



Supporting document 2

Economic analysis (Approval) – Application A1039

Low THC Hemp as a Food

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Executive summary

Hemp is currently grown in Australia and New Zealand for fibre production, animal feed and cosmetic oils, but not for human consumption. Other countries permit the use of hemp seeds for use in food. Food Standards Australia New Zealand (FSANZ) is examining the evidence to support an application to amend the *Australia New Zealand Food Standards Code* (Standard 1.4.4 – Prohibited and Restricted Plants and Fungi) to permit the use of products from *Cannabis sativa*, with low levels of THC, as food.

The analysis in this document provides a broad overview of the economic impacts of potential regulatory change. Obtaining detailed and useful economic information on this issue, in terms of both benefits and costs has been difficult. To help fill these information gaps FSANZ commissioned an analysis of the potential market outcomes of legalising hemp based foods on hemp seed production from the Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES). This report entitled *Human consumption of hemp seed: prospects for Australian production* is attached (Attachment 1).

The ABARES report indicates that, subject to a number of caveats and assumptions, the legalisation of hemp seed for human consumption in Australia and New Zealand would be expected to lead to increased demand, providing a stimulus for increased production. However the magnitude of these changes may be small.

The report also indicates that if prices for hemp seed remain high and yields can be increased to reach the levels claimed to be potentially possible, the returns from producing hemp seed could be higher than for many other crops. The resultant increases in demand could potentially be met from increased domestic production. Under these assumptions, up to an additional 190 tonnes might be produced in Australia which, at \$3500 per tonne, would bring an estimated gross revenue of \$665 000 to hemp seed producers.

However, if yields remain around their present level, and if world prices returned to those experienced between 2008 and 2010, there may be little incentive for Australian farmers to produce hemp seeds. There also remains a possibility that most, if not all, of the estimated increase in demand resulting from legislation would be met from imports, especially if prices proved to be less favourable or yields to be lower than expected.

As indicated above, hemp seed producers may be able to obtain extra value from their present production of seed and have an incentive to produce more seed. New entrants may also be willing to enter the market. However, it should be noted that hemp can either be grown for seed or fibre but typically not both. Consumers may gain access to a range of new products and may benefit from the nutritious properties of hemp. Food manufacturers and retailers may also gain benefits from the sale of low THC hemp food.

These benefits are weighed against the costs to Australian State, Territory and New Zealand governments regulating the legal production of hemp based food, although some of these costs would realistically be recovered from industry. Law enforcement agencies may also incur increased costs from regulating food production. It has also been suggested that allowing hemp to be used as a food source may cause complications and costs in relation to law enforcement activities associated with illicit drugs. However, FSANZ has been unable to obtain clear evidence of this or the likely costs.

Various approaches have been considered in relation to the legalisation of hemp based food. The following options have been identified:

- Option 1 - Reject the Application, thus not approving the use of low THC foods. This option represents the prevailing situation (the status quo) and does not imply any changes, additional benefits or costs. Other options are compared to the status quo.
- Option 2A - Prepare draft variations to permit the use of low THC hemp seed oil products only as food with maximum limits in the Code. This option offers Australian producers of hemp the possibility of selling hemp seed oil products into the food supply, similar to New Zealand producers.
- Option 2B - Prepare draft variations to permit the use of low THC processed hemp seed products (which includes hulled seed but excludes viable hempseed) as a food with maximum limits in the Code. In addition to those benefits of option 2A for producers, option 2B provides greater opportunity for businesses to enhance profits from producing hemp for a larger range of products can be produced from hemp flour, proteins and hulled seeds which could lead to an increased consumer demand.
- Option 2C - Prepare draft variations to permit the use of low THC whole hemp seeds and hemp seed products as food with maximum limits in the Code. This option provides the greatest potential for low THC hemp food producers as it allows for the sale of products including whole hempseeds and the products already included in option 2A and 2B. The assumed increase of hemp seed demand would be larger than in option 2B. However, the increase in benefits may be limited because producers would most likely need to ensure the non-viability of seed which could involve increased manufacturing costs.

