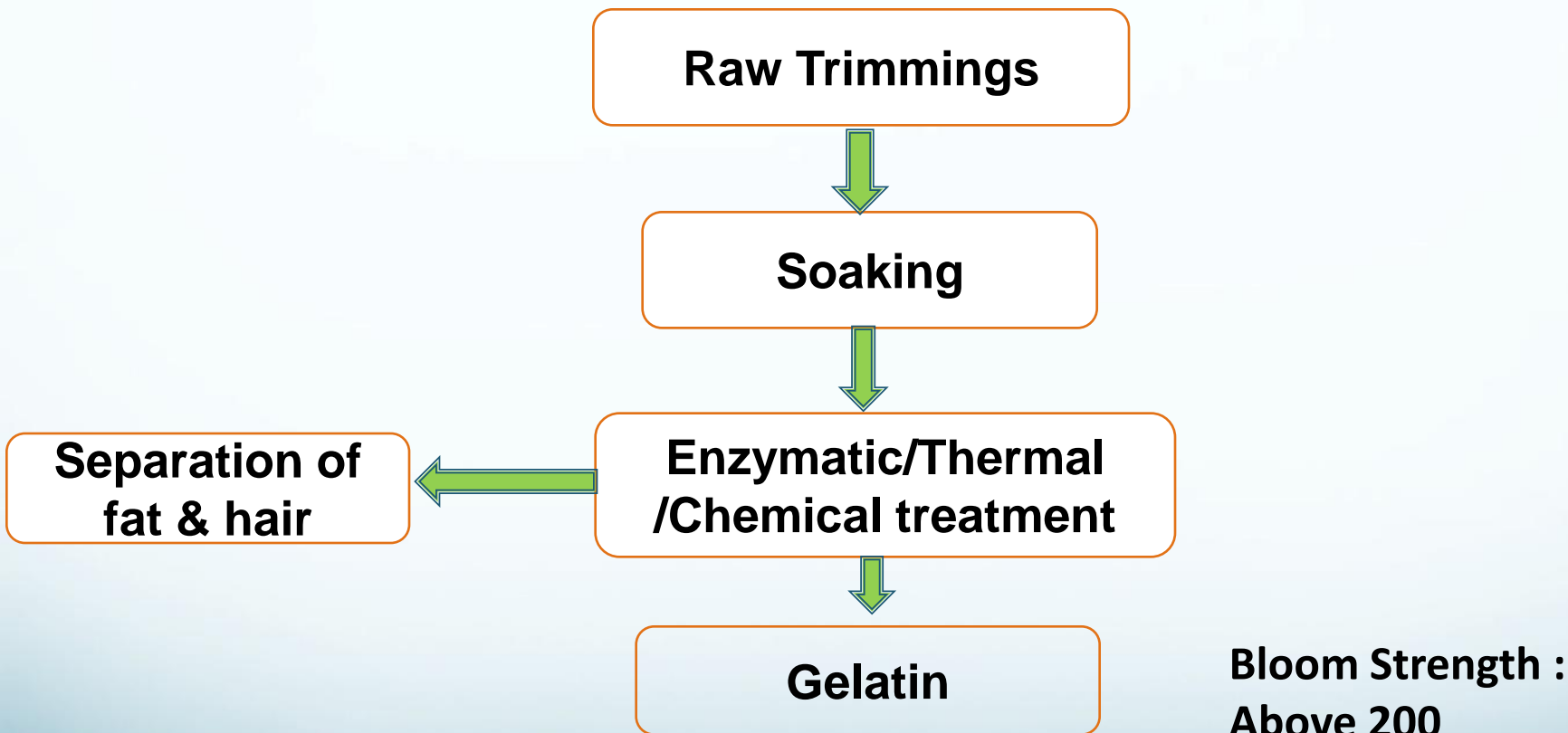
Fat

- Bio-fuel
- Fatliquors

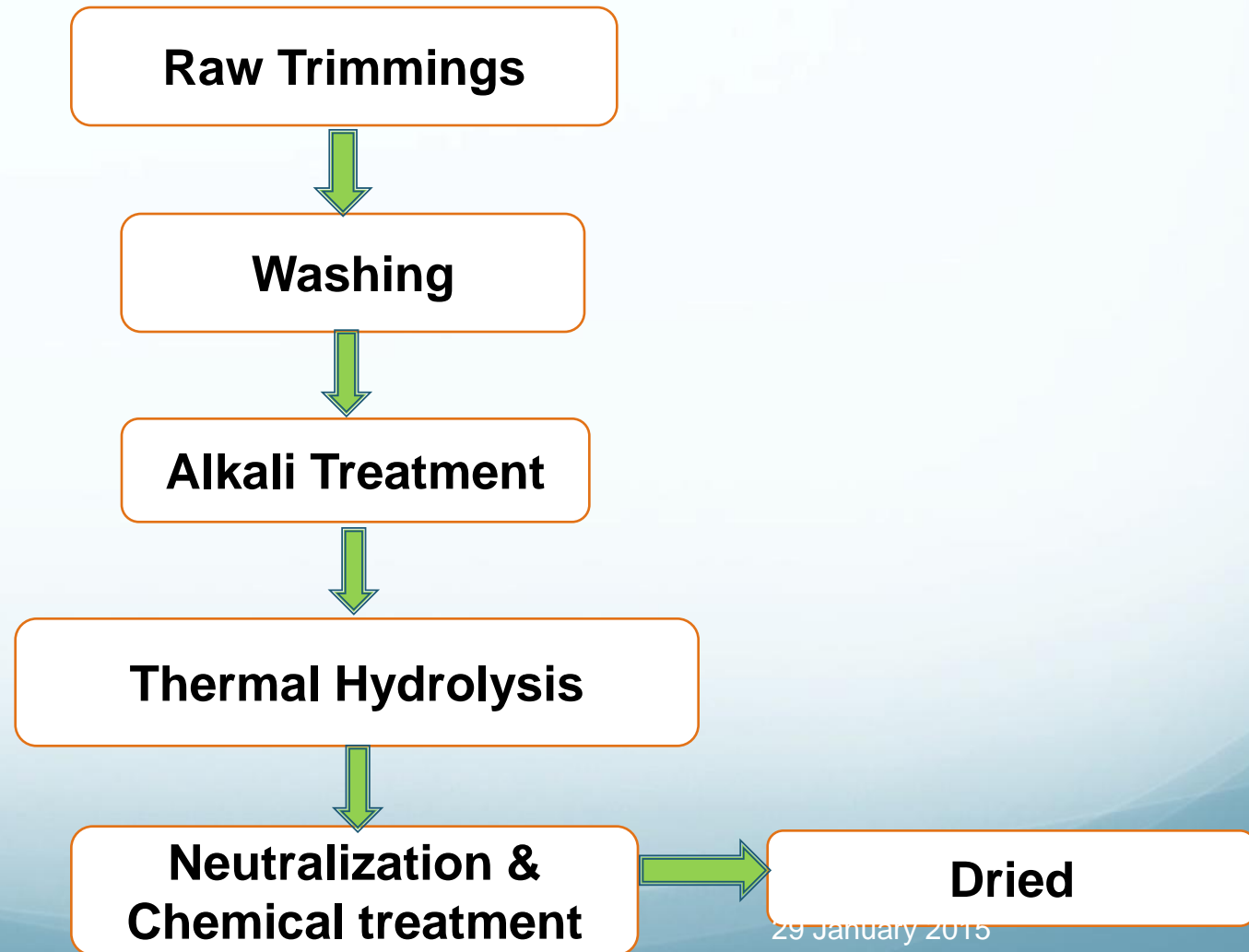
CLRI Technologies

- Manufacture of high grade gelatin
- Protein hydrolysate for retanning
- Protein hydrolysate for poultry feed/pet feed
- Bio-fuel from fat
