



Warner Research

# Warner Research Institute

## ***Primary Research Objectives.***

***To reduce energy use whilst maintaining and/or improving the standard of living in Australia without further degradation to the natural environment.***

***To optimise the ongoing reuse of material resources in the production of durable and non- durable consumer goods.***

# The Short History of Hemp Processing in Australia 1996-2019

- Today there are about 8-10 processing systems throughout Aust, most are small throughput levels for 0.3-1t/hr of straw. Other presentations will deal with this aspect.
- Three companies spent several years collaborating and investing a significant amount of funding on developing fibre systems for Australian conditions and markets accessible to Australian. Ecofibre (Phil Warner) and Fibre Laboratories (Adrian Clark) and The Australian Flax Company (David House)
- My presentation is only about processing mills I have been involved in from 1996-2019.
- One must remember the only Legislation that allowed commercial production of hemp was for fibre only. Seed for food and Cannabinoids was not allowed until very recently.

# In the Beginning, 1997

- The first commercial size trial crops of hemp in the latter of the last Century were in Tasmania and South Australia using seed imported from Hungary (Kompolti) and France (Futura 77).
- These crops were grown under special legislation from the respective Health Departments granted in response to find an alternative for wood for paper pulp.
- Interest was due to a strong demand to stop natural forest logging and from a century old supply of hemp paper production that was still available in Europe.
- Tasmanian crops were grown by U-Tas at the Richmond Uni Farm. South Australian crops were grown by a small group of farmers.
- Shaun Lisson wrote his doctorate paper on the project which was published in 1998/9.
- The trial crops did not yield sufficient from a farm/value perspective. Harvesting and baling was extremely difficult, no existing processing facility that could handle the stalks.



**Simply, hemp proved tougher than timber to process into paper pulp.**

# The Question in 1998 were: Where was does one start?

- Will it grow and yield (given only imported high latitude seed was available) at best Tas, then maybe Vic, southern SA, lower WA.
- Can we develop new cultivars for other states (NSW, QLD)? Maybe .....in 5 years.
- Where is it allowed to be grown? Vic (limited) and Tas (always), then Qld (2001).
- Where is the best location, soil and farming infrastructure for hemp? Well drained quality soils with some irrigation.
- What form and quality and quantity do the Markets want and How much with they pay? Must be the same or cheaper than existing feed stock.
- How the bloody hell do we process it? Look to where it is done already.

# SEED to Start

- Import seed from Europe at a very high cost.
- Many failures getting to understand the crop.
- Refine both seed types then the agronomy and harvesting equipment.
- Demonstrate the crop yields to encourage the Gov to take it more seriously, to allow more than small plot plant research.
- Demonstrate to Farmers to opportunity.
- Demonstrate to Markets, (import finished products for manufacturing trials)
- Find funding to set up the first processing mill.

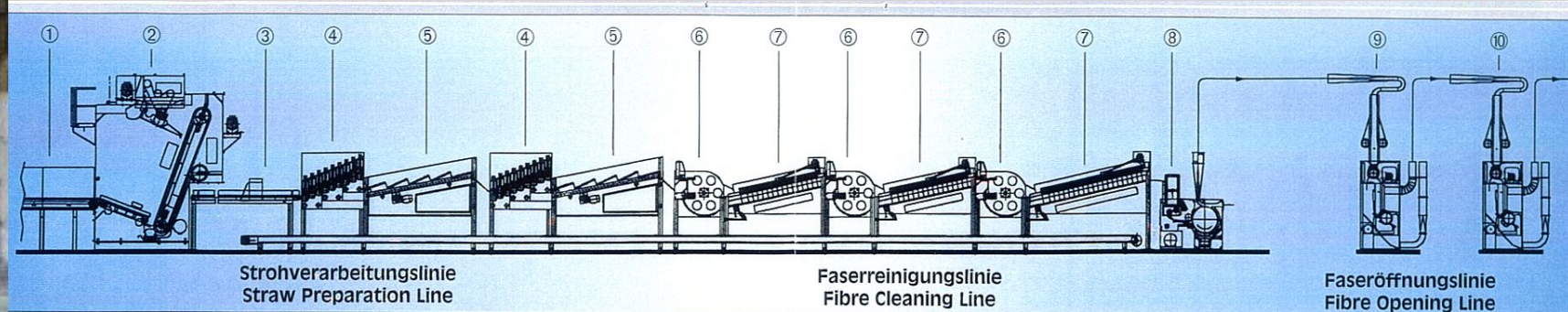
1999 First Trail crop (Qld) using seed imported from our Norfolk Island breeding facility



# Who Knows how to Process Hemp for Fibre 1999

- Eastern Europe, Russia and China, Korea, but it was very basic and high labour content.
- Nth America, no processing advances sine 1940's, no crops.
- Western Europe, Yes 4 good mills supplying hurd and fibre, many markets but industry well subsidised. Equipment Manufacturers exist, easy, but very expensive.
- Do it yourself. Reinvent the wheel?
- Or Go visit and check out markets while you are there?
- Maybe Both?

