



INDUSTRIAL HEMP MANUAL & GUIDEBOOK

Helping you succeed with a crop that has the potential
to be a global agri-business game changer

© By Adrian Francis K. Clarke & Charles B. Kovess



Textile & Composite Industries Pty Ltd



INTRODUCTION

Welcome to this EBook that has been written to help you succeed with Industrial Hemp, in whatever specific aspect you choose to be involved.

Choosing to grow hemp on your precious and valuable land makes economic, environmental, sustainable and health sense. Congratulations on being sufficiently interested in this sensible way of thinking and behaving to even read this book.

Hemp has the following advantages for a farmer, investor, adviser, over other crops:

- ✿ Profits per ha per annum can be \$700 to \$3000, and even more
- ✿ Biodynamic and organic farmers can easily grow hemp
- ✿ Hemp is as easy and simple a broad-acre crop to grow as *anything else*
- ✿ Hemp requires no pesticides or herbicides for successful growing
- ✿ The three key products of the hemp crop are fibre (from the skin), hurd (from the core), and seed
- ✿ Human beings have been utilizing the extraordinary qualities of the hemp plant (*cannabis sativa*) for over 10,000 years, and over that time have developed over 25,000 different products using the hemp fibre, hurd and seed
- ✿ Producers of hemp have many markets to commercialise their crops, and those markets are seeking reliable supplies of quality hemp raw materials
- ✿ Growing hemp rejuvenates soil with 4 tonnes of root material developed underground that quickly transforms into valuable humus, and also sequesters carbon in the soil.

The most important factor in economically harnessing the hemp plant is to be able to decorticate the plant, that is, to separate the fibre from the hurd, or to remove the skin from the core of the plant. Traditionally, this has been done through a 'retting' process that damages the fibre and can waste up to 90% of the fibre. This traditional process meant that, until now, hemp fibre has been 500%+ more expensive per kilo than other fibres used for similar purposes, such as textiles, fiberglass, and composite materials.

Through the innovative patented work of Adrian Clarke, Textile & Composite Industries Pty Ltd has developed a decorticator that requires no retting and recovers close to 95% of the hemp fibre, at a cost that enables hemp to be marketed at competitive prices to other fibres. This is a revolution and is how hemp can be an agri-business game-changer. Throughout this EBook, it is assumed that TCI's revolutionary decorticator is used at all relevant times. The static D8 version is completed in its development. An in-field harvesting decorticator will not be made.

Please visit this YouTube site to see this machine in action:

[youtube.com/watch?v=nUL5P3NB1hg&feature=youtu.be](https://www.youtube.com/watch?v=nUL5P3NB1hg&feature=youtu.be)

This Manual and Guidebook contains the basics to answer the most important questions you might have. References to \$ are to Australian currency. Values are current as at February 2016.

Further information, guidance, advisory services and solutions are available via email through TCI's website.

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In this Manual, the focus will be on conventional growing of hemp. Biodynamic and organic growers will achieve better results all round, via reduced input costs and higher production.

One ha of hemp can be expected to grow to 3-4 metres in size in 100-140 days, and can produce:

- ✿ 10 tonnes of hemp, comprising 3 tonnes of fibre and 7 tonnes of hurd on average
- ✿ 1 tonne of seed
- ✿ 4 tonnes of underground root matter that quickly breaks down into valuable humus, rebuilding and rejuvenating your precious soil, whilst sequestering carbon in the soil.

This crop has the following market value, on the farm, after decortication:

- ✿ Each tonne of fibre is worth \$2000, a value of \$6000 per ha
- ✿ Each tonne of hurd is worth \$800-1500, a minimum value of \$5600 per ha
- ✿ Each tonne of seed is worth \$3000, a value of \$3000 per ha.

Thus, each ha of well-grown hemp can produce \$14,600 of revenue. Whether or not farmers realize these prices depends on many factors. TCI has been developing markets for hemp buyers for many years. TCI will be buying hemp raw production from farmers who use its decorticator technology.

The costs of growing hemp in Australia can be expected to require:

- ✿ Purchase and delivery of the seed
- ✿ Preparing the land
- ✿ Sowing the seed
- ✿ Watering the crop
- ✿ Fertilising the crop.

