Stage 2 Cost Recovery Impact Statement

Unit charge rates on livestock germplasm exports

AGENCY DISCLOSURE STATEMENT

This Cost Recovery Impact Statement (CRIS) has been prepared by the Ministry for Primary Industries.

It provides an analysis of options to amend existing charges to address cross-subsidisation and historical deficits.

Cost recovery principles

Options are identified using, and analysed against, the cost recovery principles that appear in the relevant legislation and MPI's cost recovery guidance.

Whilst MPI considers it has sufficiently met the Transparency and Justifiability principles, MPI has identified several areas for improvement:

- Information about expenditure, revenue, and service levels and design information could be set out more fully and transparently when seeking specific consultation from stakeholders, including presenting more options to ensure a full and thorough consideration. However, industry has a strong other avenue for consultation through the Animal Trade Advisory Committee and this has been effective particularly around the service levels and design and the allocation of MPI's resources.
- MPI makes best endeavours in setting charges, however, forecast variances could be better explained to help inform the reason for the deficit – i.e. whether the cause of the deficit is due to over or under optimistic forecasting or due to changes in service levels.
- Not all potential contributors to the deficit have been identified, including productivity improvements or cost inefficiencies. However, the contributors that have been identified – the revenue variance and the more onerous requirements by importing countries – are large and plausible and, in the case of onerous requirements, have been consulted with industry through the Animal Trade Advisory Council.

Improvements will be picked up as part of work on cost recovery policies and processes that MPI is currently undertaking.

Subject to the gaps around Transparency and Justifiability, there is no uncertainty that MPI's preferred option is the only option that eliminates the problems of the deficit and the cross-subsidisation and, therefore, best meets the Efficiency principle.

Impact analysis

The analysis estimates the immediate financial impact of options on the market and at the business-level, and then how the financial impact feeds through to changes in prices and volumes over the medium- to long-term.

Because of uncertainties around some of the assumptions, and in particular how sensitive demand is to price increases, the estimated magnitude of impacts should be treated as a rough indication of the true impact rather than a reasonably precise estimate. The order of options and the relative magnitude of impacts of options should be reasonably precise, e.g. an option that reduces half the cross-subsidy has half the impact of an option that reduces all of the cross-subsidy.

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Bruce Arnold, Director Cost Recovery

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EXECUTIVE SUMMARY

The current unit charge structure involves a common $0.06 charge per unit across all ruminant germplasm categories. The cost recovery settings have not changed for several years. A deficit has accumulated and cross-subsidisation between categories has been identified.

This CRIS considers five options:

- Option (1) eliminates the accumulated deficit but does not address the cross-subsidy.
- Option (2) eliminates the accumulated deficit and eliminates the cross-subsidy.
- Option (3a) to (3d) eliminate the accumulated deficit and reduce cross-subsidisation to various degrees.
- Option (4) maintains the deficit.
- Option (5) defers changes by a year.

MPI's preferred approach is for Option (2) which eliminates the deficient and cross-subsidisation to be implemented as soon as possible. If the Government considers further support should be offered to businesses at this time, Option (5) could be selected which defers any changes until 1 July 2022.

Bovine exporters make up about 90% of production by value and have been generally supportive of MPI's preferred option through several rounds of consultation. Exporters of smaller germplasm categories have been generally preferred Option (1).

Structure and level of charges

The CRIS uses MPI's Cost Recovery Principles of Transparency, Justifiability, Efficiency and Equity.

MPI has identified some questions about how best to allocate costs for some activities. For this reason, MPI is only proposing to address the accumulated deficit as at 2018/19 and reconsider unit charges once these questions are resolved.

Option (2) is MPI's preferred option on Efficiency grounds as it has the smallest reduction on industry revenue (net of unit charges) by around 1.4% compared to the status quo which involves taxpayers subsidising the industry. By contrast, Option (1) reduces net revenue by 1.8%.

The proposed changes are:

Category	Current	Option (2)
bovine semen	$0.06	$0.08
ovine and caprine semen	$0.06	$7.87
cervine semen	$0.06	$7.90
embryos/ova	$0.06	$22.64

Some options, including Option (2), are expected to have large reductions on export volumes of ovine and caprine semen (around 26%) and cervine semen (around 15%) as the increases in unit charges are large compared to export prices. These categories make up only a small proportion of overall germplasm exports (hence the smaller 1.4% impact on industry revenue).

Industry revenue in the ovine and caprine semen, cervine semen, and embryos/ova is lower under Option (2) compared to Option (1), but this is more than offset by the increase in revenue in bovine semen.

Covid and the timing of changes

While export volumes appear to be largely unaffected post-Covid, MPI has less visibility about likely cost increases and possible export price impacts due to Covid.

The Government has so far preferred to deal with the impacts on businesses through central supports such as the wage subsidy and through supports to banks (to then support bank customers). This, combined with the general approach to Equity of beneficiaries rather than taxpayers paying, means that MPI's preferred option is to implement the above option from July 2021 rather than delay a year.

If the Government considers that these central supports adequately address Equity concerns, then Option (2) might be favoured. The Government may, however, determine that further weight should be given to business concerns. In this case, Option (5) which defers changes for a year might be preferred at a cost to the Crown of $80,000.[1]

STATUS QUO

The industry

The genetic improvement of livestock is a major industry in New Zealand

Products derived from pastoral farming of ruminant livestock include milk, meat, wool, hides and skins. They collectively accounted for around $29 billion of New Zealand's exports in 2018/19[2] or around 50% of total merchandise exports.

Genetic improvement is an important contributor to increasing the productivity of pastoral farming. This is reflected in significant investments in research and breeder tools by each of the relevant peak industry bodies,[3] as well as by government agencies.[4]

In the domestic dairy sector, there are around six million artificial inseminations (AIs) of cattle for production purposes each year, and a substantial proportion of herds are bred using AI. Just one year using AI can offer economic benefits in the low tens of thousands of dollars

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[1] Option (5) might be also be favoured if Equity, Transparency and Justifiability concerns are together considered large enough to defer changes.

[2] This document will usually use 2018/19 figures to illustrate where the industry would have been prior to disruptions caused by Covid-19. This is not intended to hide the effects of Covid-19, but just to simplify the scene-setting contextual information. Because Covid-19 struck towards the end of 2019/20, any impacts may not be obvious in data covering the entirety of 2019/20. The 'impacts of Covid-19' section breaks down data monthly to understand any impacts more clearly.

[3] These include DairyNZ (through its subsidiary New Zealand Animal Evaluation Limited), Beef+Lamb New Zealand (through subsidiaries B+LNZ Genetics and Sheep Improvement Limited (SIL)) and Deer New Zealand (for instance, by developing and maintaining Deer Select, New Zealand's deer recording database).

[4] This includes partnership funding, such as by the Ministry for Business, Industry and Employment (MBIE) for initiatives such as "AI on hooves: Multiplying elite sheep genetics by germline complementation" with AgResearch Limited, and with B+LNZ Genetics on the Genetic Single Step genetic evaluation system and by MPI in the *Happy Cows – Healthy Milk* Primary Growth Partnership Programme with DairyNZ and the Livestock Improvement Corporation.

(net of costs) for a typical dairy farm over a ten-year period, when compared to use of a service bull.[5]

While volumes are lower for other types of ruminant livestock, domestic artificial breeding is also relied on heavily and can offer economic benefits.

