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The opportunities for the hemp industry in Australia

Prepared by Mara Seeds Pty Ltd

Introduction

Mara Seeds have been growing hemp commercially for over 15 years and operating a hemp breeding program since 2014. In collaboration with Innovative Agriculture, Mara Seeds has been granted PBR registration with IP Australia for developing four hemp varieties. Additional varieties are being developed to suit different purposes, (grain, fibre, biomass) with planting seed currently being bulked up for sale to the public. Breeding and adapting hemp for the northern cropping regions of Australia is our focus. We also currently crop between 20ha and 120ha of hemp per year ourselves and successfully rotate it with Wheat and Soybeans. Therefore, this submission is from a hemp grower and researcher perspective.

Our grain varieties are grown to press for oil and protein meal. Our existing soybean processing facilities enable us to clean and process all our grain and perform contract processing for other producers around the Northern Rivers region.

Our breeding program is headed up by Tim Shapter (Innovative Agriculture) who has over 25 years experience in breeding research around the world and has overseen the PBR registration of 7 hemp varieties in Australia.

We keep a full-time agronomist on staff, and have found many agronomic benefits to growing hemp as part of our farming system. With the area of hemp cropping increasing and growing regions expanding nationally, it will be important to have tailored agronomy advice specific to varieties, regions and end uses as the industry advances.

Hemp sequesters vast amounts of carbon in its biomass. We have used hemp as a feedstock for pyrolysis which turns the biomass into biochar (<80% Carbon) which can then stored for the next few thousand years in our cropping soils as stable carbon sequestration.

Hemp cropping in Australia has fantastic potential with many market streams demanding product that supply is already struggling to keep up with. It is very difficult for farmers to reliably source commercial quantities of suitable planting seed which seriously limits industry expansion.

Industrial Hemp - Industry potential

Agronomic factors

- Hemp presents as a versatile break crop with evidence of crops like wheat and cotton performing better following hemp due to the nutrient cycling and organic matter left behind as well as the pest and disease break.
- The greatest rotational benefit of hemp in our system has been weed control; hemp grows fast to out compete weeds and with a short growing period it also allows a short fallow on either side of the crop to control weeds.
- Irrigated corn growers would see added weed control benefits by being able to use selective grass herbicides.
- We have also had particular interest from local sugar cane growers who would normally use soybeans as a break crop.
- We grow and harvest all our grain with the conventional farming equipment that we use for our soy, wheat and corn with the only stipulation being that the header needs to have a draper front to manage hemp when grown for grain.
- It is fortunate that hemp has, so far, shown tolerance to many pests and diseases because there are very few options available for chemical control. Generally, the plant is safe once you get it out of the ground more than 50mm right up until flowering, but pests and disease can be an issue after this point, and more control options would be very useful.
- Hemp can remove heavy metals and excess nutrients from contaminated soils. We are currently working with a piggery on a plan to use one of our biomass varieties to start removing excess Phosphorus and Nitrogen (N) from some of the paddocks that regularly get effluent applications. A 23T/ha crop of hemp dry matter removes more excess nutrient than any other option available and should warrant further investigation into other soil contamination issues.

Farmer uptake and Licensing

Many people ask us about growing hemp and they are usually very keen, but they are also usually not experienced croppers and hemp is not a crop for first timers. Most people that come to us interested in growing hemp run small operations and do not have their own equipment (planters, booms, headers etc.) and then when we ask them about irrigation capacity and fertiliser budgets they give a very confused look. It seems that because hemp uses irrigation and nutrients more efficiently than other crops, people have interpreted this to mean that hemp does not need any, or minimal irrigation or nutrients. This is not the case, hemp will happily take 80-200kg of N and 2-6ML of supplementary irrigation per hectare for a profitable crop when grown for fibre or grain and biomass can use even more.

Farmers that have this capacity and experience are already using it to grow other crops. These are the people that need to be convinced about hemp if the industry is going to expand. They need information about the crop and how to grow it profitably as well as reliable seed supply and varieties suited to their growing region. **A farmer won't change something that is working for them unless they believe the new crop will make them more money.** Especially when the new crop involves applying and paying for a special license, paying for a government official to come onto their land to inspect and sample their crop and then submit to a reporting and auditing program for the life of their license whether they grow hemp in the following seasons or not.

Due to the risk of cross pollination affecting our lines we must keep our varieties growing significant distances apart (>5km). To accomplish this, we sometimes need to engage other growers to contract grow under our license and guarantee all seed is supplied back to us. By the time our latest variety got to the point that we would get someone else to grow it out, it had been tested for THC multiple times per year for 6 years (12 generations) and never once gone over 0.5% THC. If a farmer has bought certified breeders seed and proves their cropping business legitimacy, we think many (not all) of the above requirements of the hemp license can then be waived. Of course, this depends on the establishment of a practical hemp seed certification framework and a national licensing standard.

Grain and Oil - Food and Health

Stock feed

- Since the APVMA changed the definition of END product to include hemp seed in May 2025 we have been trialling hempseed meal with some of our cattle and have seen anecdotal success with animal health, condition and palatability.
- The sample that we sent away came back with a protein content comparable to the Canola and Soybean meal that we use in our SOFT Agriculture lines of stockfeed.
- We were able to use all the same oil pressing and extrusion equipment as we do for soybeans and achieved 15-20% oil returns. The meal pelletized well and makes a great addition to feed blends.
- The above-mentioned piggery also wanted to use their harvested hemp biomass as bedding material for their pig pens because of its superior moisture absorption compared to other types of hay. However, as pigs will eat a percentage of their bedding, the APVMA and Food Standards Australia and New Zealand (FSANZ) would need to establish MRLs for THC in animal products before this last step could happen. This lack of MRL's also stops mixed farming operations from being able to graze hemp crop residues even though the biomass of the crop residues had to test below 1% THC before it could be harvested.