In other economic analyses prepared by FSANZ, it has been possible to recommend a 'best solution', based on reliable data. However, clear data is not readily available which will allow a strong recommendation between the various options to be made. Due to the uncertainty surrounding almost all the costs and benefits they have principally been considered qualitatively with quantitative evidence provided where possible. However, option 2B appears to offer a reasonable level of benefits whilst avoiding some of the potential costs associated with option 2C and providing greater commercial advantage than option 2A. However it is not possible to identify whether relaxing the current regulatory restrictions provides a greater net benefit to the community than the current arrangement. Consequently it is not possible to identify whether option 2B should be preferred over the status quo (option1)

A demand for low THC hemp foods does appear to exist. The creation of this new market will give growers an opportunity to gain extra revenue from their seed crops meeting consumer demand. New participants will only enter the market if benefits exceed the next best use of inputs. The question of whether this regulatory relaxation is likely to result in an overall positive net benefit to the community is dependent on how likely it is that it will cause complications and costs in relation to illicit drug law enforcement activities and the magnitude of those costs if they do exist.

It should be noted that the Office of Best Practice Regulation did not require a regulatory impact statement to be created for this application as the changes are deregulatory in nature.

1. Introduction

Hemp is currently grown in Australia and New Zealand for fibre production, animal feed and cosmetic oils, but not for human consumption. Other countries permit the use of hemp seeds for use in food. Food Standards Australia New Zealand (FSANZ) is examining the evidence to support an application to amend the *Australia New Zealand Food Standards Code* (the Code) (Standard 1.4.4 – Prohibited and Restricted Plants and Fungi) to permit the use of products from *Cannabis sativa*, with low levels of THC, as food. The human consumption of hemp seed oil is already permitted in New Zealand.

This document looks at the economic impact of potential regulatory change on producers, consumers and government. A number of options for change have been identified.

1.1 Objective

The objective of this document is to investigate the impact on producers, government and consumers from a proposed regulatory change of the Code to permit the production and consumption of low THC hemp foods in Australia and New Zealand. Although not required by Office of Best Practice Regulation (OBPR), the purpose of this analysis is to support decision makers in their consideration of whether or not to change the Code by providing the best available economic information.

1.2 Stakeholders

The affected parties for this application include:

- producers who want to produce and sell food products containing low THC hemp food products;
- consumers who want and value low THC hemp food products;
- Australian, State, Territory and New Zealand Government enforcement agencies that enforce food regulations; and
- other law enforcement agencies, including police, that enforce illicit drug legislation.

1.3 Regulatory options

The following four regulatory options exist:

Option 1: Reject the Application, thus not approving the use of low THC hemp foods

The status quo or 'do nothing option' is the base case against which other options are compared. It represents the prevailing situation and does not imply any changes, additional benefits or costs. Other options are compared to the status quo. The analysis states additional costs and benefits compared to this option. It should be noted that the 'do nothing' option includes hemp seed oil products continuing to be legally available for human consumption in New Zealand.

Option 2A: Prepare draft variations to permit the use of low THC hemp seed oil products only as food with maximum limits in the Code

This option offers Australian producers of hemp the possibility of selling hemp seed oil products into the food supply, aligning Australian law to the present New Zealand law.

Option 2B: Prepare draft variations to permit the use of low THC processed hemp seed products (which includes hulled seed but excludes viable hempseed) as a food with maximum limits in the Code

In addition to those benefits of option 2A for producers, option 2B provides greater opportunity for businesses to enhance profits from producing hemp products. A larger range of products can be produced from hemp flour, proteins and hulled seeds which could lead to an increased demand both in Australia and New Zealand.

Option 2C: Prepare draft variations to permit the use of low THC whole hemp seeds and hemp seed products as food with maximum limits in the Code.

This option provides the greatest potential for low THC hemp food producers as it allows for the sale of products including whole hempseeds and the products already included in option 2A and 2B in Australia and New Zealand. The increase of hemp seed demand would be larger than assumed in option 2B. However, the increase in benefits may be limited because producers would most likely need to ensure the non-viability of seed which could involve larger regulatory costs.

2. Impacts

This section outlines the key impacts of permitting the use of low THC hemp in food. A number of direct and indirect consequences have been identified. However, as a general proposition this proposed change is deregulatory in nature akin to past microeconomic reforms in both Australia and New Zealand. Consequently the OBPR has not required a regulatory impact statement. Whilst the magnitude of changes in this specific instance is highly uncertain, deregulation in general can be expected to provide additional opportunities for the more efficient uses of land, capital and labour which may result in positive impacts in relation to employment, exports and the wealth of Australia and New Zealand.