Ruminant germplasm exports can be a profitable side market for breeders and are dominated by exports of bovine semen

There have been no more than eight exporters of livestock germplasm of any type in any of the five years to 2018/19.[6] Two or three exporters are specialist livestock genetic companies, providing targeted or end-to-end services (breeding, genetic selection, as well as a range of technical and practical services associated with semen/embryo extraction) and account for the majority of bovine semen exports, which heavily dominates livestock germplasm exports.

Other exporters are not breeders, but provide specialist animal reproductive services to breeders, the vast majority of which is for use domestically.[7] Occasionally, breeders identify a profitable export opportunity[8] and because of the technical, procedural and regulatory requirements for exporting germplasm, these are exported by the specialist service providers on behalf of their breeder clients. Almost all non-bovine livestock germplasm exports are facilitated by these specialist companies.

As shown in Figure 1 total exports are over $7.5 million, dominated by bovine semen exports of $7.1 million.

Figure 1: Ruminant germplasm exports, export value, 2014/15 to 2018/19

Category	2014/15	2015/16	2016/17	2017/18	2018/19
Bovine semen	$5,788,000	$6,676,000	$5,775,000	$6,965,000	$7,055,000
Ovine and caprine semen	$60,000	$194,000	$236,000	$243,000	$193,000
Cervine semen	-	-	-	$50,000	$46,000
Embryos/ova	$303,000	$356,000	$896,000	$244,000	$272,000
Total	$6,151,000	$7,226,000	$6,907,000	$7,502,000	$7,566,000

In 2018/19 over 1.4 million units of bovine semen were exported, compared with around 19,000 from all other ruminant germplasm types combined.

Figure 2: Ruminant germplasm exports, units, 2014/15 to 2018/19

Category	2014/15	2015/16	2016/17	2017/18	2018/19
Bovine semen	1,264,100	1,306,400	1,684,000	1,434,700	1,429,100
Ovine and caprine semen	2,400	8,400	12,100	8,200	15,900
Cervine semen	800	1,600	2,100	800	1,800

[5] See, for instance, DairyNZ (2015), *Stopping AI - it's not worth it advises DairyNZ*, https://www.dairynz.co.nz/news/latest-news/stopping-ai-its-not-worth-it-advises-dairynz/ retrieved 29 August 2019.

[6] For reasons set out later, this CRIS only considers the accumulated deficit to 2018/19.

[7] This typically includes extracting, processing and storing semen; laboratory analysis and testing services; artificial insemination; embryo and/or ova transfer; and animal health checks.

[8] In the last three years the average number of consignments that were not bovine semen was only around 30 per year.

Embryos/ova	1,700	2,800	1,400	1,500	900
Total	1,269,000	1,319,200	1,699,700	1,445,100	1,447,800

Impact of Covid-19

Ruminant germplasm exports are seasonal with the very few exports happening from November to February.

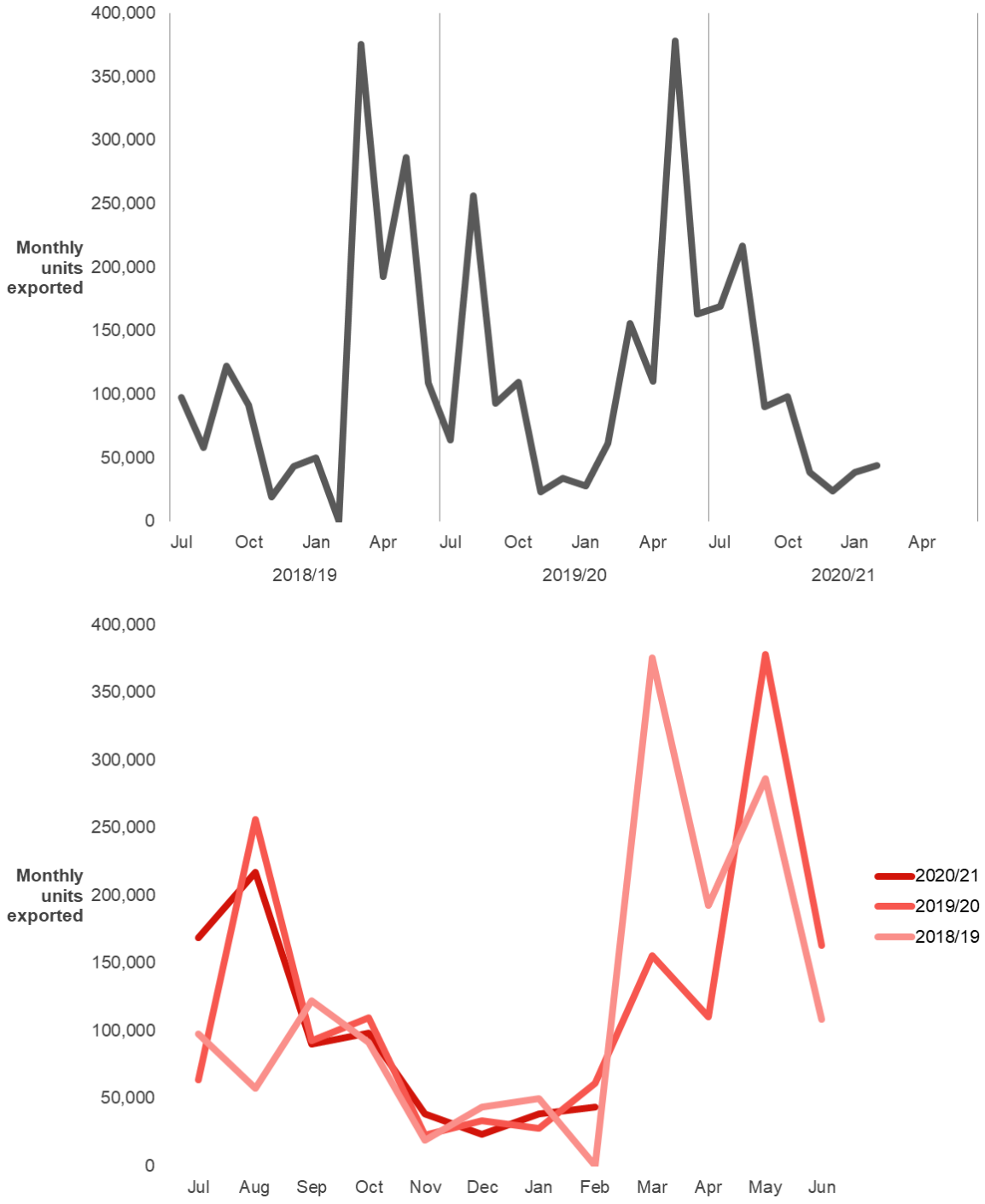
Figure 3 suggests that exports may have experienced a short-term or temporary drop from where they might have otherwise been during New Zealand's lockdown in March and April 2020. The higher alert levels may have impacted on New Zealand production. With other countries taking similar measures around the same time, some of the impact may also have been due to a drop in demand for exports.

May to July 2020 appears to have recouped those reductions, and export patterns appear to have returned to normal from August.

Overall, it does not appear that Covid-19 has had a lasting impact on the volume of exports.