The total cost pa is projected to be \$1200-2000 per ha.

Harvesting the crop then takes place followed by decortication, with TCI's decorticator. Only approved agents can purchase TCI's decorticator: for others, TCI makes it available on a contract processing basis. TCI recommends reaper/binders as the best way to harvest and bring the hemp stalks to the static D8 in a shed or factory.

The TCI D8 decorticator can decorticate between one to five tonnes of hemp stalk per hour. The contract cost per hour is \$300, with the farmer providing all associated equipment and labour.

Thus, with TCI being engaged to decorticate, the Basic Economics per ha look like this:

Revenue:	\$5,000 – 14,600 (dependent on markets)
Crop production:	1,200-2000
Harvesting:	400
Decortivating:	1,500 payable to TCI, assuming two tonnes per hour
Associated decortivating costs:	500 (labour, running costs).
Net profit per ha per crop:	\$600 – 11,000.

For detailed analyses, see the Excel Financial Analysis spreadsheet available on request from TCI.

Your soil needs to be prepared in similar fashion to most cereal crops.

The type of soil can be described as similar to that needed for carrots, potatoes, wheat, barley, canola, and corn.

Fertilisation prior to sowing will depend on usual agricultural factors.

There are over 150 varieties of hemp seeds. Different climates and different latitudes require different seed types. It seems that latitude is the greatest factor to bear in mind in seed choice, because length of daylight is the key issue.

Tropical regions such as Far North Queensland and Northern Territory will require the seed variety developed for the latitude.

Southern states of Australia will do well with Fedora, Kompolti, Dora and USO 17, and most of the hemp seed types planted in Europe. They do well in Victoria and better in Tasmania.

Hemp has colloquially been known as 'weed': that is because it is so easy to grow, and so prolific. It grows 10 tonnes per ha of material in less than 4 months!

It is unlikely that test hemp crops need to be grown prior to planting a commercial crop. Sufficient research and experience is available to make confident predictions about successful growing.

Sowing the seed requires standard seed sowing equipment. Seed needs to be planted at 50-60 kg per ha, with the aim of at least 200 plants sown per square metre. Depth of sowing is 2 cm.

It is very important the seed is sown to this quantity. You want the stalks to grow tall, and the denser they are sown, the better. If the crop is not sown densely you will get branching of the stalks and seed (grain) growing on the branches. While TCI's decorticator will handle some branching, it is much better for it to have tall straight stems without branches.

There is another benefit when the crop is planted densely: the grain all gathers at the top of the plant. It is easier to harvest the grain from the tops of the plants, as it is all gathered in one place, thus giving an extra good reason to plant the crop densely.

You may find other books advising you to plant sparsely: that is only relevant if you are using old technology to harvest and decorticate!

Contact TCI via its website for details of seed suppliers, both in Australia and globally.



This is the easy part!

Other than watering, via irrigation, or pivot watering, nothing much needs to be done.

The hemp crop grows so quickly that it smothers all other weeds.

Just sit and watch the plant grow at a rate of up to 4 cms a day, after it has emerged from the ground.

Hemp requires no more than 20% of the water that a cotton crop would require. Subject to soil type, it can be expected to need a maximum of 2 megalitres per ha. If sufficient rain falls, then irrigation might even not be necessary.

ADRIAN CLARKE WITH A STOOK OF HEMP, ITALY



FOOD - HEMP
SEEDS & HEMP OIL



The key decision to make is whether or not to only produce fibre and hurd, or fibre, hurd and seed (called a 'dual crop': it is a little confusing, because there are three products with a dual crop!). There are various regimes to process various types of crops.

Fibre and hurd only crop

For the best fibre, it is best to harvest the crop (of between 100-300 stems per square metre) when it is at the start of Male Flowering. This is just before the plant starts to lay down lignin in the fibre and also while it is most biologically active. The fibre is at its finest for the best textile product. The ideal stems will have leaves mostly at the top of the stem. Of course, fibre harvested later is also perfect for textiles use, it is just not so fine.

Dual crop for fibre, hurd and seed

However if the crop is to be a dual crop, this same dense crop is allowed to grow through to produce seeds. The stem will form seed spikes at the top with the leaves. Though the stem has lignin and the fibre is not quite so fine, it can still be used for textiles when degummed with TCI's Kier/dyeworks system. However, without degumming, it can be used for composite products (e.g. fibre glass and carbon fibre replacement) without the need for degumming.

