What should farmers know and do when planning and growing an industrial hemp crop?

Hemp is somewhat different to other broad acre crops:

- Hemp crops sequester more carbon than other crops (on a per month basis).
- Biomass crops can grow to 5 m in 5 months with as much as 15 MT/ha dry weight.
- The grain is processed into high value food products. The stems have a layer of very strong fibres (the strongest) and a central core (the hurd). Both have their own value chains.
- Hemp requires an investment in a significant amount of irrigation water (perhaps 4-6 ML/ha, depending on rainfall) and more fertilizer compared to conventional cereal crops, to achieve this rate of growth.
- There are about 20 varieties grown in Australia – all with their own special features.
- Grain and dual purpose crops (grain and biomass) require 3- 4 months from sowing to harvest. Biomass crops could require 5 months.

Before starting:

- Contact State Officials about procuring a Hemp Growers License.
- Engage with a recommended seed supplier and organize product sale contracts.
- Check the field to make sure it has adequate access for trucks and heavy equipment: check for narrow bridges, gates, sharp corners, wet areas, etc.
- Ensure that there is cleaning and drying equipment for grain and for bales of straw
- Work out if the irrigation equipment can operate in tall crops and whether there is an adequate water supply available to get the crop though the season.
- Think about the soil when selecting a field. The best fields have sandy to clay loam – but sandy and 'light clay soils' can work. It's all about well drained fertile soil.
- Hemp plants die if they stand in ponded water for more than a few hours. This means that fields should be free of depressions and have an adequate slope of more than 1:1000. Pans should be broken up by deep ploughing.
- Raised beds can be used on flatter, lasered slopes.
- Never sow hemp after hemp – diseases will build up.
- Review the fertility of the field to make sure its nutrients have not been 'depleted'.
- Soil tests are needed perhaps two months before sowing so that ameliorants can be added well in advance of crop establishment.
- pH of 6-7 is the optimum range.
- Crops may require as much as 150 kg N, 50 kg P, 150 kg K, and micronutrients (mixed or selected) per ha. Hemp crops also need calcium and magnesium. No more than 20 units of N should be applied with the seed if leaf burn is to be avoided. Soil carbon may need to be boosted with manure etc., but that is long term operation.
- Weeds impede the establishment of hemp crops, so that weed management should start well before sowing.

- Check that no residual herbicides (e.g., Atrazine) have been applied to the field for at least a year before the anticipated sowing date.
- Ensure that all farm operations are possible with owned equipment or known contractors well before the need arises.

Operations:

- Sowing can start in mid-September in northern Victoria and southern NSW, depending on variety and planned end use.
- Test germination rate of seed before sowing to help determine sowing rate (aim for an emergence of 100 seeds/sq m for biomass and 60 for grain).
- Ensure seed is treated with a fungicide such as Thiram (dealers often do this before they sell the seed).
- Before sowing, check soil for unwanted insects, such as wireworm, cutworms, white grubs, etc. If sowing into stubble (e.g., after canola) check for Rutherglen bugs. Conventional insecticides may be needed. Always check if the product is permitted for hemp by the AVPMA.
- Sowing: close row spacing is best: 15- 20 cm is good.
- Sow into moisture with the seeds 15-25 mm deep and firm soil moisture contact.
- Weed control may be needed before or after sowing.
- Irrigation – an establishing crop pumps out water all the time: check soil moisture levels frequently at crop rooting depth.
- Grain (and dual purpose) crops can be attacked by insects: *Helicoverpa* species (Heliothis, bollworm, budworm) are the most likely and the most damaging. They are resistant to many insecticides so information about the most appropriate (within APVMA guidelines) should be sought from Government or professional advisers, including HFS. Green vegetable bugs, Rutherglen bugs and mirids could also be a problem.
- Foliar diseases are not common, except for isolated cased of Botrytis (grey mould) and mildew in cool, wet summers. Preventative fungicides can be applied as a prophylaxis and are effective if applied soon enough. Soil diseases are more of a problem, hence the suggestion to treat the seed with a fungicide and to rotate the following crop(s).
- Timing of grain harvest is critical, because the seeds mature sequentially. Best to cut when most of the lower seeds are ripe (70% brown and hard inside). Draper front headers are best. The grain has to be put dried down slowly in dryers from up to 20 % - to less than 10% moisture within 12 h of harvest, cleaned and stored cool.
- The biomass/stubble can be left to ret for a couple of weeks: rotting helps the central core of the stem (hurd) separate from the outer fibres.