However, MPI does not have timely information about the value of exports or of costs. One submitter during 2021's consultation said that Covid disruptions mean that freight costs are higher. We have not verified this for the germplasm industry in particular, but disruption and higher freight costs has been reported generally in the news. It is highly likely that profit margins are temporarily lower due to higher freight costs and, possibly, lower prices due to recessions overseas.

Figure 3: Monthly exports, July 2018 to February 2021



MPI's services, charges, and the regulatory framework

Cost recovery in general

Cost recovery funds the services that protect New Zealand from biological risks, ensure our food is safe to consume and export, and that help ensure the sustainability of our natural resources. These outcomes allow our primary sector to grow the value of its exports, which currently generate over $48 billion per annum (2019/20). Typically, approximately 30% of MPI's departmental funding comes from cost recovered revenue. With the emergence of COVID-19, this is expected to be approximately 20% ($150 million) in 2020/21, largely due to the drop in revenue for border biosecurity levies on arriving travellers.

In line with best practice guidance, MPI generally undertakes a thorough review of each cost recovery regime at least once every three years.

Additionally, MPI aims to set fees and levies at levels that ensure memorandum accounts trend towards zero over a three-year period. To achieve this, fees and levies may also be updated outside this normal three-year review cycle if a material surplus or deficit accumulates in a memorandum account.

MPI takes a principles-based approach, as set out in the 'Cost Recovery Principles and overall approach to cost recovery' section, to both its thorough reviews and its out-of-cycle reviews.

What regulated services does MPI provide for germplasm exporters?

Exporters of live animals and germplasm under the Animal Products Act 1999 (APA) must obtain an Official Assurance from MPI as a prerequisite for exporting to most countries. The requirements of these Official Assurances are set by agreement with the importing country and require constant review and maintenance, including the following services:

- market access maintenance – renegotiating market access conditions as overseas authorities' requirements change; and
- export standards and systems – developing, implementing, monitoring and reviewing export standards and systems.

The level of service provided under the APA is primarily driven by the level of demand for these services, both from industry domestically and trade partners internationally.

MPI reissues about half a dozen Overseas Market Access Requirements (OMARs) a year.

Figure 4: Reissues of Overseas Market Access Requirements

Category	Current OMARs	Reissued OMARs		
		2017	2018	2019
Bovine semen	44	3	2	0
Ovine and caprine semen	28	1	2	1
Cervine semen	9	0	0	3
Embryos/ova	51	2	3	2
Total	132	6	7	6

The services are club goods

A 'club good' is one where people/businesses can be excluded (e.g. have to join a 'club'), but once in the club, use of the services does not reduce the amount available to other members (the benefits are 'non-rival').

The benefits of market access are available to any business that chooses to export. One business making use of the access does not prevent another business from making use of the access. The benefits of access are, therefore, non-rival. Businesses, however, can only receive these benefits if they comply with the regulatory requirements (the service is excludable).

To encourage businesses to only demand or use services that they value highly enough it is economically efficient to, wherever possible, recover the costs of providing club goods from those who benefit from the services.

How are these levies regulated?

In general

The Acts allow MPI to recover costs in accordance with the principles of Transparency, Justifiability, Efficiency and Equity (see the 'Cost Recovery Principles and overall approach to cost recovery' section of this CRIS).

Charges are set out in the Animal Products (Fees, Charges, and Levies) Regulations 2007.

Those that benefit from market access are the businesses that export and, ultimately, the customers of those businesses. Economically-efficient cost recovery would see businesses pay in proportion to the benefits they receive. However, it is generally difficult to ascertain the precise level of benefit a business receives from a service. As a result, MPI uses an appropriate proxy (such as units produced or exported) to quantify the benefits its services provide to each business. This approach is consistent with MPI's cost recovery policy and best practice guidance from the Treasury.

The costs of services covered by this CRIS are recovered on a per-animal/unit or per consignment basis, described as 'unit charges'.

Additional requirements for changes made part-way through a financial year

Any changes to the charges in 2021 will be made part-way through the financial year (1 July 2021 to 30 June 2022). The APA contains additional requirements being that the Minister is 'satisfied' that affected parties 'agree or substantially agree' with the changes.

How are the levies set?

Unit charge rates are designed to ensure that charges reflect actual costs and that these are fairly and equitably spread between exporters. There are currently 17 categories of live animal and animal germplasm that have unit charges.

Unit charges are set by:

- calculating total service costs
- apportioning total service costs to different export categories based on the estimated share of staff time
- dividing the apportioned costs by expected export volumes to produce the rate for each category.

Current charges

MPI charges a single $0.06 unit charge across all categories of germplasm.

The categories are bovine semen, ovine and caprine semen, cervine semen, embryos/ova. A unit is a straw of semen, embryo or ova.

Review of cost recovery charges

MPI regularly reviews cost recovery across each of the systems it administers to ensure that settings remain appropriate. Regular updates allow changes to be well signalled and avoids sharp, unexpected changes.

MPI reviewed unit charges in 2018. That review identified that the memorandum account had accumulated a deficit.

Feedback during consultation identified a further issue: that some businesses are cross-subsidising others.

These problems are elaborated on in the 'Problems' section.

COST RECOVERY PRINCIPLES

This section sets out MPI's Cost Recovery Principles, how they relate to each other, and what this means for the overall approach to cost recovery.

MPI's Cost Recovery Principles

MPI's four Cost Recovery Principles are:

- Transparency – costs are transparent;
- Justifiability – costs are reasonable;
- Efficiency – net benefits are maximised; and
- Equity – costs are fair.

These principles are set out in MPI's cost recovery guidelines[9] and in in the Animal Products Act 1999[10].

The principles build on each other with Transparency and Justifiability providing a foundation to the consideration of, and sometimes trade-offs between, Efficiency and Equity. Essentially, MPI can only cost recover if it has sufficiently met the Transparency and Justifiability principles.

Once the Transparency and Justifiability principles are met, the Efficiency and Equity principles say that the beneficiaries of services should generally pay for services. That is, beneficiaries pay 100% of costs unless there is a strong efficiency or equity reason why they should not.

Appendix 1 contains a fuller description of the principles and how they relate to each other.

Overall approach to cost recovery

The requirement to meet a level of Transparency and Justifiability and the default of beneficiary pays results in the following overall approach:

Customers/beneficiaries generally pay

Customers/beneficiaries should generally pay for the services they demand.

Charging beneficiaries encourages them to demand or use only the quantity and quality of services that they value highly enough. If the cost is subsidised by others, then beneficiaries will demand more services (with the cost being met by others). The extra demand from a subsidy is an inefficiency as it results in more use of resources in production than people value and are willing to pay for.

Charging beneficiaries helps ensure MPI service volumes or quality are not higher than is economically efficient.

When beneficiaries might not pay

Beneficiaries might not pay full costs in four situations:

Transparency and justifiability

The first is where MPI has not sufficiently demonstrated that it is doing all it reasonably should to keep costs low (cannot meet the Transparency and Justifiability principles).

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[9] https://www.mpi.govt.nz/dmsdocument/30855/direct

[10] https://www.legislation.govt.nz/act/public/1999/0093/latest/whole.html#DLM35716

In this situation it may be appropriate for MPI to:

- change fees/levies to the level that can be justified for the time being; and
    - cover the remainder of costs; or
    - recover the deficit from a future time period after further work is undertaken;
- guarantee that prices will not exceed a certain level over the next period;
- charge fees at a fixed level, rather than variable with time, to encourage efficient service delivery.[11]

Administration costs

The second is where the administrative costs of charging (e.g. invoicing, collection) are excessive compared the revenue raised or the efficiency gain of precisely charging beneficiaries.