# Over There in Europe 1999-2004



# Over There in China 2001-2006





# Summary and Issues

- Most has centuries of experience to draw upon. Hemp wasn't seen as Cannabis.
- They all had a well-established but small industries with sufficient market demand of traditional materials, with subsidies field to product.
- Legislated requirement for more bio-degradable fibres. (e.g. Auto Industry) (Chinese PLA)
- Labour intensive processes.
- Storage and Handling inefficiencies, treble handling
- Huge energy inputs, guillotines, bail breakers, 600hp Decodicator, feed inconsistencies, enormous dust issues.
- Completely different crop production issues and approached (80-100 p/2mt)

# In Field Decortication & Transport to Mill



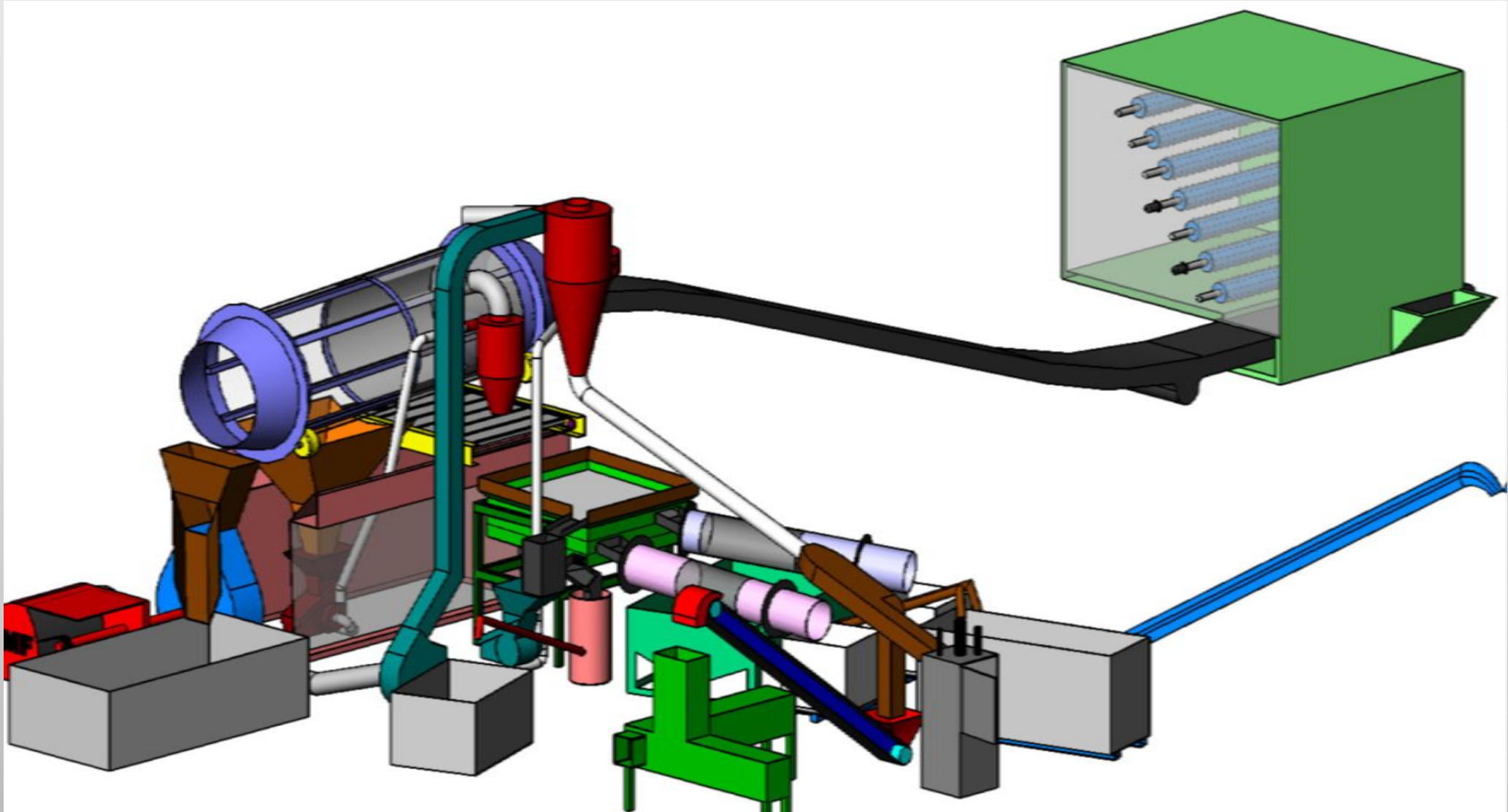
# Storage and Feeding



# Dalby Mill "stage by stage"



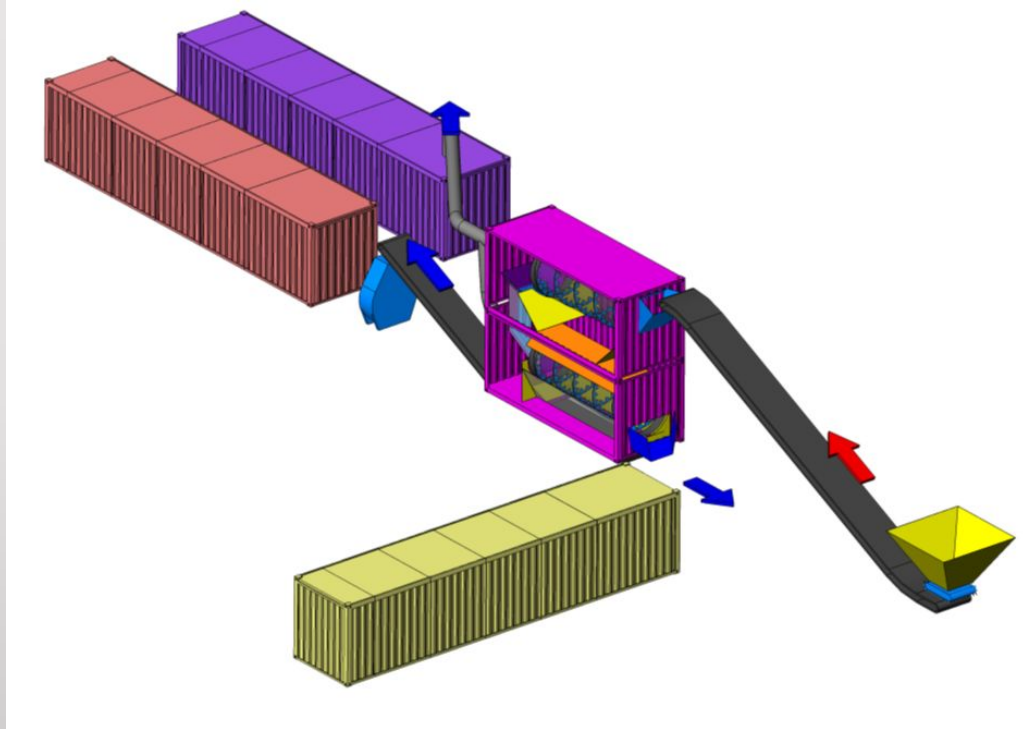
# Dalby Mill Design 2007



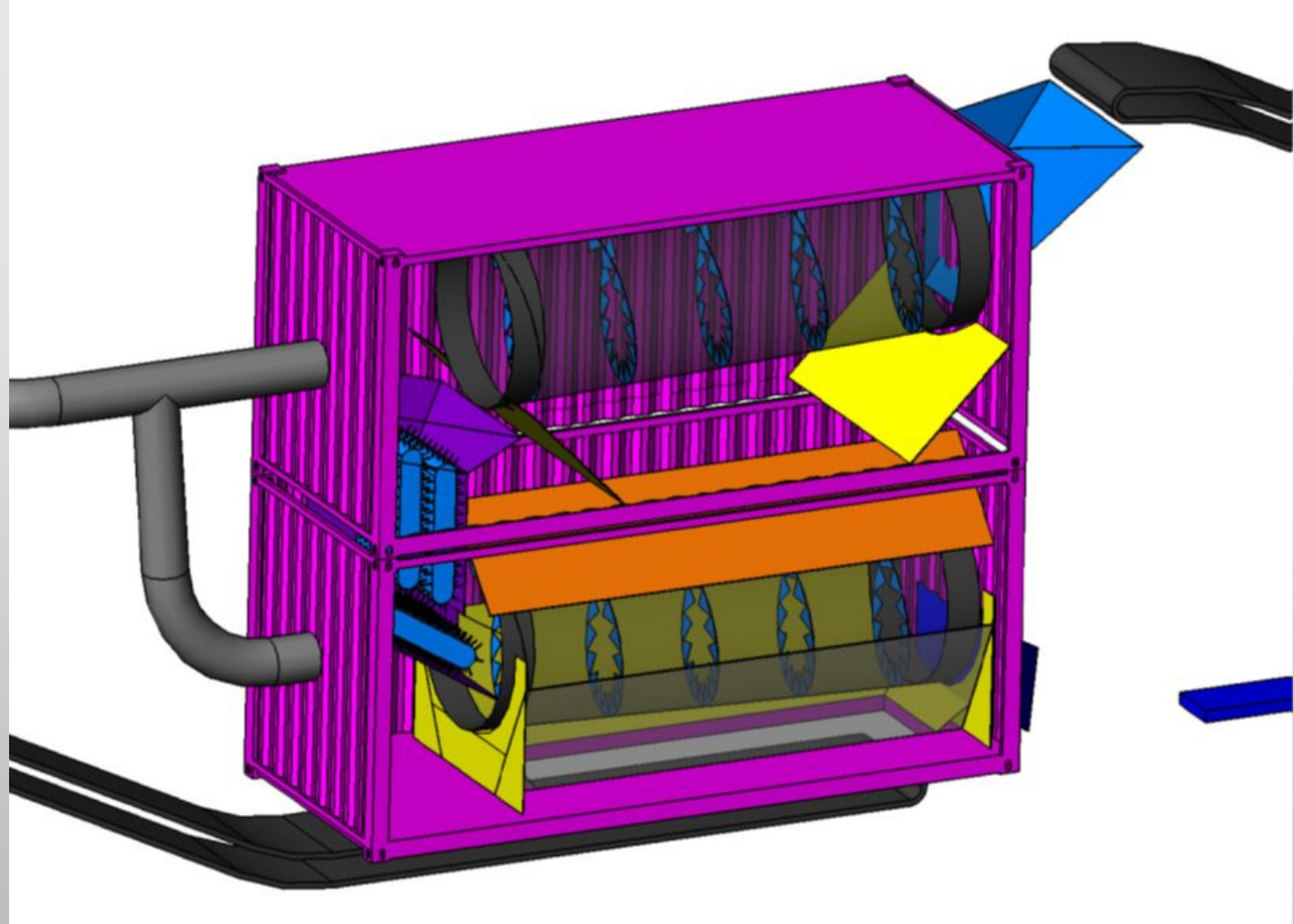
# Summary Dalby Mill No1 2006

- Cost \$250k
- Crop straw both seed stubble and fibre only crop.
- Decorticated in field, Modules shipped to mill.
- Straw input 1-2t/hr
- 2 man operation
- Products,
- Hurd Hempcrete and Horse bedding.
- Short Fibre -Hydroseeding mulch and Garden Mulch.
- Refined Fibre- Geotextiles, Tree mats,

# New Relocatable Mill Concept 2008



Then the GFC Hit and all the funding disappeared.



# Aust Flax Company 2006 ( Darling Downs Qld)

- Input 2.5t/hr (40% hurd/shive -60% fibre)



