

# The Current Economics of Kānuka Oil Production: Back of the Envelope Calculations

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AUGUST 2022





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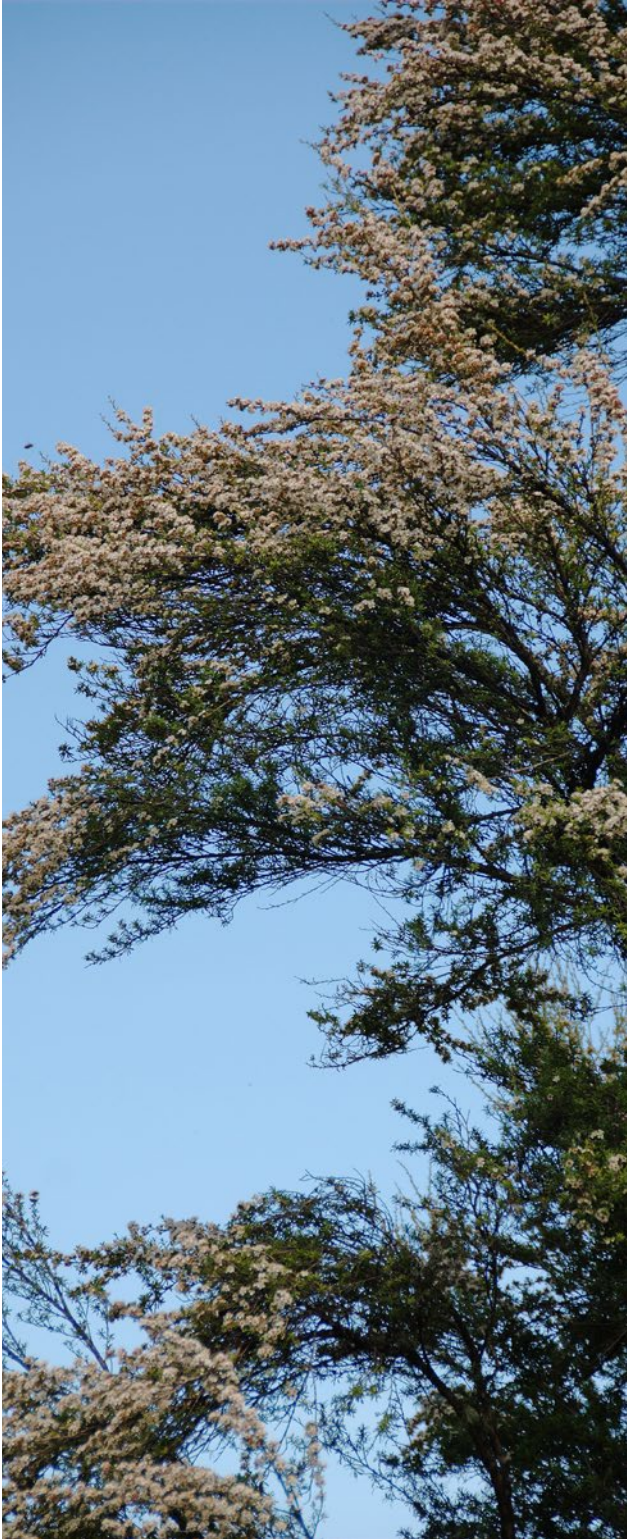
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# Introduction



Given that the kānuka market is not yet proven, and there is little economic data available, any financial modelling is reliant on the limited data that exists for the mānuka industry.

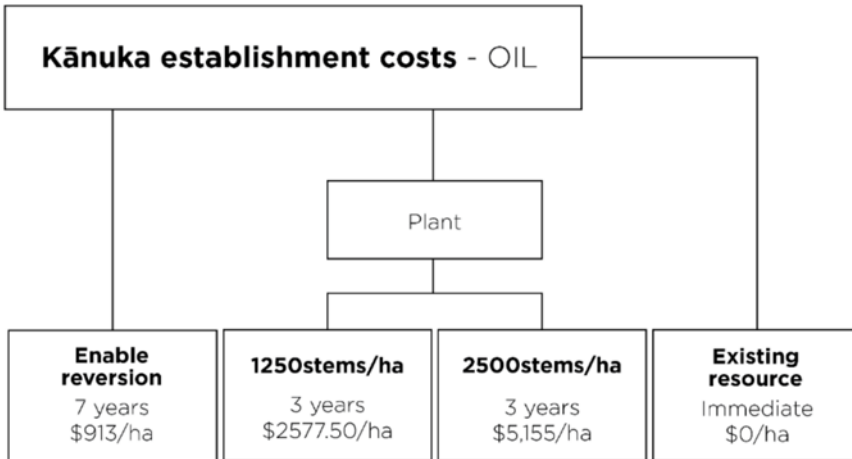
This report does not include any income from carbon credits, which are based on look-up tables that monetise units of carbon sequestered. Different plants species sequester carbon at different rates, and thus attract different prices. The carbon prices change over time: for example, in 2020 mānuka trees attracted a price of \$25/NZD and in 2022 the price has increased to \$75/NZD. It should be noted that the ETS scheme is built on several assumptions, including stem density/hectare. Carbon prices would be additional to revenue derived from production of kānuka products, assuming any utilisation of the trees did not significantly impair their ability to sequester carbon in the wood. The tree canopy must exceed five metres for the block to qualify for ETS registration.