Externalities

The third is where there are externalities. Externalities are positive or negative impacts on third parties from the demand and supply of a good or service. MPI primarily deals with negative externalities. An example is the risk that arises from consumers demanding, and importers supplying, overseas products. A negative externality on a third party is the biosecurity risk from pest incursions on domestic farmers. Charging importers for MPI activities to reduce the risk encourages importers to reduce the risk and, therefore, need for the service.

Equity

The fourth is where the Government determines that there are equity (fairness) reasons why the Government or some other party should contribute to costs.

PROBLEMS

Problem 1: An accumulated and ongoing deficit

Background

Annual deficits in the live animal memorandum account (live animals in addition to germplasm) had contributed to an accumulated deficit of $669,000 by June 2019.

The precise identification and allocation of costs within the memorandum account is difficult. These difficulties include allocating costs between germplasm and other activities, and between different categories of germplasm.

The relevant business unit works hours that are specific to categories and are directly attributed to those categories. However, the business unit also does work that benefits multiple categories / the entire system. Historically, this work has been attributed at the staff member's discretion meaning that costs might not have been always attributed consistently and correctly.

These issues were identified in 2020. It is not feasible to go back and work out how historical costs might more precisely have been allocated, but it can be done for future costs. For this reason, MPI is proposing to address the accumulated deficit to 2018/19 and to do a review of cost allocation before full recovery of costs for 2019/20 and beyond is considered.

[11] This last approach is that used in the status quo and in some of the options.

MPI's best estimate of germplasm's share of the entire account is 18.7% and 81.3% for other activities for costs up to 2018/19. These shares result in $125,000 of the accumulated deficit being allocated to germplasm and $544,000 to other activities.

The Government has previously agreed to recover the deficit attributable to other activities and charges to do that have been in place from the 2019/20 year. This CRIS considers the deficit allocated to germplasm.

What is the size of the problem?

The accumulated deficit for germplasm as 2018/19 is $125,000.

What is the nature of the problem?

Deficits are an efficiency problem – costs are too high, revenue is too low, or a combination.

If costs are too high, through providing too high-a-quality service or other cost inefficiencies, then resources are wasted or not spent in areas that generate the most value.

If revenue is too low, then charges must be increased, or costs reduced, to match future costs and eliminate the accumulated deficit. If charges are increased, future customers end up paying the costs generated by past customers. Future customers face higher charges than they should be paying, increasing exporters' costs, artificially making some exports unprofitable, and reducing demand for exports (and MPI services) below efficient levels. Past customers faced lower charges than they should have, lowering exporters' costs, artificially making some exports profitable, and increasing demand for exports (and MPI services) above efficient levels.[12]

If the deficit is written-off, then the Crown pays the cost rather than the beneficiaries of the service. Crown funding comes from higher taxes or lower goverenment spending in other areas, reducing economic value in those areas. Past customers faced lower prices than they should have, increasing demand above efficient levels.

What is the cause of the problem?

To perfectly demonstrate the causes of a deficit (and why ongoing expenditure and revenue is justified), MPI would need to draw on a business case (or something similar setting out MPI's processes and the costs needed to run them) for recently developed services or, in the case of an established service, taking an old business case and accounting for changes to factors that affect revenue and costs. These factors are the following:

(a) Lower than anticipated revenue

(b) General cost inflation

(c) MPI-specific increases in the costs of particular inputs beyond general inflation

(d) Increases in the level of resource used for a given service – whether through more effort and resources, or from cost inefficiencies

(e) Increases in the volume or quality of services

MPI has identified (a) lower than anticipated revenue and (d) increases in effort as likely significant contributors to the deficit, with (b) general cost inflation explaining a small amount of the deficit. Increases in the volume or quality of services (e) is not considered to be a material factor. MPI has not identified any information one way or the other about (c) MPI-specific cost increases.

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[12] Even if customers/businesses are unchanged, if the volumes have changed, the costs past and future customers face will have changed.

Appendix 2 contains a fuller assessment of each factor.

Problem 2: Cross-subsidisation

What is the nature and cause of the problem?

Exporters in all categories pay the same charge per unit despite generating different costs. This results in a cross-subsidy whereby bovine semen exporters pay more than their share of costs and other exporters less than their share.

Bovine semen pay a greater share of cost than they should. The higher charge increases bovine exporters' costs, artificially reducing some exports profitability, and reducing demand for exports (and MPI services) below efficient levels.

Other exporters face lower charges than they should, lowering exporters' costs, artificially making some exports profitable, and increasing demand for exports (and MPI services) above efficient levels.

This problem was identified by industry during consultation in 2018 and confirmed by MPI.

Further elaboration of the nature of the problem is in Appendix 3.

What is the size of the problem?

Bovine semen represents 45% of the cost to MPI of maintaining livestock germplasm Overseas Market Access Requirements (OMARs) but, because of much higher volumes, pays 99% of unit charges.

In contrast, the other categories collectively represent 55% of costs to MPI, but pay 1% of unit charges.

Figure 5: Average annual export volumes (revenue) versus MPI time (cost)

Category	Export volume		MPI time	
	Units	Percent	2015/16 to 2017/18	2018/19
Bovine semen	1,515,926	99.0%	45%	45%
Ovine and caprine semen	12,097	0.8%	28%	12%
Cervine semen	1,578	0.1%	5%	22%
Embryos/ova	1,261	0.1%	22%	21%

OPTIONS

Introduction

Feasible options are those that can address the problems and the Cost Recovery Principles.

This section summarises the options and how they address the problems.

Appendix 5 contains more description of the options and, by running through each element of the 'Overall approach to cost recovery' section above and the Cost Recovery Principles, how they were identified.

Summary of options

The options in consideration and the overall direction of impact on the problems are set out in Figure 6.

Option (1) eliminates the accumulated deficit to 2018/19 but does not address the cross-subsidisation.

Option (2) eliminates the accumulated deficit to 2018/19 and eliminates the cross-subsidisation.

Option (3a) to (3d) eliminate the accumulated deficit to 2018/19 and reduce cross-subsidisation to various degrees.

Options (4) and (5) do not eliminate the accumulated deficit.

The status quo and options (1) to (3) were included in the discussion document. Option (4), Option (5) were not included in the discussion document.

Appendix 4 sets out how the charges were calculated.