- Purification of collagen from skin

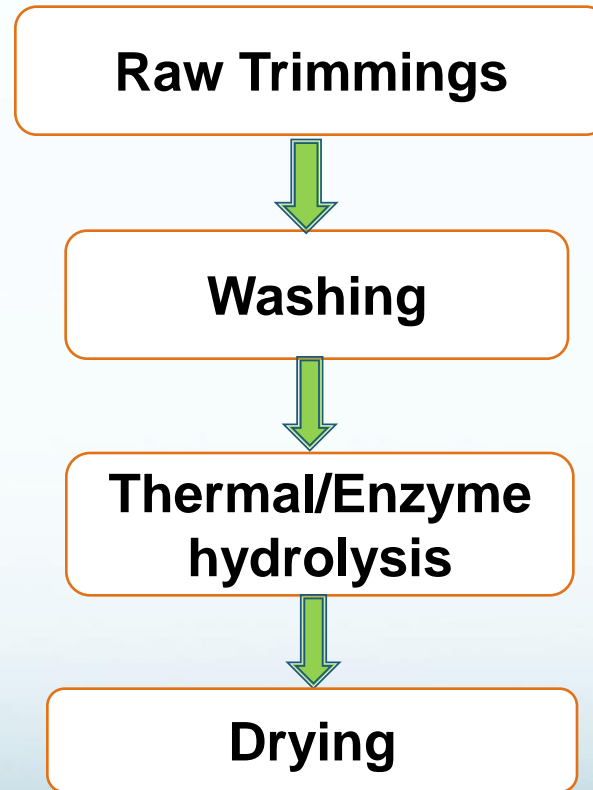
High Grade Gelatin from Trimmings



Auxiliary from Raw Trimming



Preparation of protein hydrolysate for poultry/pet feed



Is Leather Making the Ultimate Value Addition?