Fibre and hurd only crop

You would harvest the hemp, ideally with a reaper/binder. Round baling can also be utilised, but keeping the stalks straight is preferable. You would immediately decorticate the stems and use the hurd in building and many other products, and dry the hemp skin to preserve it from the strong enzyme action of its biological activity.

TCI has developed a simple method of reducing the gum and preserving the fibre. It is simply to squeeze the gum in a mangle and then dry the skin in a dryer. This action stops the damaging enzyme/biological action and preserves the fibre. It also simplifies the final degumming if the skin is to be used in textiles. If not, it has reduced the gum so the skin is in a very good condition for fibre glass replacement in composite products such as fence posts, shipping pellets, window frames and doors, furniture, and car body panels.

This can only be done with the fibre when it has been decorticated in TCI's decortication system. This is a very significant benefit of the TCI system and will prove its worth by making the intrinsic value of the fibre greater by enabling the production of light strong composite products and, if the fibre is to be used in textiles, by considerably reducing the cost of that final degumming which renders the fibre able to be spun on cotton spinning systems.



*Beautiful hemp hurd on the ground
after decortication in Victoria*

The hemp stems are cut at ground level and then will be decorticated in the static D8 in one of two ways, either in the field or after the stems are transported to a central processing area. TCI recommends decortication in a covered environment, to minimise product loss. Manual labour would be used in the field whilst conveyor systems would be added in the factory. The skin must be taken to a squeezer and dryer. Both the fibre and the hurd will need to be stored.

Even the juice from the squeezing can be collected and used. We call this 'hemp juice' and we suspect it will become a 'super food' of the future!

So the work flow for a fibre crop taken at male flowering can be summarised as

- 1** Cut the stems and windrow them. There are a number of cutting options. A reaper binder option is recommended, with a view to taking the stems into the factory. Or a round baler may be used.
- 2** Process the stems with the D8 decorticator in the field or the factory.
- 3** The hurd will be conveyed from the decorticator into a chaser or bin
- 4** Simultaneously the fibre will be conveyed to a collector
- 5a** That collector can then convey the fibre to a separate machine which will squeeze the juice from it and then dry it in a dryer
- 5** The dry, gum-reduced fibre can then go to a baler and be sent to a mill for product production
- 6a** That product can be textiles. Therefore the fibre would be further degummed, opened, carded, spun and woven
- 6b** That product may be a composite product where the remarkable strength of hemp fibre is used in any of thousands of products from building components to car body parts.

Dual crop for fibre, hurd and seed

- 1** Trim off the seed spikes with a seed harvester. The seed will need drying and threshing
- 2** Cut the stems and bring them to the D8 decorticator.
- 3** Process the stems with the D8 decorticator in the field or the factory
- 4** The hurd will be conveyed from the decorticator into a chaser or bin
- 5** Simultaneously the fibre will be conveyed to a collector. As this hemp skin is more mature it is far less biologically active and may not be susceptible to releasing gum by squeezing. However, it will need drying
- 6** The dry, gum-reduced fibre can then go to a baler and be sent to a mill for product production
- 6a** that product can be textiles. Therefore the fibre would be degummed, opened, carded, spun and woven
- 6b** that product may be a composite product where the remarkable strength of hemp fibre is used in any of thousands of products from building components to car body parts.

It is worthy of note that all of the above are simple processes from field to valuable fibre product and immediately useable hurd product - REGARDLESS OF THE WEATHER. This can be done in the rain! There is NO DANGER OF LOSS even when the weather is too wet or too dry.

The recovery of good quality fibre is almost total.

The fibre can be used in strong composites because it is not damaged by the decortication process.

The fibre can be used in textiles because it is not damaged by the decortication process.

The cost of a TCI decorticator is a fraction of the cost for the now outmoded static decortication mills that are used around the world.

The ability to have the decorticator on the farm puts the most vital value-adding step in the hands of the farmer on his farm so he makes the first value addition himself.

The D8 will process between one and five tonnes of hemp stalk per hour. An equivalent vast static decortication mill which does that volume of stem requires that stem to be processed several times and retted and stored for months before it can be decorticated.