Figure 6: Summary of options

Option		Bovine semen	Ovine and caprine semen	Cervine semen	Embryos/ ova	Accumulated deficit to 2018/19	Cross-subsidisation
Status quo	6 cents for all categories	$0.06	$0.06	$0.06	$0.06	Continues to grow over time | Past deficits progressively written-off	Remains
Option (1)	17 cents for all categories	$0.17	$0.17	$0.17	$0.17	Eliminated	Remains
Option (2)	Different unit charges for different categories	$0.08	$7.87	$7.90	$22.64	Eliminated	Eliminated
Option (3a)	Several options between (1) and (2)	$0.10	$5.95	$5.96	$17.02	Eliminated	Reduced
Option (3b)		$0.13	$4.02	$4.03	$11.41		
Option (3c)		$0.15	$2.10	$2.10	$5.79		
Option (3d)		$0.12	$4.33	$4.35	$12.46		
Option (4)	Increase levies to maintain the deficit. The unit charges could be common or different across categories. The equivalent of Option (1) would be 14 cents for all categories.					The deficit is maintained with nothing written off	Cross-subsidisation depends on the unit charge levels across categories, for example, cross-subsidisation could be eliminated if the equivalent to Option (2) was chosen
Option (5)	Defer increases in charges by a year – 6 cents for all categories remains for the 2021/22 year					One year's deficit written-off ($80,000) | Impact after then depends on which option is subsequently chosen	Cross-subsidisation continues for a year | Impact after then depends on which option is subsequently chosen

Note: Because all the options only address 2018/19 costs and deficits, deficits will re-emerge or expand until a new approach is identified and approved.

Discarded options

This CRIS discards options that fully cost-recover the accumulated deficit to 2018/19 and actual and forecast costs to 2023/24 (as a typical full cost-recovery approach would do). We consider that there are sufficient questions about the appropriate way to allocate costs of work that benefit multiple categories / the entire system (see the 'Justifiability' section above) that further work is needed before we commit to an approach.

It is intended that, whichever option is chosen, that rates will be reviewed again next year after this work is completed.

The equivalent of Options (1) to (3) would have seen unit charges increase to the levels in Figure 7.

Figure 7: Discarded options

Equivalent option		Bovine semen	Ovine and caprine semen	Cervine semen	Embryos/ ova
Status quo	6 cents for all categories	$0.06	$0.06	$0.06	$0.06
Option (1)	29 cents for all categories	$0.29	$0.29	$0.29	$0.29
Option (2)	Different unit charges for different categories	$0.10	$14.95	$62.91	$7.69
Option (3a)	Several options between (1) and (2)	$0.18	$7.89	$40.61	$4.53
Option (3b)		$0.21	$5.35	$27.17	$3.12
Option (3c)		$0.25	$2.82	$13.73	$1.70
Option (3d)		$0.24	$3.64	$18.89	$2.08

ESTIMATED FINANCIAL AND ECONOMIC IMPACTS

Introduction

This section summarises the key financial and economic on industry of the options.

Appendix 6 contains a fuller assessment of both the market-level and business-level impacts. Appendix 6 also details the assumptions and caveats. Because of uncertainties around some of the assumptions, and in particular how sensitive demand is to price increases, the estimated magnitude of impacts should be treated as a rough indication of the true impact rather than reasonably precise.

The order of options and the relative magnitude of impacts of options should be reasonably precise, e.g. an option that reduces half the cross-subsidy has half the impact of an option that reduces all of the cross-subsidy. That Option (2) maximises economic activity is not uncertain.

The estimated financial and economic impacts feed into the full assessment of all the Cost Recovery Principles later in this CRIS.

What is the immediate financial impact on the industry?

Options (1) to (3) increase costs on the industry as a whole by about $150,000 per annum. This is the immediate financial impact on industry before prices and volumes adjust.

What are the impacts on industry's market prices and volumes?

The increase in costs above flows through to lower profit margins. Over the medium- and longer-term, less profitable production ceases, reducing supply and increasing prices until the remaining production is making normal levels of profit again.

The increases in unit charges some germplasm categories can be substantial. For example, Option (2) sees the charge for ovine and caprine semen increase from $0.06 to $7.87 (see Appendix 6).

This is expected to have non-negligible impacts on market prices and volumes, particularly for ovine and caprine semen and for cervine semen.

The unit charge increases feed through to export prices with, under Option (2), prices rising by about:

- less than 1% for bovine semen;
- 39% for ovine and caprine semen;
- 20% for cervine semen; and
- 3% for embryos/ova.

At the other end of spectrum, Option (1)'s price increases are estimated at 2% for bovine semen and less than 1% for the other categories.

The price increases under Option (2) are then expected to generate volume reductions of about:

- less than 1% for bovine semen;
- 26% for ovine and caprine semen;
- 15% for cervine semen; and
- 4% for embryos/ova.

What are the implications for overall economic efficiency/activity?

While the impacts on some germplasm categories is substantial, these categories are a small part of total germplasm exports. Option (2), for instance, reduces industry revenue (net of unit charges) by about 1.4% compared to the status quo.[13]

By eliminating both the deficit and the cross-subsidisation, Option (2) maximises economic efficiency. Compared to Option (2), Option (1) reduces industry revenue (net of unit charges) by about 0.5% for an overall reduction of 1.8%. The impact on Efficiency is discussed more in the next section.

ASSESSMENT AGAINST THE PRINCIPLES

Introduction

In working out how best to meet the cost recovery principles, the 'Applying the principles to identify options' section identified two core issues that options and analysis should address:

- whether MPI had sufficiently met the Transparency and Justifiability principles such that it the accumulated deficit should not be 100% cost recovered
- whether to, how much to, and how quickly to reduce the cross-subsidisation (Efficiency and Equity issues).

The 'Impact analysis' section addresses each issue and then presents estimates of the efficiency and equity impacts of options.

Transparency and Justifiability

There are some identified gaps in MPI's achievement of the Transparency and Justifiability principles. While these are areas to improve on for future cost recovery proposals, MPI considers that the Transparency and Justifiability principles have been met to a sufficient degree. The areas are as follows:

[13] Note that there is only a reduction in revenue relative to the status quo because the status quo involves persistent deficits which are paid for by the Crown/taxpayers (reducing economic activity elsewhere).

- Specific consultation didn't set out complete cost and revenue information, had limited information about service levels and design, and did not present all options under consideration. However, industry has a strong other avenue for consultation through the Animal Trade Advisory Committee and this has been effective particularly around the service levels and design and the allocation of MPI's resources. See Appendix 5 for more detail.
- Part of the deficit is likely due to forecasting variances, which resulted in setting unit charges lower than the required service levels. However, MPI makes use of the best available data at the time to help set charges. See Appendix 2 for more detail.
- Not all potential contributors to the deficit have been identified, including productivity improvements or cost inefficiencies. However, the contributors that have been identified – the revenue variance and the more onerous requirements by importing countries – are large and plausible and, in the case of onerous requirements, have been consulted with industry through the Animal Trade Advisory Council. See Appendix 2 for more detail.

While MPI considers that it has sufficiently met the Transparency and Justifiability principles, it is nevertheless useful to consider which of Options (4) and (5) would be best if Government decides the Transparency and Justifiability principles haven't been sufficiently met.

In MPI's view, the gaps against Transparency and Justifiability are relatively small. Option (4) would therefore seem to be more reasonable than Option (5).[14] Option (5) could be more administratively straight-forward from the Government's perspective, however. Option (5) would see about $80,000 written off as a cost to the Crown over the next year.

Efficiency and Equity

The discussion in this section focusses on Options (1) and (2) as they are at opposite ends of the spectrum of options. Appendix 6 contains estimates of impacts across a variety of measures for all options.

Summary

Option (2) maximises efficiency. MPI also considers that Option (2) best meets the Equity principle. Option (2) is, therefore, MPI's preferred option.

Option (2) would achieve Efficiency by both eliminating the accumulated deficit and by eliminating cross-subsidisation.[15] As near as can be achieved before the review of cost allocation is completed, Option (2) will mean that customers pay the cost of services they demand. This will encourage efficient levels of production and exporting across export categories now and over time.