It should also be noted that the production of hemp seed is currently legal under licence in all Australian states, except South Australia, and in New Zealand. In 2011, the area planted for hemp seed production in Australia was an estimated 185 hectares. Assuming an average yield of 0.5 tonnes per hectare, Australian production is estimated at around 93 tonnes. An additional 35 tonnes were imported into Australia from Canada, meaning an estimated 128 tonnes (5.7 grams per person) were used in Australia in 2011 for purposes such as body care products, pet food and possibly some livestock feed. Figures obtained from the New Zealand Ministry of Primary Industries indicate that for the 2011/12 financial year New Zealand farmers produced just over 9 tonnes with an additional 24 tonnes being imported. In addition to the uses mentioned above these seeds were used to produce hemp seed oil for human consumption.

Obtaining accurate and useful economic information on the likely effect of the possible legalisation of hemp based food, in terms of both benefits and costs, has been difficult. This is despite numerous attempts by FSANZ to elicit this information from various sources. The difficulty arises due to:

- a lack of international data on hemp seed price, volumes and consumption;
- the fact that a market does not yet exist for low THC hemp food in Australia or New Zealand (excluding the sale of hemp seed oil in New Zealand); and
- the sensitivities that appear to exist around providing information on law enforcement activities.

Some additional information was provided by industry members which was considered.

Due to the uncertainty surrounding almost all the costs and benefits they will principally be considered qualitatively with quantitative evidence provided where possible. However, regulatory costs should be proportionate to the scale of production (excluding illicit drug enforcement and road side drug testing) meaning that whilst benefits may be modest relative to other industries so will most of the regulatory costs. The specific economic costs and benefits that have been identified are set out below:

2.1 Benefits and costs to hemp seed farmers

FSANZ commissioned an analysis of the potential market outcomes of legalising hemp based foods on hemp seed production from the Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES). This report entitled *Human Consumption of hemp seed: prospects for Australian Production* is attached (Attachment 1). The ABARES report indicates, subject to a number of caveats and assumptions that the legalisation of hemp seed for human consumption in Australia and New Zealand would be expected to lead to increased demand, providing a stimulus for increased production. However the magnitude of these effects may be small.

Further, the report also indicates that if prices for hemp seed remain high and yields can be increased to reach the levels claimed to be potentially possible, the returns from producing hemp seed could be higher than for many other crops that could alternatively be grown by farmers. The resultant increases in demand could potentially be met from increased domestic production. Under these assumptions, up to an additional 190 tonnes might be produced in Australia which, at \$3500 per tonne, would bring an estimated gross revenue of \$665 000 to hemp seed producers.

However, if yields remain around their present level, and if world prices returned to those experienced between 2008 and 2010, there may be little incentive for Australian farmers to produce any hemp seeds. There also remains a possibility that most, if not all, of the estimated increase in demand resulting from legalisation would be met from imports, especially if prices proved to be less favourable or yields to be lower than expected.

Hemp seed producers may be able to obtain extra value from their present production of seed and have an incentive to produce more seed. New entrants may also be willing to enter the market. However, it should be noted that hemp can either be grown for seed or fibre but typically not both as they are harvested at different stages of maturation and planted at different densities to either optimise fibre or seed production.

The creation of this new market will give growers an opportunity to gain extra revenue from their seed crops meeting consumer demand. New participants will only enter the market if benefits exceed the next best use of inputs. Whilst the revenues predicted by the ABARES report for hemp are modest other niche grain crops such as quinoa and chia have experienced significant growth in output from a relatively low base.

In addition to the above benefits industrial hemp reportedly has a positive impact on land thereby making it a good rotational crop. The rotational benefits of hemp include suppressing weeds (Ehrensing 1998), rebuilding soils (Kraenzel et al 1998), and assisting in preventing nematodes and fungi (Poitrowski & Carus 2011). Hemp can also benefit later grown crops by increasing yield potential (USDA 2000). One study estimates that wheat yields can be up to 20 per cent higher after the cultivation of hemp under average seasonal conditions (Bocsa & Karus 1998, cited in Poitrowski & Carus 2011). No attempt has been made to explicitly quantify these benefits in this report.

The expected increase in volume may be met from increases in production from existing growers in the market, new entrants, and the importation of seed from overseas.

New entrants will bear the costs associated with police checks, security requirements, testing and record keeping as mandated by the current licensing schemes. However, new entrants will not enter the markets if these costs are not more than offset by the expected gains over and above the next best alternative use of land, capital and labour.