- Short & Long Fibre



- 2-3% Shive hurd/shive





# Visit to Dun Agro in Holland



# Visit to Dun Agro in Holland

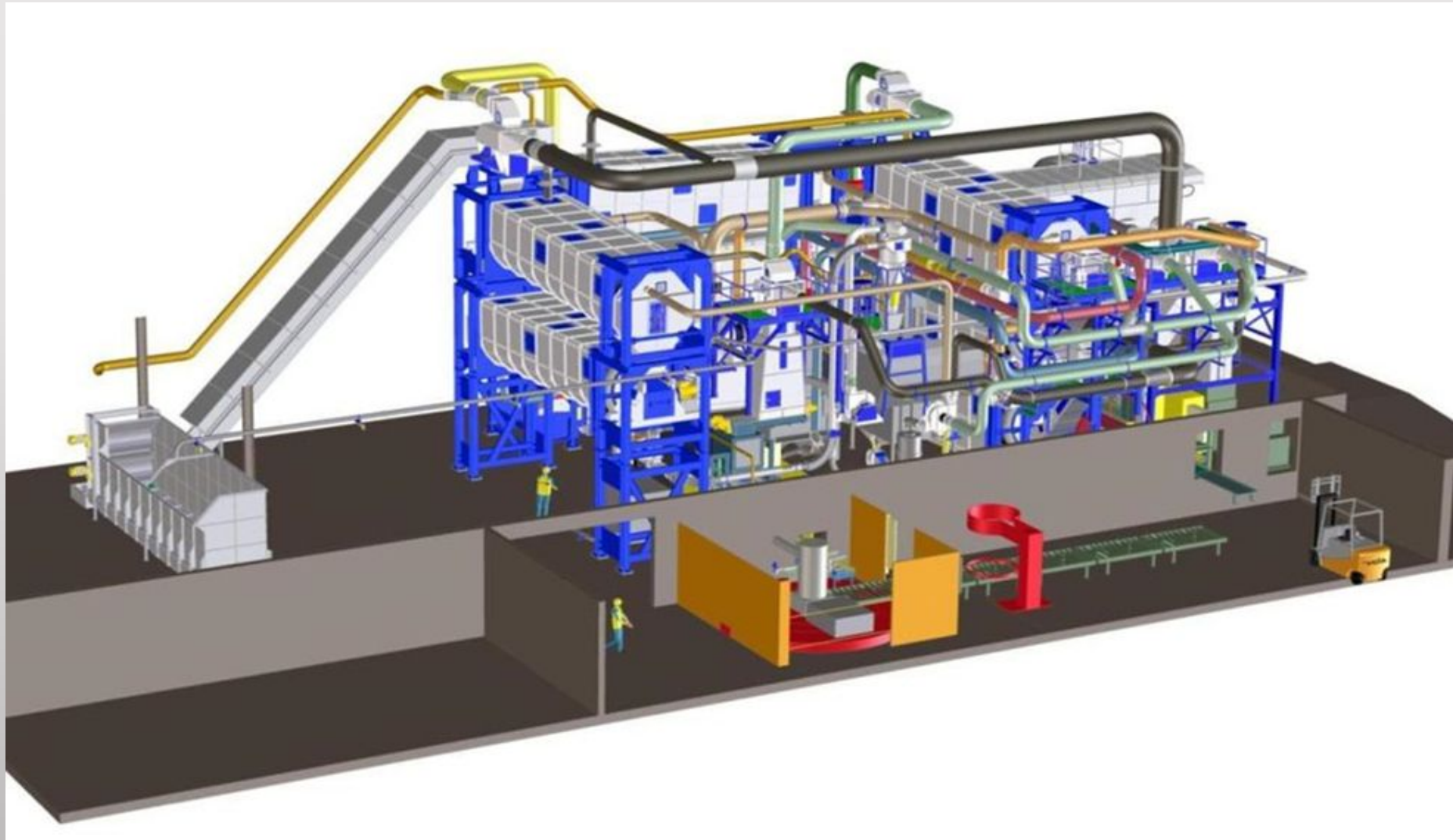


# Visit to Dun Agro in Holland

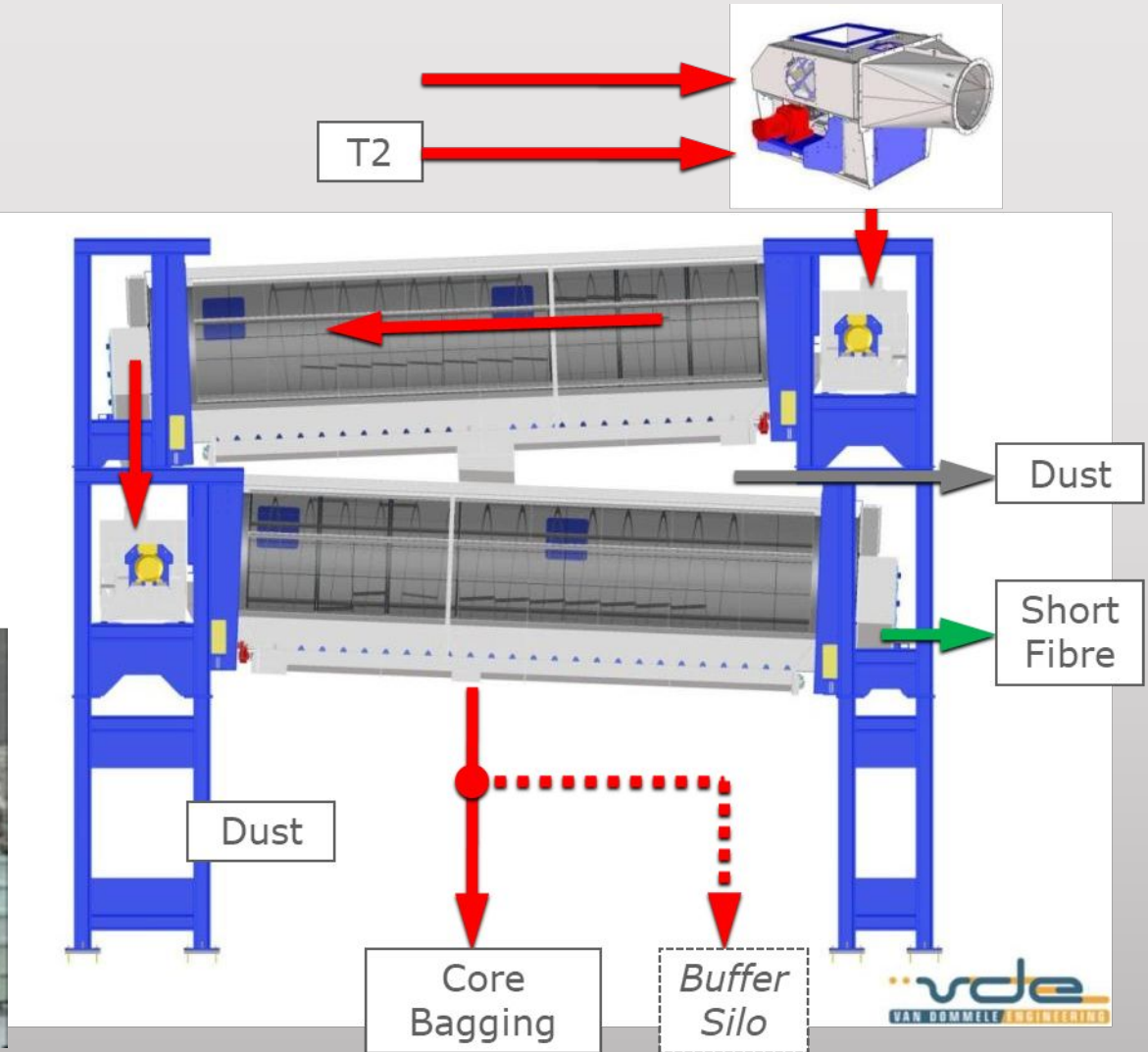
- After visiting a number of mills in Germany, France, ( now three times) we eventually became a partner with Dun Agro



# Visit to Dun Agro in Holland



# Similar Process to our concept plus the use of Air Pressure in the Trommels



# EU Mill Standards



Class 1



Class 3



Class 5



Class 7



Class 9



Class 2



Class 4



Class 6



Class 8



Class 10

# Dun Agro Mill Summary

- 10 million Euros
- The drums made the foundations for the processing structure.
- Field decorticated in-put between 6-8t/hr (depending on moisture content)
- 3 man operation. Centralised data and camera control.
- Produced a number of levels of fibre, Paper Grade, Non-woven grade, poly-composite grade, fine short fibre.
- Produced 3 levels of hurd
- Dust that was pelletised
- Low maintenance classification of materials due to the use rolling drums and air cleaning and transport of materials.