Efficiency

Options (1) to (3) all increase economic efficiency by eliminating the deficit and increasing the degree to which beneficiaries, rather than taxpayers, pay.

While the negative impacts on the non-bovine germplasm exporters from eliminating the cross-subsidy can be substantial, these categories make up only a small proportion of industry revenue and they are more than offset by the positive impacts to bovine germplasm exporters.

Option (2) is expected to reduce revenue (net of unit charges) by around 1.4% compared to the status quo. Option (1) reduces net revenue by 1.8%.

Option (2) has the smallest reduction in net revenue compared to the status quo because it eliminates the cross-subsidy which distorts business decision-making away from the most profitable business

[14] Note that Options (4) and (5) are discrete options. There are an infinite number of options between then, and between them and other Options, such as recovering 50% of the deficit.

[15] Option (2) is the only option of any of those considered, and of any other options (there are an infinite range of possible charges) that could be developed, that eliminates both the deficit and the cross-subsidisation.

activities. Note that there is only a reduction in revenue relative to the status quo because the status quo involves persistent deficits which are paid for by the Crown/taxpayers (reducing economic activity elsewhere).

The options, in declining order from most efficient to least efficient are:

Option (2)

Option (3a)

Option (3d)

Option (3b)

Option (3c)

Option (1)

Status quo

Equity

Phasing out the cross-subsidisation

MPI considers that there are no Equity reasons for why the cross-subsidisation should be prolonged or phased out over time. While some of the unit charge increases are large, prolonging them would continue cross-subsidisation and higher-than-necessary charges on bovine germplasm exporters.[16]

MPI also notes that in competitive international markets, most[17] of the costs and benefits of cross-subsidies are felt by overseas consumers of our exports rather than businesses themselves.

Mitigating the impacts of Covid

Another Equity issue is whether it is fair that the Government increases the cost of services during the immediate post-Covid period. It is highly likely that profit margins are temporarily lower due to Covid in the form of higher costs (particularly freight which was highlighted by one submitter and has been widely reported in media) and, possibly, lower prices due to recessions overseas.

The Government has so far preferred to deal with the impacts on businesses through central supports such as the wage subsidy and through supports to banks (to then support bank customers). On the basis of this, MPI's preferred approach is to implement Option (2) as soon as possible.

If the Government considers that past and current central supports adequately address Equity concerns, then implementing Option (2) as soon as possible should be favoured on Efficiency and Equity grounds.

If the Government has further concerns about the cost to businesses, then partially deferring costs via Option (4), or fully deferring costs via Option (5), by a year might be favoured.

Option (4) has no write-off risk, but costs to industry would need to increase by a greater amount than in Option (2) if full cost recovery is pursued from 2022. Option (5) involves writing off $80,000 a cost to the Crown.

[16] One submitter preferred that cross-subsidisation wholly or largely continue. Their arguments and why MPI disagrees are covered in the 'Consultation' section.

[17] As much as 95%. See Appendix 6.

CONSULTATION

Avenues of consultation

MPI consulted with industry through two channels: several rounds of specific consultation on the proposals through discussion documents published online and sent to industry participants, and ongoing consultation through the Animal Trade Advisory Council which has industry representatives.

In summary, there were gaps in MPI's specific consultation through the discussion document, particularly around demonstrating value for money and what is causing cost changes, and presenting limited options for consideration. This was unnecessarily restrictive and did not provide on opportunity at this stage for industry to interrogate different service and cost structures.

The discussion documents did not include Options (4) or (5), in order to focus industry engagement on aspects of the proposals other than the possibility of deferring cost increases. Based on the well-considered submissions we received, we expect that including such options in future discussion documents would not detract from industry feedback.

MPI's ongoing consultation with industry through the Animal Trade Advisory Council provided better information to industry and a better opportunity for industry feedback. MPI meets with industry's Animal Trade Advisory Council each quarter to update on services and costs. These briefings and reports are comprehensive about levels of service, where MPI could be allocating its effort and factors impacting on cost. Industry takes the opportunity at these meetings to question MPI staff. The ongoing consultation did not provide an avenue for presenting options for cost recovery this time, though.

Summary of submissions and response

MPI received much considered feedback during three rounds of consultation. This feedback, and MPI's response, is summarised below.

In 2018, the first discussion document proposed eliminating the deficit. This round of consultation led to bovine germplasm exporters identifying cross-subsidisation.

In 2019, the second discussion document proposed eliminating the deficit and the cross-subsidisation. Submitters were generally supportive, but some queried whether MPI was as cost-efficient as it could be. Because there's a further opportunity to review unit charges during the consideration of costs post-2018/19, MPI will work with small livestock germplasm exporters on ways to reduce costs. If successful, MPI will consider partially waiving the new unit charge rates to reflect the lower costs incurred.

In 2020, the Government deferred decisions due to Covid and later agreed to a further round of consultation. Bovine germplasm exporters who submitted were supportive, but other submitters raised a range of issues around impacts on animal welfare, genetic gains, and the potential impact on both small and large producers. Bovine exporters make up about 90% of production by value.

The overall view among industry submitters is general support for the proposals.

Because some of the feedback and MPI's response is lengthy and technical, detail is included in Appendix 8. The largest of the issues is a suggestion that exports of some germplasm might disappear completely from New Zealand. MPI considers that this is unlikely but, as the analysis in this CRIS suggests, the impact on some categories will be large.

ADDITIONAL REQUIREMENTS FOR CHANGES MADE PART-WAY THROUGH A FINANCIAL YEAR

As noted in the 'How are the levies regulated?' section of the 'Status quo' section, there is an additional requirement for changes made part-way through a financial year. This legislative requirement is that the Minister needs to be 'satisfied' that affected parties 'agree or substantially agree' with the changes.

The Animal Products Act 1999 emphasises that the Minister needs to be satisfied. As such, this CRIS does not say whether the Minister should be satisfied or not.

The ‘Consultation’ section covers submitters views. Bovine exporters make up about 90% of production by value and have been generally supportive of the proposals through the rounds of consultation. Exporters of smaller germplasm categories have been generally against the proposals.

CONCLUSIONS AND RECOMMENDATIONS

MPI’s preferred approach is for Option (2) to be implemented as soon as possible. If the Government considers further support should be offered to businesses, Option (5) could be selected which defers any changes until 1 July 2022.

Structure and level of charges

The current unit charge structure will continue to result in deficits and cross-subsidisation.
MPI has undertaken analysis about how to address those problems. MPI has identified, and analysed, a range of options using MPI’s Cost Recovery Principles.

Overall, MPI considers that while there are some gaps, it has sufficiently met the Transparency and Justifiability principles in its service delivery and review of cost recovery settings.

MPI’s preferred option is Option (2) which eliminates the cross-subsidisation and accumulated deficit to 2018/19. Option (2) is expected to have a large impact on some of the smaller germplasm categories but, compared to Option (1) which only addresses the deficit, will have better outcomes for the germplasm industry as a whole.

Option (2) is expected to reduce revenue (net of unit charges) by around 1.4% compared to the status quo. Option (1) reduces net revenue by 1.8%. Option (2) has the smallest reduction in net revenue compared to the status quo because it eliminates the cross-subsidy which distorts business decision-making away from the most profitable business activities. Note that there is only a reduction in revenue relative to the status quo because the status quo involves persistent deficits which are paid for by the Crown/taxpayers (reducing economic activity elsewhere).