2.2 Benefits and costs to low THC hemp food producers and retailers

In countries where human consumption of low THC hemp foods is legal, hemp seeds are used in a variety of food products including margarines, cereals and hemp milk, or can be consumed raw. Components of whole hemp seed include around 45 per cent oil, 35 per cent protein and 10 per cent carbohydrates and fibre. Production of some or all of these products may allow existing or new food manufacturers and retailers to achieve the benefits of additional profits.

Costs may also be incurred from the increased security requirements for storage and transport. However these costs are expected to be similar to those presently paid by those using hemp seed for alternative uses.

New entrants to the industry will bear the costs associated with police checks, security requirements, testing and record keeping as mandated by the current licensing schemes. However, new entrants will not enter the markets if these costs are not more than offset by the expected gains over and above the next best alternative use of capital and labour. Profit margins for hemp based foods will depend on the economies of scale achieved, the mix of products produced and the success of industry in promoting the product.

2.3 Benefits to consumers

Based on the overseas experience some consumers will want to consume low THC hemp foods. In economics terms this will mean that many of them will enjoy an increased consumer surplus (the difference between willingness to pay and the price paid) as a result of them purchasing and consuming low THC hemp foods. Consumers may purchase the product as a result of its nutritious and other attributes. Other attributes may include taste, novelty value, benefits to the environment of the crop etc.

FSANZ considered the nutritional profile of hemp foods as part of the risk assessment for Application A360 and this Application. Low THC hemp seed contains a substantial amount of good quality protein, as well as many vitamins and minerals, similar to the nutritional profile of many nuts and seeds. Hemp seed and hemp seed oil are also potential dietary sources of polyunsaturated fatty acids, particularly omega-3 fatty acids. The nutrition assessment for this Application reinforces the outcome of the A360 nutrition assessment, and concludes that hemp food products may provide a useful alternative dietary source of many nutrients and polyunsaturated fatty acids. Only small quantities of whole hemp seed or hemp seed oil need be consumed to meet the adult Adequate Intake for alpha-linoleic acid (an essential omega-3 fatty acid).

A number of submitters have commented on the favourable nutritional profile of foods derived from hemp seeds. The Dietitians Association of Australia supported the use of hemp seed (including the oil) based on its nutritional merit. There could be some impacts on substitute goods. However, the consumer will be in a position to maximise their own welfare as a result of having the choice to consume low THC hemp based food.

2.4 Government costs

The main costs from the proposed change of the Code are the economic burden for businesses and governments caused by the licensing process for the industry.

Hemp producers have to comply with strict licencing requirements regarding the possession of hemp seeds, growing hemp, storing, transporting and the sale of hemp. Likewise, manufacturers using hemp need to comply with regulatory and licencing conditions. The cost of regulation varies between jurisdictions. The introduction of low THC hemp foods will most likely also require additional testing of THC contents and testing of the non-viability of seeds. Costs to governments may result also from training staff with regard to the new regulatory requirements and the cost of additional enforcement measures.

A growing market for hemp may require more businesses to be licenced and some new regulations in addition to those that are presently in place. However, regulatory systems presently exist and the likely increased tonnage of hemp produced is unlikely to produce a significant new regulatory burden. However, given governments' ability to cost recover these costs, these costs should not be seen as a strong argument against the removal of the present prohibition against hemp based foods. Numerous industries need significant regulation to operate in a way that is acceptable to the wider community.

In addition to these direct regulatory costs two negative outcomes have been suggested in relation to the law enforcement activities surrounding illicit drugs. The first suggested unintended consequence of permitting low THC hemp food is the potential for it to make the enforcement laws against the use of marijuana more difficult due to the close resemblance of hemp to other cannabis varieties such as marijuana. This for example could cause evidentiary problems if marijuana seeds were to somehow become confused. No quantitative evidence was provided to support this concern. Furthermore the requirement for seeds to be hulled and non-viable significantly mitigates this risk.

Secondly some government stakeholders have also identified the possibility of road drug tests and work place drug tests being compromised due to the consumption of low THC hemp food. It has been contended that the consumption of low THC hemp foods could result in a number of false positive screening results, which would require confirmatory testing at a cost to police and to the inconvenience of drivers who have legitimately consumed low THC hemp foods. Some jurisdictions conduct a significant number of oral fluid drug tests each year.