If planting kānuka, it is important to decide on the purpose of the block because this decision will determine the planting density (stems/hectare) chosen, and where on the terrain the trees will be located. Unlike mānuka, where cultivars have been bred for superior honey production traits, selectively bred kānuka seedlings do not seem to be available, and choices for kānuka are limited to simply using eco-sourced seedlings or planting seedlings sourced from other rohe.

There are several components to consider when forecasting the costs of production, and these include:

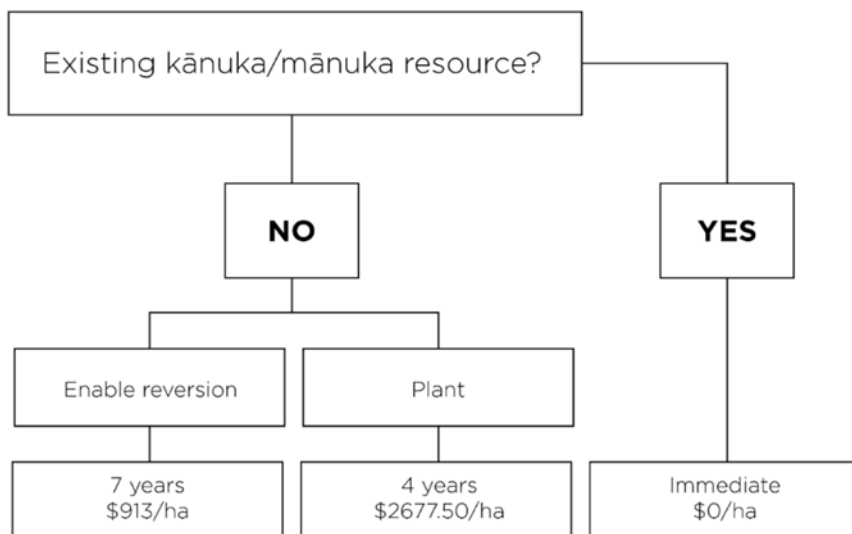
- costs associated with establishing and maintaining the trees (development costs);
- costs associated with harvesting the brush;
- costs associated with extraction of the oil from the brush;
- and costs associated with sale of the product (e.g., packaging and distribution including warehousing, marketing, and inventory).

# Development Costs: Establishing and Maintaining the Kānuka Trees



Investment required, and time to harvest, for establishing a kānuka resource (for oil extraction) will differ according to the strategy adopted (excludes costs of fencing, irrigation, and insurance). Indicative only.

Oil plantations tend to be planted at a stem/hectare density (2500–3000 stems/ha). Enabling reversion to create the kānuka resource will cost \$913/ha over seven years. Planting the kānuka resource for oil production (2500 stems/ha) will cost \$5,155/ha over three years. Note that a higher stem/hectare density is used when oil production is the primary intention. Accessibility to harvest the plants will be an important consideration, either by hand using a brush cutter, or by a vehicle with a suitable blade attachment.



Cost/hectare to establish a kānuka resource for honey production (excluding fencing, irrigation, and insurance). Indicative only.

# Modelling the Business Case For Kānuka Oil

Several key assumptions have been made based on advice from the few people already undertaking kānuka oil production, and these include:

- We have assumed that 13 tonnes of brush will be harvested per ha for the purposes of modelling. Expert opinion from the industry reports that kānuka regenerates faster than mānuka, and therefore the yield of brush/ha will be higher than for mānuka. The 13 tonnes/ha yield was based on observations from a mānuka plantation at a slightly higher stem/ha planting density. Kānuka brush yields more oil than mānuka, and we have assumed this density/ha is relevant for our financial modelling.
- We have assumed that 6.68kg of kānuka oil will be produced from 1 tonne of brush. This is based on expert opinion from the few producers in the industry.
- Assumes that all components per kg of brush harvested contribute to the oil yield (100% harvest efficiency).
- Assumes that time to harvest brush from each plant is equal for the purposes of modelling.
- Where landowners opt for outsourced extraction, we have assumed that they will utilise a commercial plant (800kg brush/day throughput minimum).
- We have assumed that landowners will sell their oil and leaf either wholesale (in drums, to third parties to sell), or direct to consumer retail.
- We have assumed that landowners have a vehicle capable of towing the tandem trailer around the paddocks, and a vehicle to transport brush via roadways.
- Assumes all trees survive for the purposes of modelling.
- Assumes oil extraction takes place with 72 hours of brush harvest.