Covid and the timing of changes

It is highly likely that profit margins are temporarily lower due to Covid in the form of higher costs and, possibly, lower prices due to recessions overseas.

The Government has so far preferred to deal with the impacts on businesses through central supports such as the wage subsidy and through supports to banks (to then support bank customers). This, combined with the general approach to Equity of beneficiaries rather than taxpayers paying, means that MPI’s preferred option is to implement Option (2) as soon as possible rather than delay a year.

The Government may, however, determine that further weight should be given to business concerns. In this case, Option (5) which defers changes for a year might be preferred at a cost to the Crown of $80,000. Option (5) might be also be favoured if Equity, Transparency and Justifiability concerns are together considered large enough to defer changes.

IMPLEMENTATION PLAN

If agreed the changes proposed will be made through amendments to the Animal Product (Fees, Charges, and Levies) Regulations 2017, which will then be publicly notified in the New Zealand Gazette. Implementation will apply from 1 October 2021 (if the Government selects MPI’s preferred approach around timing) and MPI will notify fee payers of the new rates that will apply prior to this, as well as updating its application forms and other material to include the appropriate rates.

Unit charges are collected automatically at the border. No administrative changes are expected to be needed on the part of MPI or industry.

Industry has informed MPI that is would prefer to have as early indication of levy changes as possible so they can build them into contracts. There was also suggestion during consultation that if MPI could make future changes earlier, this would assist industry as many contracts can be agreed before changes are notified.

MONITORING AND EVALUATION OF SERVICES

MPI recognises that performance reporting is a critical component in providing transparency to industry and other interested parties, as well as ensuring ongoing system efficiency. This is explicitly acknowledged in the policies and guidance on our Principles.

To improve transparency, MPI has worked with industry to create a framework for reporting on the performance of cost-recovered services for all sectors. This has involved publishing annual reports about MPI's performance for the primary sectors. Performance reporting is an area for ongoing development for MPI – the annual reports currently focus on transparency around financial data and there is scope to use them to report against performance metrics (once developed).

MPI regularly reports on live animal and germplasm cost recovery and performance through the Animal Trade Advisory Council, a consultative forum between importer and exporters of live animals and animal germplasm and MPI.

REVIEW OF COST RECOVERY SETTINGS

MPI monitors the financial performance of all cost recovered systems it administers on an ongoing basis throughout the year. In line with best practice guidance, we generally undertake a thorough review of each cost recovery regime at least once every three years. This ensures that cost recovery regulatory settings remain appropriate. Reviews consider both cost recovery policy settings (who should pay for services, and how) and the rates of fees and levies.

Fees and levies may also be updated outside this review cycle if a material surplus or deficit accumulates in a memorandum account. MPI aims to set fees and levies at levels that ensure memorandum accounts trend towards zero over a three-year period.

A wider refresh of MPI's principles, policies and processes is underway. Work done to date has informed this CRIS including in the definition and application of the cost recovery principles and the analysis and identification of gaps that has flowed from that. The identified gaps will be referred to the refresh project for consideration as the refresh continues to roll out over the coming years, and addressed in future cost recovery regulatory impact analysis as appropriate.

APPENDIX 1: MPI'S COST RECOVERY PRINCIPLES

MPI's four Cost Recovery Principles are:

- Transparency – costs are transparent
- Justifiability – costs are reasonable
- Efficiency – net benefits are maximised
- Equity – costs are fair

These four principles appear in the Animal Products Act 1999 and the Wine Act 2003.[18]

The legislative definitions and interpretation of these are set out under each of the four principles below.

Transparency

Legislation

'Costs should be identified and allocated as closely as practicable in relation to tangible service provision for the recovery period in which the service is provided.'

Interpretation

'Transparency' means providing adequate information to people such that they can understand charges and have an opportunity to input into their calculation and setting.

'Identified and allocated…' means presenting the costs in a way that people can see what services generate what costs and when. 'Allocated' does not mean 'charged'. How costs are charged is a result of consideration of all the principles.

Justifiability

Legislation

'Costs should be collected only to meet the reasonable costs (including indirect costs) for the provision or exercise of the relevant function, power, or service.'

Interpretation

'Reasonable costs' are those necessary to deliver the service at the demanded quantity and quality.

Efficiency

Legislation

'Costs should generally be allocated and recovered in order to ensure that maximum benefits are delivered at minimum cost.'

Interpretation

Efficiency is made up of several elements:

(1) Costs should be the lowest necessary to meet customer demand. Customers can include businesses, members of the public, and the Government including other agencies. Meeting customer demand might involve treating different customers differently.

(2) Costs should be charged to:

[18] https://www.legislation.govt.nz/act/public/1999/0093/latest/whole.html#DLM35716
https://legislation.govt.nz/act/public/2003/0114/latest/DLM223236.html

(a) Who benefits from the service – If the customer pays, they have the incentive to demand only those services that provide them benefit compared to other things they might purchase. If parties other than the beneficiary pays, then the beneficiary will demand more services than otherwise.

(b) Whose behaviour can reduce the need and cost of the service – Typically both the supplier (MPI) and the customer will be able to do things to reduce the need and cost of the service. For example, MPI could adopt innovative technologies to reduce labour costs, while businesses might locate in urban, rather than rural, areas to reduce distance from market (including MPI's services).

If MPI has transparently justified its costs, it will not normally be appropriate for MPI to contribute to the costs.

Where there are externalities, it may be efficient to charge the third party as well, or instead of, charging the customer/beneficiary.

(3) Charges should account for administrative costs – sometimes it will be administratively prohibitive to charge according to (2)(a) or (2)(b) so a simplified approach is warranted.

(4) Charges should be competitive neutral – MPI should not use any dominant market position to charge inflated prices and make more than a fair economic return.

Equity

Legislation

'Funding for a particular function, power, or service, or a particular class of functions, powers, or services, should generally, and to the extent practicable, be sourced from the users or beneficiaries of the relevant function, power, or service at a level commensurate with their use or benefit from the function, power, or service.'

Interpretation

The Government will usually deem it fair that beneficiaries pay.

On other occasions, the Government will determine that other fairness considerations mean that another party contributes to the costs. For example, sometimes industry will be happy to support parts of its industry. Other times, Governments will want to provide additional support.

Relationship between the Cost Recovery Principles

The principles build on each other with Transparency and Justifiability providing a foundation to the consideration of Efficiency and Equity. Figure 8 summarises the relationship between the principles.

Transparency and Justifiability come before considering Efficiency and Equity

The APA says about Justifiability that MPI can only recover reasonable costs.

While the Transparency principle itself doesn't have a similarly strong statement, the very next clause says that costs should not be recovered unless there's been adequate consultation with affected parties including 'sufficient time and information to make an informed contribution'. Adequate consultation can only happen if MPI has been transparent.

With language of 'should not' and 'only', Transparency and Justifiability require[19] some minimum standard to be met. In contrast, Efficiency and Equity are to be achieved 'generally'.