Such outmoded and cumbersome systems cost between 10 and 20 Million Euros. The fibre which comes from them is so badly damaged by hammer milling that it cannot be used in textiles and it cannot be used as a strength component in strong composites. The value adding power is in the hands of the mill owner who buys the stems from the farmer and sells the fibre and hurd at the value-added price. The mill owner makes the margin.

TCI's remarkable, revolutionary and simple low-cost system enables each farm region to develop its own value-adding industries near the farm. Those industries will include



D8 installed for use powered by the PTO of a tractor. Developed by TCI.

- ✿ food from the seeds of dual crops,
- ✿ building materials/houses from the hurd and the fibre composites,
- ✿ car body parts,
- ✿ light weight car bodies for electric cars,
- ✿ if small textile mills are set up in the regions, clothing, fashion and furnishings can come from near the farm,
- ✿ and many, many more.

This will bring industry, quality manufacturing and creative jobs and prosperity back into the rural regions while creating opportunity for R and D projects in local educational facilities.

After decortication, there will be a maximum of 4 components of the harvested crop:

- Fibre
- Hurd
- Seed
- Leaves and other waste material.

Fibre

Fibre will either be degummed or left as is.

Squeezing the liquids and gums at the point of decortication is recommended.

Fibre that is degummed for textile use is more valuable than un-degummed fibre. Composite material uses do not require degumming.

Fibre should be stored in a dry environment. It does not deteriorate.

Hurd

Hurd is light and one tonne comprises 10 cubic metres of space. It can be stored under tarpaulins, or in warehouses.

Seed

See Chapter Six for seed handling. It should be kept secure and dry.



There is only one model of decorticator made by TCI:

- the D8 static model (for hand feeding in the field or conveyor feed in a factory).

Further work and research has shown that a harvesting decorticator which was in development will not be needed. This is because the whole hemp crop is valuable, nothing is wasted. Therefore it is beneficial to bring the whole stalk into a shed or factory for controlled environment processing. The D8 can be easily moved from shed to shed, if needed.

The creation of the compact and efficient D8 decorticator has enabled a whole new hemp harvesting regimen to be designed to optimise field-based decortication and change forever the way we consider hemp processing from field to products.

TCI developed the D8 from a long line of very effective prototypes. It is the first commercial-sized machine that can operate at desired commercial capacities on both fresh green unretted hemp and dry unretted hemp.

TCI's decorticator renders obsolete short 'seed only' crops because the system can harvest the seed from the tallest crops. The system obsoletes retting completely because it decorticates both green and dry crops without any retting. This removal of the retting step has the advantage of undamaged fibre, undamaged hurd and virtually total recovery of all the fibre in the field in its best condition. Another significant benefit is that the field can be used for something else as soon as the hemp harvest is completed. The land does not have the downtime traditionally taken up by retting.

This system obsoletes costly long-line spinning processes by enabling the fibre to be spun on low-cost state-of-the-art modern cotton systems. Of course it also saves time. Retting takes weeks and in most European mill systems, it takes a year. The D8 machine does not need the hemp stem to be retted and it can be processed immediately after it is cut, either fresh or dry.

Now with TCI's decorticator, hemp can be harvested and decorticated in the morning, degummed over lunch and spun and woven in the afternoon on standard cotton or wool systems! This is indeed a game-changing agribusiness revolution.

The D8 Decorticator

The D8 is mounted on a frame as shown in the pictures in this EBook.

The D8 can process fresh green material faster than dry material. The power consumption is significantly increased when the input material is dry.



HEMP ROPE

The D8 processing capacity is limited by the speed at which it can be manually fed dry straight stems or green fresh straight stems. A good team can do about one tonne per hour. With mechanization and conveyors, this could increase to five tonnes per hour.

On average, if the stems are 2.5 to 3 metres tall that is 10 tonnes of stems per ha measured dry. Of course if they are green and fresh, the weight will be more because it will include an indeterminate amount of water. However, when the output is measured dry, there will be hurd and fibre to approximately 10 tonnes.

The grower must decide on whether he will do the crop dry and have dry hurd and dry fibre, or if he will do it fresh and green and have fresh green fibre skin for immediate further processing and fresh wet green hurd for immediate processing. This will also depend on the terms of any contract to produce hemp products that the farmer may have signed with TCI or other buyers.