# Hunter Field & Mill Storage 2010



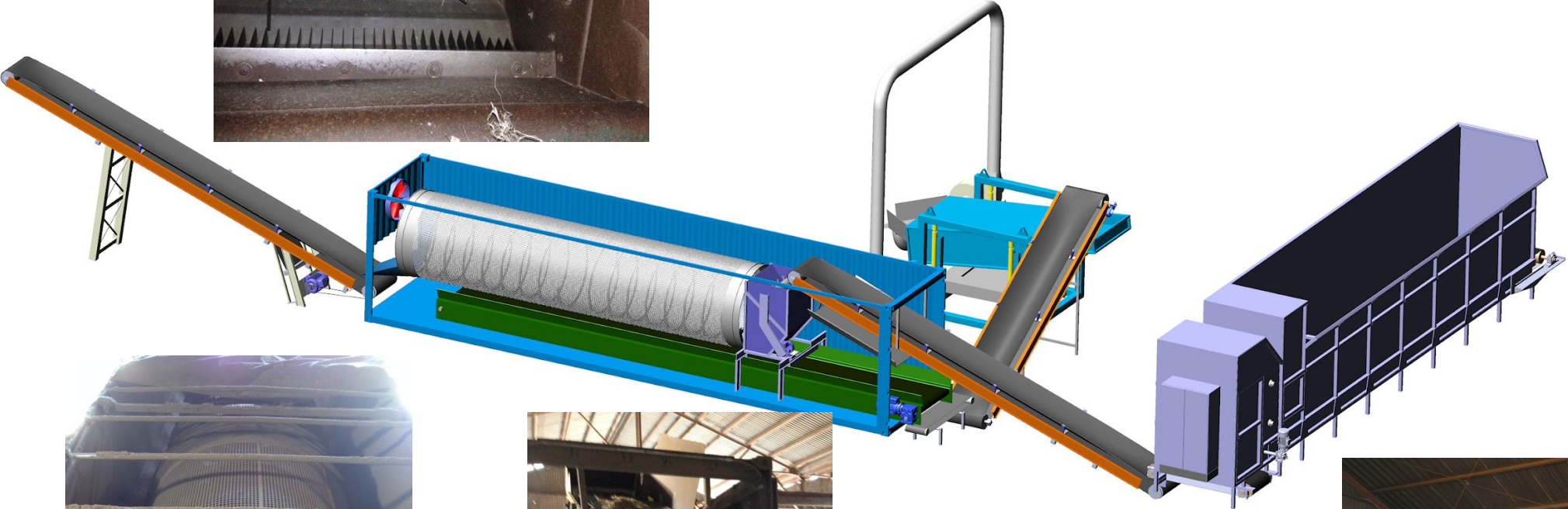


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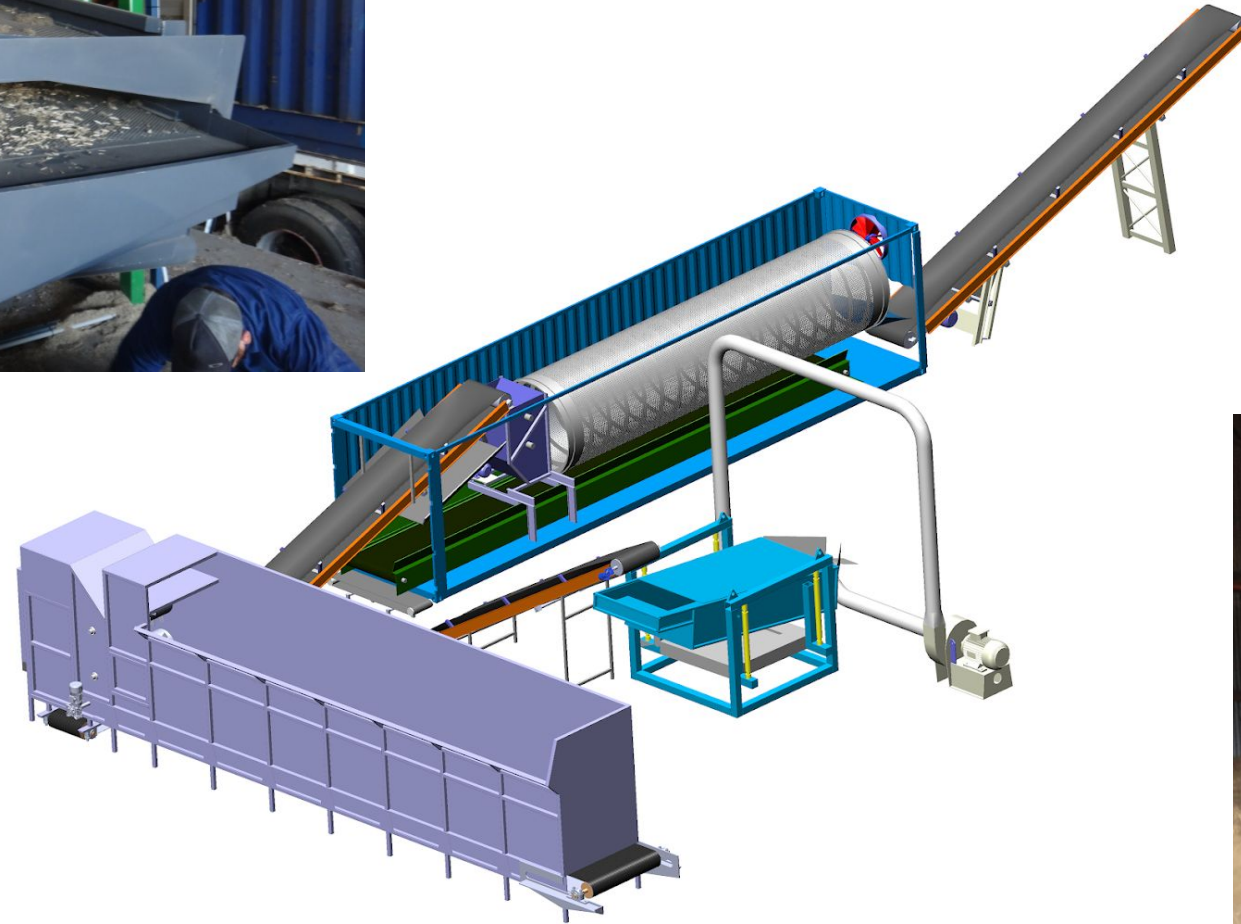