Indicative costs of roadside oral fluid testing are:

- Initial screening test - \$40 per test
- Secondary screening test - \$42 per test
- Laboratory confirmation - \$200 per sample, although may be as high as \$500 in some jurisdictions.¹

Police noted that these tests currently play a major role in efforts to reduce drug driving and the trauma associated with drug driving attributable accidents. The consumption of low THC hemp food may be used as a defence against conviction of a drug driving offence. At present, the consumption of cannabis is illegal and any detection of THC in oral fluid of a driver is an offence. If low THC hemp foods were legally available, drivers may claim that the consumption of low THC hemp food resulted in the positive drug screen result, rather than any illicit use of cannabis. This could result in a greater number of court challenges against convictions and an undermining of the effectiveness of roadside oral fluid drug testing. However, no quantitative evidence or examples of this being a problem has been provided. This issue and the likelihood of its occurrence are discussed more fully in the *Approval Report* that this analysis supports.

¹ Communication with State Police Departments.

2.5 Comparison of the cost and benefits of the options

In other economic analyses prepared by FSANZ, it has been possible to recommend a 'best solution', based on reliable data. However, in this case clear data is not readily available which will allow a clear choice between the various options. The costs and benefits of allowing low THC hemp foods is set out in table 2.1 below.

Regardless of this, it is reasonable to assume that benefits to growers and food producers will be positively related to the number of food products that are permitted. Likewise, it is reasonable to assume that regulatory costs will be positively correlated with the number of growers and producers and the number of products on the market. Therefore the option that allows the widest range of low THC products could arguably be preferred. However, whilst option 2C offers industry and consumers a wider range of products it may also cause a wider range of regulatory problems. These include the need for seed viability testing and the potential for seed to be confused with other varieties of cannabis seed causing difficulties with illicit drug law enforcement activities. As a result of the above it is suggested that option 2B should be preferred above option 2C.

Table 2.1 Impacts from permitting low THC hemp food to be considered

Impacts to be considered:		Direction and magnitude when allowing low THC hemp food (+benefit, -cost)
Producers		
	Net profits to hemp seed producers.	+
	Net profits to low THC hemp food manufacturers and retailers.	+
	Good rotational crop in relation to soil health and other benefits	+
	Additional compliance costs (through licencing etc).	-
Consumers		
	Consumer benefit from low THC hemp food as a result of its nutritious benefits and other perceived attributes.	+
Governments		
	An additional number of businesses may need to be regulated in relation to the growing of hemp seed and manufacturing of hemp based food (some or all costs may recovered through licencing and other fees).	- / neutral;
	The possibility of road drug tests and work place drug tests being compromised due to the consumption of low THC hemp food. (not quantified nor clear evidence provided)	-
	Potential that low THC hemp food may cause evidentiary problems in relation to drug enforcement activity. (not quantified nor clear evidence provided)	- / not determined

3. Conclusion

In other economic analyses prepared by FSANZ, it has been possible to recommend a 'best solution', based on reliable data. However, clear data to conduct a comprehensive cost benefit analysis is not readily available which will allow a clear choice between the various options. Due to the uncertainty surrounding almost all the costs and benefits, they have principally been considered qualitatively with quantitative evidence provided where possible.

However, whilst option 2C offers industry and consumers a wider range of products it may also cause a wider range of regulatory problems. As a result it is suggested that option 2B should be preferred above option 2C. Option 2B should also be preferred over 2A as it provides a much larger commercial potential. However it is not possible to identify whether relaxing the current regulatory restrictions provides a greater net benefit to the community than the current arrangement. Consequently it is not possible to identify whether option 2B should be preferred over the status quo (option1).

A demand for low THC hemp foods does appear to exist. The creation of this new market will give growers an opportunity to gain extra revenue from their seed crops meeting consumer demand. New participants will only enter the market if benefits exceed the next best use of inputs. This means that benefits will be highly correlated with variable regulatory costs.

Whilst the revenues predicted by the ABARES report for hemp seed are relatively modest, other niche grain crops such as quinoa and chia have experienced significant growth in output from a relative low base. The question of whether this regulatory relaxation is likely to result in a positive net benefit to the community is dependent on how likely it is that it will cause complications and costs in relation to illicit drug law enforcement activities and the magnitude of those costs if they do exist.

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