There are advantages to green processing if the downstream treatment systems are readily available for textile and composite uses.

Green processing is recommended when the climate will NOT allow for field drying. It also allows for the mechanical removal of much of the gum before it dries.

There is an extra dimension and option to consider. Is the crop a FIBRE and HURD only crop? The BEST Fibre crops are taken at the onset of male flowering for the finest textile fibre. A fibre crop gives you fine fibre and hurd.

Is the crop a DUAL CROP which has been grown for BOTH seed and fibre and hurd?

A dual crop gives you slightly more-lignified fibre in tighter fibrous bundles, as well as seed and hurd. In the case of a dual crop the regimen is different compared to the fibre-only crop. The nature of the skin and the hurd is different and the seed must be taken separately as described below.



Harvesting and processing options will be dictated to the farmer depending upon the weather, the crop, the end use of the fibre, the storage and transport conditions and the market which can be sold to - direct from his farm gate. This will also depend on any contracts for hemp product that have been signed with TCI.

The farmer will either bring in TCI as a contract harvester, or the farmer will have been contracted to grow the crop by TCI who will decorticate the crop and take it away to its own markets or factories. TCI will require to be satisfied that the farmer has viable markets for selling his crop when TCI is simply a contract harvester.

In many cases, TCI will be bringing the D8 to the farm. All necessary additional equipment and labour to harvest and decorticate the crops will need to be provided by the farmer, at the farmer's cost. This is estimated in the economic assessment earlier in this Manual.

The D8 Decorticator

Power and other media consumption.

The D8 has two power centres. The beater roller requires 30 hp and the input roller set requires 15 hp. The straw walkers below the D8 require 5 hp.

TCI supplies the static D8 with hydraulic motors so that it can be powered by a tractor or a power pack. The power pack can be powered by petrol, diesel or electricity.

Weight.

The D8 unit itself weighs approximately 1000 kg. With motors it will be heavier depending on the brand and model of hydraulic motors applied.

The overall weight will be increased by the motors' weight.

The weight will be further increased by the weight of the stand and the straw walkers. When fully equipped the overall weight will be approximately 2.5 tonnes. It can be mounted in a trailer and transported from place to place, barn to barn, or operated in the field.

Dimensions of the machine.

The D8 workface length is 900 mm. Its overall length dimension is 1.2 metres. With motors it will be more depending on the brand and model of hydraulic motors applied. The D8 is 800 mm tall and 800 mm deep.

The frame can vary according to need. It must accommodate the straw walkers chosen and yet not be inconveniently high.

The Chute can be angled, however if all the stems are long, as per the ideal, the feeding chute can be virtually level with the ground. The length of the chute will also depend on the circumstances and nature of the stems.

The standard working area, operating conditions.

There should be at least 4 metres space at each end. This much is needed at the input end to allow for ease of feeding in long stems. Since the fibre comes out under the input chute, there needs to be space for the operator to remove it either piecemeal or in a large bag.

This much is needed at the end opposite the chute to allow for the easy removal of the Hurd as it comes down the straw walkers.

For safety it is recommended that there should be two metres each side.

Running and maintenance costs

Running costs are estimated to be \$25 per hour of fuel and lubricants.

Maintenance is estimated to be lubrication and checking each 20 hours of operation, comprising a one hour process. Allow \$60 as a cost indication.

How many people are recommended for the operation?

The capacity of the static manually-fed machine depends upon how much can be fed into it. However, for safety, two people can stand at the chute and feed stems in steadily and safely. In the factory, labour will be determined by the conveyor system that has been installed.

One other person can shovel the Hurd from the output end and also manage the fibre output.

So two can run the static D8 and a third and even fourth person will increase the capacity significantly.

Environmental impact.

This will depend on whether the machine is operated indoors and the fibre brought to it by truck, or if it is operated on a trailer and taken to the field for operation.

It will depend on whether it is driven by an electric power pack driving the hydraulics or from a tractor hydraulic system or from a separate power pack fuelled by diesel or petrol etc.