# Hunter Mill Design



# Hunter Mill Design



# Hunter Mill Products

- Horse Bedding and Hempcrete



- Pet bedding

- Fines for Oil spill mop



- Fibre with 5% shive

# New Products Under Development

## Oil spill, containment & Bio-remediation

Hydro seeding-Mulch



### Hemp hurd

- High cell absorbency
- No oil loss, holds it in
- **Full bio-remediation**
- Aerobic and anaerobic
- Low-density, lighter
- Little or no dust



### Wood fibre

- Limited cell absorbency
- Significant oil leakage
- Little or no remediation
- Anaerobic only
- Greater density, heavier
- Powder/dust

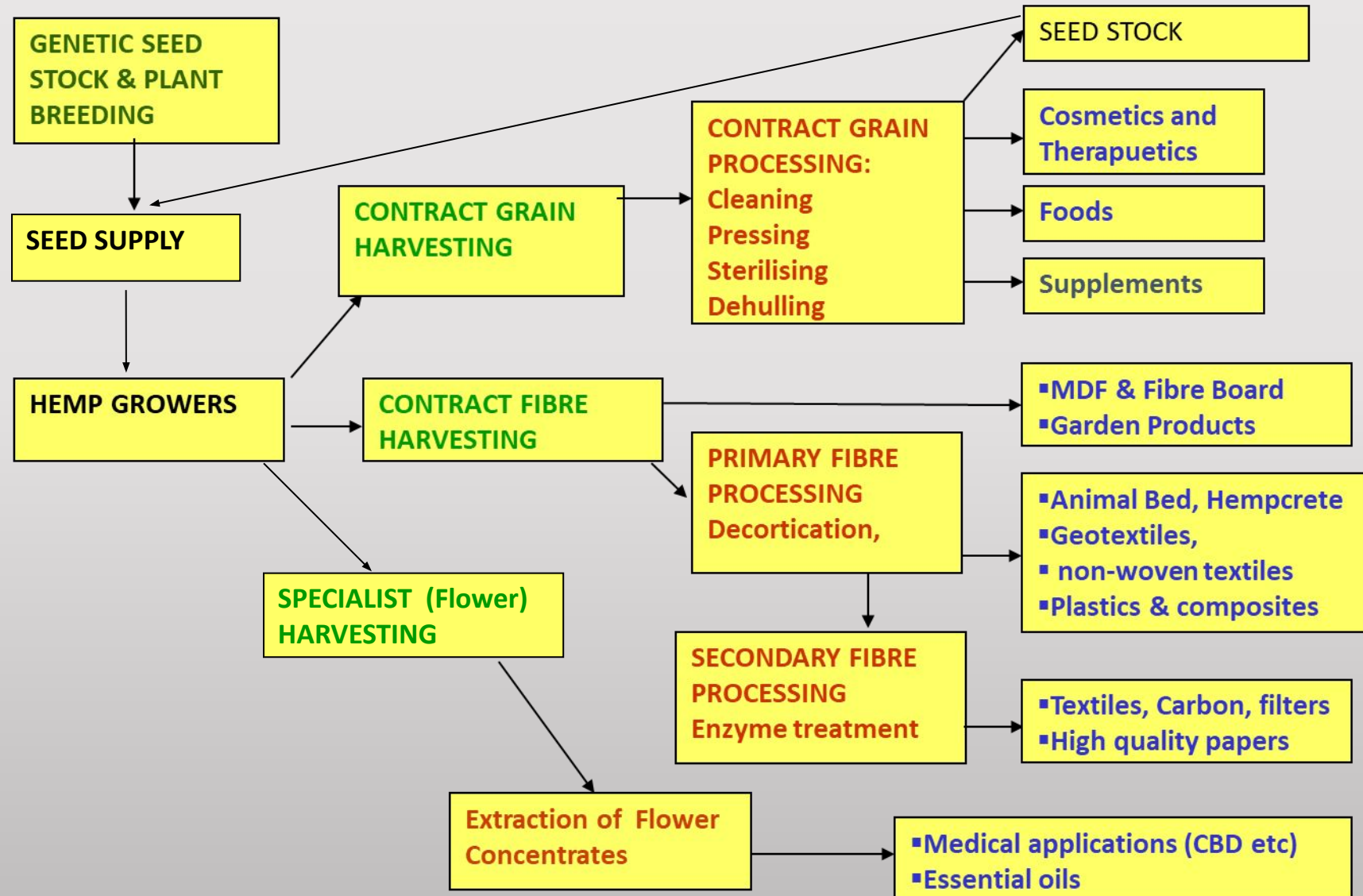


# Hunter Mill Summary

- \$1.75 M for the Mill and infrastructure plus Harvesting equipment (2<sup>nd</sup> Hand \$500k)
- Significantly less handling or loss field to mill and mill to main hopper.
- 2.5-4 tonnes per hr field decorticated input. (dependant on moisture)