Biomedical

- High Value
- Low Volume



Gelatin/Bio-fertilizer

- Medium Value
- Medium/High Volume



Material of daily use

- Low Value
- High Volume

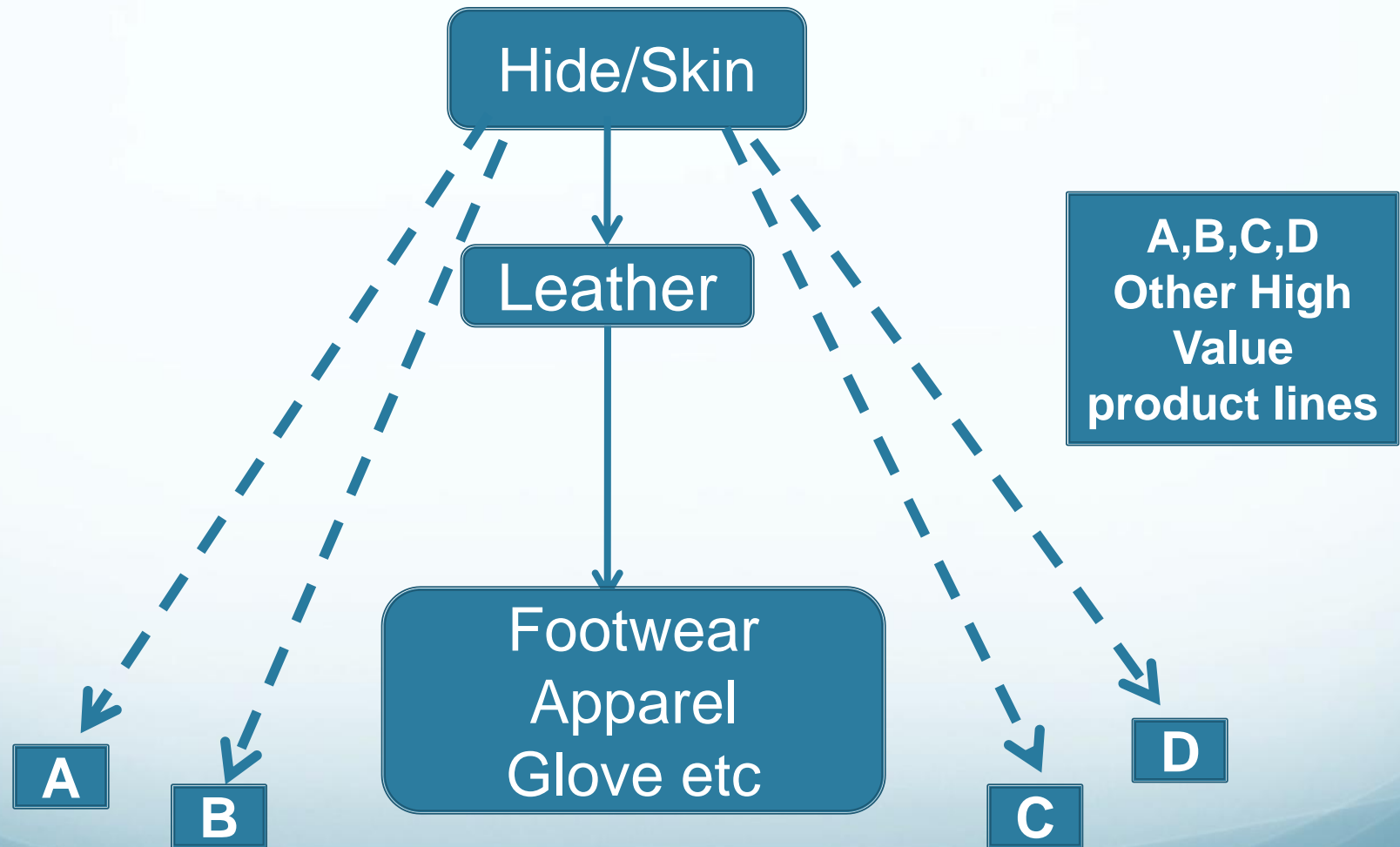
Potential Value Addition for Hides/Skins

Cost benefit analysis of Leather Vs Other bioproducts from 1kg of utter reject cow hide

Leather Making Option: Cow hide 1 kg = 1.7 Sq.ft
In value terms ~**Rs 125** (lining leather)

Constituents from 1kg of cow hide	Product option	Minimum Value for actual constituent (Rs)
Collagen (~250 gms)	Gelatin	125
Keratin (~50 gms)	Keratin Syntan	10
Fat (~25 gms)	Fatliquor	10
Total (in value terms)		Rs. 145

Hides/Skins: Leather & Beyond



2100 AD: “Leather is one of the important products from hides and skins”

Thank You