The power is given above as requiring approximately 50 to 60 hp overall, so the customer will make his own judgments depending on the power source. The hydraulic flow required is 100 to 150 litres per minute and must have efficient hydraulic oil cooling.

Noise level.

This is a noisy machine. The quantum of noise has not been measured. When used indoors, the noise is significant and ear protection must be used. When used outdoors the noise is significantly reduced, however ear protection is advised.

Pricing.

The static D8 with straw walkers is available for purchase, and for contract harvesting. TCI welcomes all enquiries and discussions.

***TCI's D8 DECORTICATOR
SEMI-DISMANTLED SHOWING
QUALITY OF ENGINEERING***



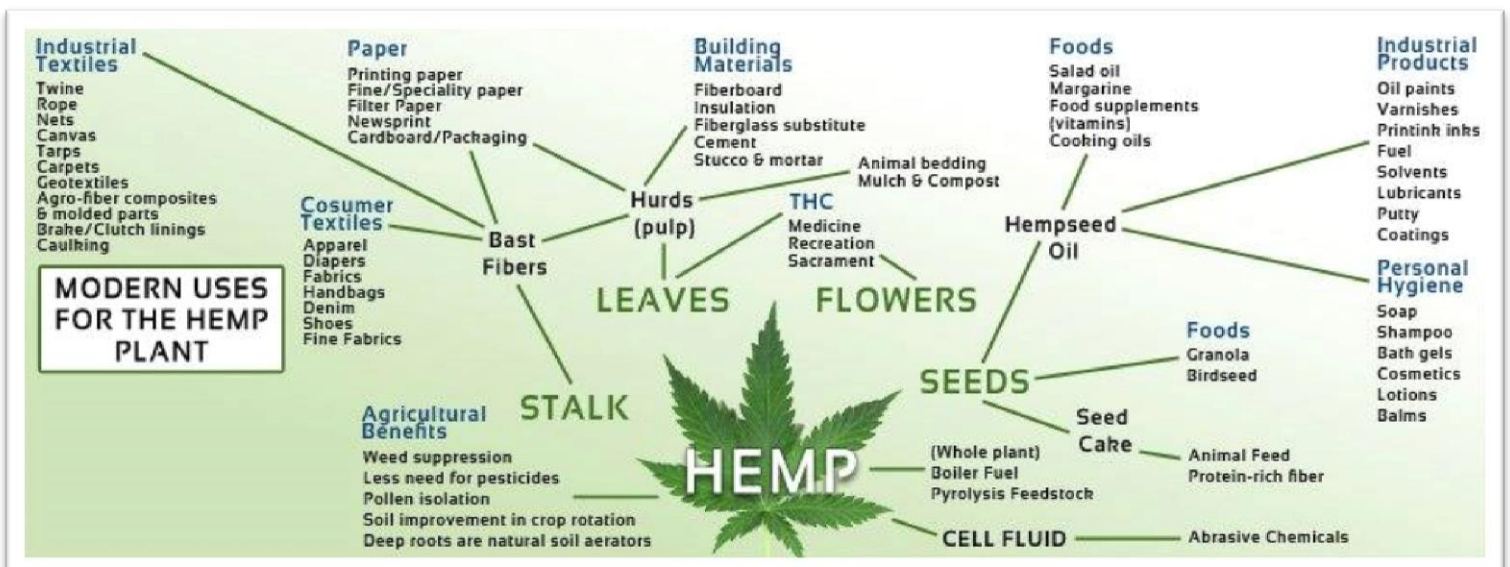
Many countries permit the growing of industrial hemp. Some countries do not, including the USA. Ironically, Canada permits it and successfully exports hemp products into the USA. This situation is changing rapidly, with at least 22 States in the USA passing legislation to permit the farming of industrial hemp.

Early in 2014, Congress in the USA passed the Farm Bill, legalizing the growing of hemp federally 'for research purposes'.

In Australia, and many other jurisdictions, hemp may be grown with a Government issued licence. At this moment, hemp cannot be grown in South Australia or Northern Territory.

Only in Australia and New Zealand, out of all the countries in the world, is it illegal to sell hemp as a food product. Steps are being taken to change this illogical and untenable situation, but those steps have been taking almost 10 years so far!

Each potential hemp farmer needs to explore all legal and administrative requirements in their respective localities.