- Reduced dust in process.
- 2 man operation.
- Air ducting 75% Of the product to specific quality bulk store bunkers.
- Separation and classification using Cyclones.
- Good quality products achieved, price structure enabling profit for all (\$11/15lt hurd in bags)
- Better if bagging and value adding on site.
- Transport and logistics cost and problems interstate.
- Markets for industrial fibre begins to shrink in Australia. (ropes and geo-textiles)

**2017 Mill closed. Investors demand the Focus became Cannabinoids and Food.**

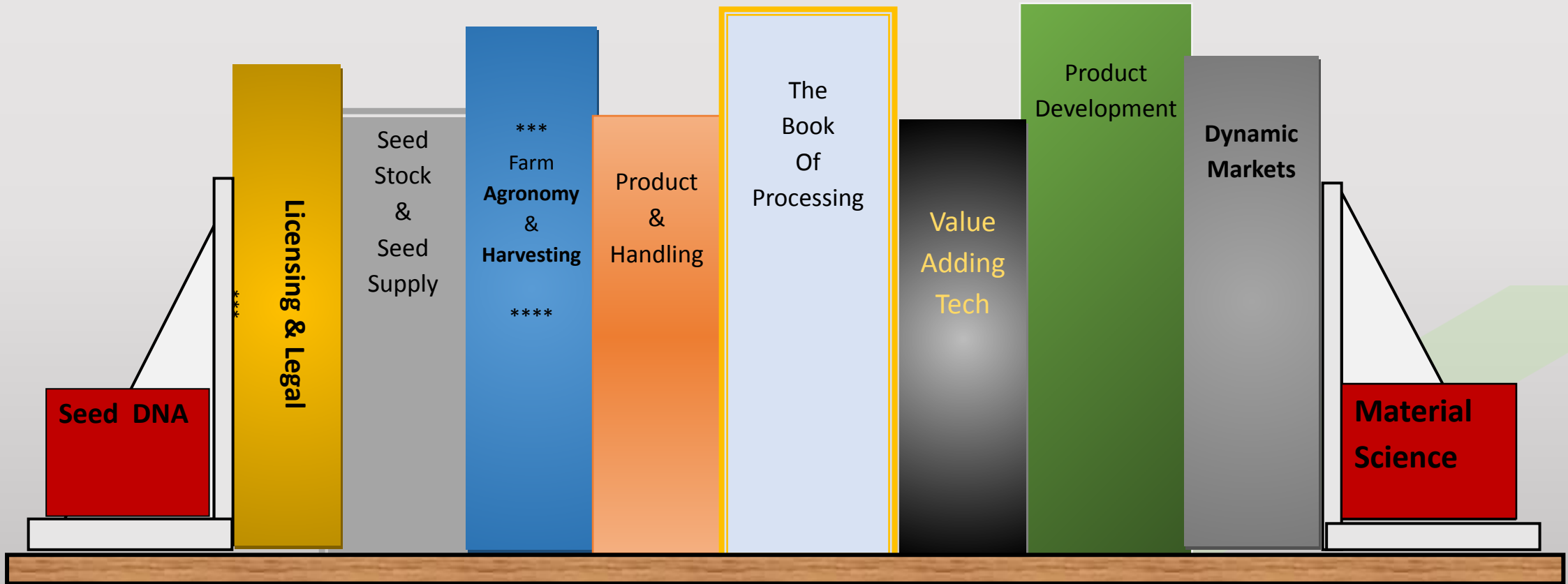
# Value-Chain





# Industry Shelf

Bookending the Value Chain where critical IP exists within Industry Gateways



With a start-up industry one is better placed to succeed if one understand it.



“Of all the plant species on this planet, cannabis has the sole capability to enrich and sustain human life indefinitely.”

Philip.S.Warner