Human consumption

- **Protein source** containing all 20 essential amino acids for human nutrition.
- We see a major role for hemp to help meet the projected future vegetable protein requirements both in Australia and internationally. This can be in the form of a de-fat meal or processed into textured vegetable protein and vegetable protein isolate for use in a wide range of foods
- Hempseed Oil contains omega-3 and omega-6 fatty acids as well as a fatty acid profile ideal for human consumption
- Gluten free flour
- Most of the nutritional benefits of hemp foods are well established and the market is starting to grow to feature in supermarkets and not just health food stores, but it is still rather niche and as such attracts higher prices. If the industry is to grow more large scale, hemp farms will need to drive prices down and normalize the product.

Cosmetics

- Hair care products such as shampoos and hair treatments
- Skin care products
- We believe there is a substantial opportunity for hemp oil to be used in a variety of cosmetic products, due to the size and value of this industry, targeting the cosmetic industry would allow for significant increases in planting areas which is necessary for the industry to develop beyond a niche/boutique crop

Circular Carbon Economy

- On a small scale we have achieved yields of 23T/ha dry matter with our biomass lines.
- **Using the conversion equations outlined in the Department of Climate Change and Energy Efficiency paper on carbon farming with hemp, this equates to 37.6T CO^2 removed per/Ha in one crop. This is a longer season crop so you would only get 1 full crop and 1 smaller crop of about half the biomass yield in a year. Therefore, this could potentially remove 40-60T of CO^2 /Ha/Yr if the season, variety and agronomy align.**
- By using a forage harvester like a Class Jaguar on a biomass crop we can chip hemp to a grade that suits our pyrolysis plant and turn the biomass into biochar. Our experiments with Central QLD Uni have shown biochar made from hemp is of superior quality to all other feedstocks tested. When we then return the biochar to our soils, either through an animal (removing methane as it goes through) or direct application mixed with composted manure it becomes long term (1000s years) carbon sequestration in soil. With varietal development and more policy and regulation in carbon farming, **hemp has huge potential to help meet emissions reduction targets if taken up on a broader scale.**

Regional development

- Hemp is a very light and bulky product directly after harvest for fibre and bast which means it cannot be economically transported much more than 100km from the paddock to the processor. Investment in more processing facilities and new technology would allow more regions to grow hemp and provide more jobs within those regions.
- There are very few decorticators for Fibre and Bast separation in the country and of those few, they all require some level of hand feeding and multiple workers to operate. If fibre and bast industries are to develop, we will need more of these facilities close to the hemp growing regions. They will also need to produce a higher quality end product to keep up with international standards and be able to handle larger quantities to accommodate industry growth.
- Even once initial separation has taken place, the shredded bast is still a very light product so it would make sense for companies making prefab panels or hempcrete blocks to complete this step as close to the processor as possible. Similarly with fibre it makes economical sense to get the fibre processed before freighting it. Aside from reducing the amount of air getting freighted around the country this would bring more processing and manufacturing jobs to the regional areas where the hemp would have to be grown.

Required Research

Plant breeding and Varieties

- After 10 years and well over $3M dollars we are now at the stage of bulking up our first commercial varieties for planting seed sale. This is the reality of plant breeding.
- Due to its legal status hemp largely missed the “green revolution” of plant breeding that other commercial crops went though over the last 80 years.
- There is potential for significant production gains through selection and breeding. Our research on varietal characterisations has shown there to be suitable genetics for sub-tropical latitudes with yields multiple times the current industry standards
- Further research and breeding is required to select and stabilise these varieties for sub-tropical production. This will require significant further investment.
- There are currently very few companies/programs in Australia that are legitimately breeding and selecting industrial hemp varieties.
- Funding and rebates for companies that successfully breed advanced varieties may help to encourage other qualified plant breeders to work on hemp.
- **Direct funding to the breeding of new varieties so they remain publicly available for the entire industry, rather than being protected by the company that creates them.**

Research Agronomy

- Like the above point on plant breeding, hemp has largely missed the last 100 years of agronomy due to its illegality. Since legalisation to grow in 2008 we have seen grain yields jump by an order of magnitude. This will be a very exciting space to see where this crop can get to as new varieties, growing regions and agronomic practices come online.
- Funded APVMA trials to give farmers more tools in their toolbox. This will be critical if hemp is to stay the low pesticide use crop that it is now. The more we rely on the small number of chemical controls available, the greater the risk of resistance and then the more chemicals we will need to apply later on. If we have access to a broad range of controls early, then our integrated pest management (IPM) can incorporate a robust resistance management strategy and reduce chemical use into the future. This will also be required if hemp is to move into more commercial cropping regions with higher pest and disease pressures.
- MRL limits for animal products are needed so that we can start feeding more of the hemp residues from grain production to livestock and reduce waste.

Markets

- Perhaps hemps greatest benefit and greatest barrier to commercialization is its versatility. As a crop it can be grown for many different market streams and purposes. It is fantastic that one crop can do all these wonderful things but the lack of focus on specific markets has fragmented the industry.
- **Specific varieties bred for specific uses need to be selected and advertised to specific industries. Instead of advertising magic beans that can do everything and wandering all over the country trying to sell them to everybody.**
- If we can focus the demand, then we can focus the supply to meet it.
- Optimal varieties can then be bred and grown under contract to meet processing capacity and specific demands of industry.

Kind regards,

The Mara Seeds Team