TCI's decorticator technology produces hemp fibre that is unique and is of the highest quality because the raw hemp plant HAS NOT BEEN RETTED. The fibre has not been damaged in the way that retting damages fibre: that is, rotted and discoloured, fractured and brittle.

Hemp hurd and seed produced with this technology is of the highest available quality.

The markets for the three categories of hemp raw products are developing and are global. They have been operating for thousands of years. But they are micro-markets or cottage industries compared to other global markets such as cotton, synthetic textiles, linen, wheat, timber, fiberglass and paper.

TCI's decorticator is designed to revolutionise the harvesting and processing of hemp, to dramatically reduce the time and cost of separating the hemp plant into its wonderful constituent parts.

When farmers understand the game-changing opportunity that is available, TCI is confident many more will choose to grow hemp.

When the potential users of hemp products are confident that sufficient volumes of raw product are available on a consistent and predictable basis, they will choose to buy hemp rather than alternative or synthetic raw materials.

TCI predicts that the following 14 major market opportunities will experience explosive growth over the 4 years through to 2020 partly due to TCI's game-changing technology:

FIBRE

- Clothing textiles, particularly fine quality fabrics that use 12 to 22 micron hemp fibre, only available with UNRETTED hemp processed with TCI's decorticator
- Furnishing textiles of all types, including domestic, commercial and industrial
- Composite materials, with hemp fibre replacing fiberglass and carbon fibre in a vast range of applications including fence posts, shipping pellets, building products and car components
- Fine quality paper made with the finest fibres, and recycled paper that needs additional fibre
- Ropes and twine, particularly bailing twine for the agricultural sector
- Snow skis, snowboards, surfboards

HURD

- Hempcrete and various building products
- Insulating materials
- Horse bedding
- Bio fuels and ethanol
- Paper

SEED

- Hemp oil and seeds for a vast range of healthy and nutritious foods
- Hemp oil as a lubricant
- Cosmetics and beauty products.

UNDEGUMMED FIBRE



DEGUMMED FIBRE



Considering this range of opportunities, it will be apparent that readers of this Manual can each explore market opportunities and educate end-users of hemp about the future possibilities of significant and sophisticated supply chains.

Hemp can be decorticated with TCI's decorticator when it is green or when it is dry. It will usually be dry when it is planned to be a 'dual crop', for both fibre and hurd, and seed.

The key goal is to enable the hemp fibre to be spun on standard cotton-spinning machines, to produce yarn. That yarn can then be spun or woven into almost any type of textile. This makes the hemp fibre more attractive to existing global textile markets and manufacturers.

The steps in summary are:

- ✿ Decorticate
- ✿ If mangle available, squeeze out juice. This reduces gums in the plant stalk.
- ✿ Degumming in Kier using TCI's formula and process by dunk and squeeze systems
- ✿ Dry in hydro then RF dryers
- ✿ Rough open to separate the tangle of fibre
- ✿ Final clean and open with card
- ✿ Cotton Card
- ✿ Spin.

In these steps, it is important to consider the effect of the enzyme in the stem and how it can destroy the fibre. At the point of harvesting, it is recommended to immediately squeeze the fibre to remove more gum. Then the Kier process should be used to effectively degum.

The equipment and machines needed to complete these steps are quite well known in the textile industry. To assist your understanding, here is a simple list:

- ✿ Pressure dye Vat. Kier.
- ✿ A Hydraulic Material Press to ensure effective and total degumming.
- ✿ Associated retention tank for fluids
- ✿ Chemicals for degumming
- ✿ Dunking Tub and Mangle
- ✿ Hydro Extractors/Spin Dryers
- ✿ RF Dryer
- ✿ Cotton Press
- ✿ Clean-O-Mat
- ✿ Cotton Card
- ✿ Standard cotton spinner.



CAR BODY & INTERIOR
MADE OF HEMP

If you have read this Manual in its entirety, we hope you are excited about the possibilities for profitably growing, harvesting, processing and selling industrial hemp.

TCI stands here ready and willing and able to help you understand the steps you need to take. Please contact us for your specific questions, problems, and areas of further clarification required.

We hope you join TCI in contributing to the future well-being of the agricultural sector, and the whole planet, through increased farming of this wonderful, extra-ordinary plant.

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