Regardless of the business model, for the purposes of modelling we have assumed that the cost to harvest brush will be \$3,900/ha. This is based on 195 hours per hectare, and this includes transportation time as an additional labour cost. Harvesting kānuka brush for oil production will require a minimum upfront investment of \$4,632 (as at March 2022) for a harvesting rig.

Individual plants will be harvested every second year, to enable sufficient regeneration. Only half as many plants may actually be harvested, according to a rotation schedule, because working within the regeneration capacity of the trees is critical to ensure sustainable production.

## Contract Brush Supply to a Third-party Distiller and Marketer

This model assumes that the landowner harvests and transports the brush to a third-party distiller who pays an agreed rate for the brush. The other assumption is that there will be demand for all brush harvested, but until a thriving kānuka industry has been established, there will be limited demand (currently unknown). There is no further investment required other than transport costs. After costs, this business model can be expected to generate around \$5,431/ha every 2 years, assuming landowners have a buyer. A further key assumption is that landowners have the expected tonnage of brush (according to stem density/ha and regeneration capacity).

## Integrated Supply Chain Using a Third-party Distiller

This model assumes that the landowner harvests and transports the brush to a third-party distiller at a cost of around \$3,900/ha, pays for toll extraction of the oil (estimated at \$1000/800kg brush). A tonne of kānuka foliage can produce around 5-7 litres of oil, with an average around 6 litres. Yield depends on the dry matter content of the foliage, the twig-foliage ratio, and the time of year. The distillation time can take up to 5 hours for kānuka. The landowner then sells the oil as a bulk commodity, or as retail packs.

## Extracting Kānuka Oil

It is possible for a landowner to purchase a small portable still and undertake their own extraction. These require a minimum investment of \$14,255 for a 40L capacity (e.g., Explorer type, sold by Alembics NZ). Due to the small capacity of these stills, the labour cost is 40X higher than utilising a commercial third-party distiller. As the very high labour costs associated with the portable still make the costs of goods very high, this will further impact on the potential profitability of any products created. A commercial distillery requires investment in the order of \$250,000 for the extraction plant alone.

## Packaging, Sales and Marketing Costs

10ml glass bottles are a common format for retail oil sales. Landowners will need to hire bench space for preparation of the products (assuming a hire fee of \$300/day including power and all appliances) or build a suitable shed with power (estimated to be an upfront investment of \$15,000).

Branding and care with packaging is highly important, as is having market channels. Costs associated with selling product direct to the customer also need to be accounted for. To find new customers and secure repeat business it is critical to set up a website. Website design and hosting costs vary considerably, as will investment in a branding and media campaign to attract customers and drive sales. Store inventory and labour involved in sales administration attract additional costs, estimated to be around \$5.50/10 ml unit of oil. For the purposes of the modelling in this report, minimum costs per packaging and sales and marketing have been calculated at around \$11.98/10 ml unit of oil.

## Kānuka Oil As a Bulk Commodity

Under the current market conditions, kānuka oil supply is limited and the market is undeveloped. This means that the costs of producing kānuka oil as a bulk commodity exceed potential revenue. This report calculates that bulk oil costs around \$2,041/L (\$2,143/kg) to produce and will potentially generate \$800/kg, making a loss of \$1,343/kg of oil produced.

## Retail Packs of Kānuka Oil

The 10 ml retail format costs around \$3,239 to produce and market 100 units (1L of oil) and potentially generates \$3500/100 units sold (assuming each unit sells for \$35), making a profit of \$261/100 units sold.

This simple financial modelling highlights the importance of brand positioning. An analysis of existing kānuka and mānuka essential oils that are commercially available demonstrated that the average price for kānuka oil was \$26 compared with \$36.70 for mānuka oil. Assuming kānuka grows its brand worth, it is realistic that the price per 10 ml unit could lift to \$45/unit. Assuming market demand is strong, and all units produced are sold during the year of production, the ROI could be as high as 301% (applying a 6.5% discount rate). This increased profitability demonstrates the need to develop the kānuka oil market.