This sequential approach to the principles, rather than considering the principles simultaneously, makes sense. It is not possible to be confident that the efficient way of cost recovering has been

[19] The Animal Products Act 1999 and Wine Act 2003, however, also say that failure to consult sufficiently does not affect the validity of cost recovery charges.

identified if costs have not been sufficiently justified, or affected parties have not had a reasonable opportunity to test the costs.

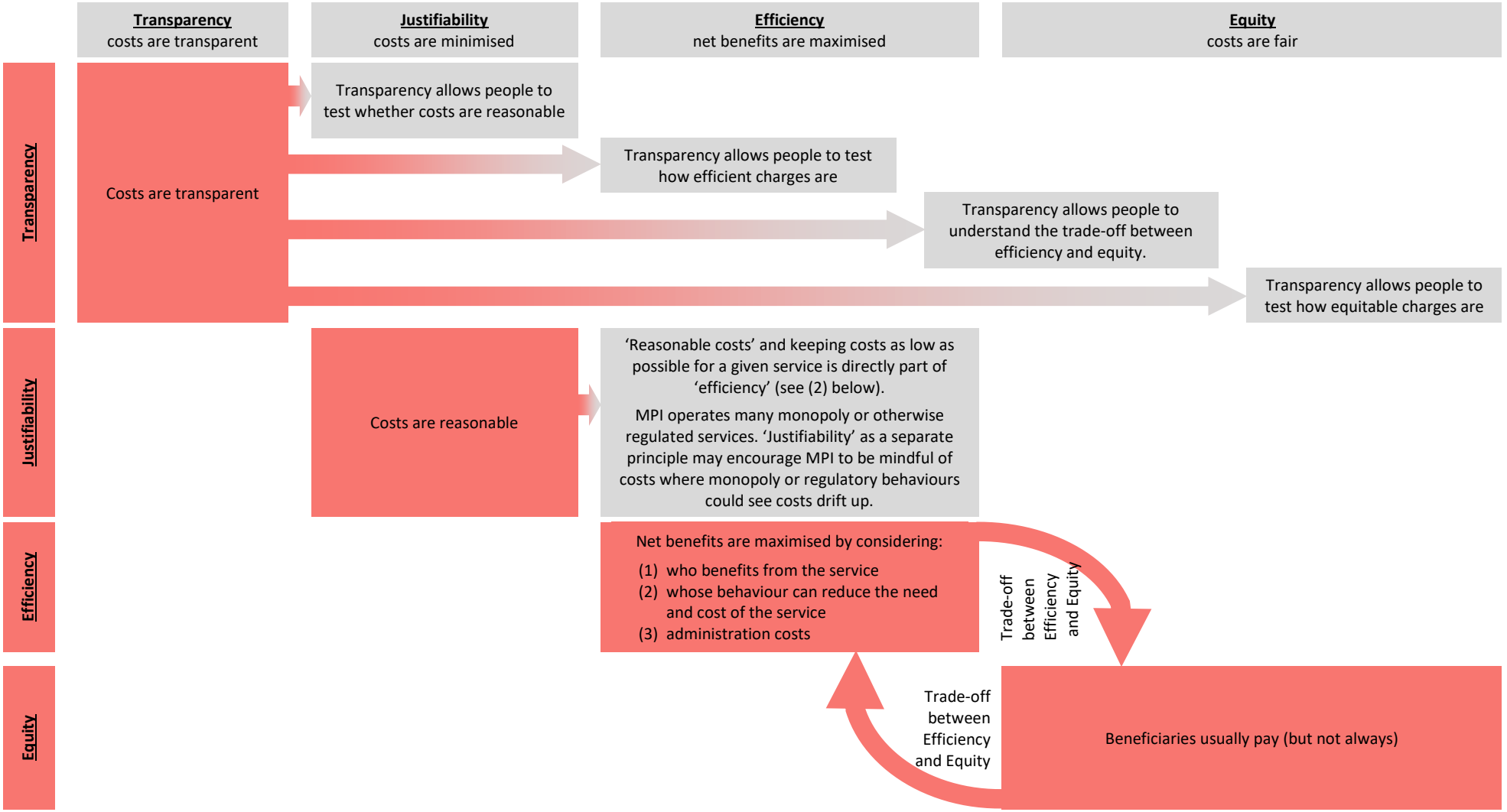
There will sometimes be trade-offs between Efficiency and Equity

The ‘generally’ in the Equity principle means that a Government might decide to charge someone other than the beneficiary. The ‘generally’ in the Efficiency principle means that cost recovery settings will not always maximise benefits and minimise costs.

This also makes sense. If the Government determines that it is more equitable pay for a service through Crown funding rather charging beneficiaries or those whose behaviour can reduce the need for the service (see (2)(a) and (2)(b)), then the cost recovery setting will not be maximising net benefits.

The two ‘generally’s allow for trade-offs to be made between Efficiency and Equity.

Figure 8: Relationship between the Cost Recovery Principles



APPENDIX 2: ASSESSMENT OF FACTORS CONTRIBUTING TO THE DEFICIT

Potential contributing factors to deficits (and surpluses), why they are important, and what MPI knows about them in relation to the services covered by this CRIS are set out in Figure 9.

Figure 9: Potential contributing factors

Factor	How important is this factor?	What do we know about this factor?
(a) Higher or lower than anticipated (or needed) volumes	MPI has negligible control over this factor. Volumes are a result of demand for product and producers' ability to supply it. In the case of levies, higher volumes generate more revenue, and reduce the average costs of the club good. It is important to be transparent so that the contribution of volumes versus other factors is understood, and so that industry can plan for the future using timely information about how revenue is tracking against cost (and thus the likelihood of future levy changes). Because MPI has negligible control, this factor is not significant to questions about whether costs should be 100% recovered.	No information suggests volumes are materially higher or lower than anticipated, but lower revenue is considered a likely contributor to the deficit. While a deficit can arise due to factors on the cost side or factors on the revenue side the number of OMARs has been fairly stable over time (Figure 4). While we don't have revenue data from before the last time unit charges were set in 2015 (the introduction of memorandum accounts is fairly recent), historic volumes of exports and the historic unit charge rates can be used to estimate past revenue. The changes to unit charges in 2015 reduced revenue by about 30%. Had fees not reduced, the deficit attributed to germplasm would have been about $15,000 rather than $125,000.[20] Additionally, revenue has been fairly stable or increasing since 2014/15 (see Figure 2) suggesting that there has not been a single shock to volumes that might have caused revenue to be lower than needed. It is further unlikely that forecast volume growth would have been so much higher than what actually occurred that forecast variances would be a major contributor to the deficit. The issue of whether MPI had made an error in lowering unit charges in 2015 was also identified in 2018's consultation with some submitters asserting that MPI had "significantly and recklessly" reduced unit charges more than it required.

[20] This estimate assumes, for simplicity, no demand response from changing charges. Higher charges would see lower demand, lower revenue, and a slightly higher revised deficit than the estimated $117,000.

		On balance, MPI acknowledges that a reduction in unit charges seems to be a contributor to the deficit rather than the deficit coming entirely from the cost side.
(b) Cost inflation	Inflation is the general increase in costs over time. The control MPI has over this factor is negligible. It is important to be transparent so that the contribution of cost inflation versus other factors is understood, and so that industry can plan for the future using timely information about how revenue is tracking against cost (and thus the likelihood of future levy changes). Because MPI has negligible control, this factor is not significant to questions about whether costs should be 100% recovered.	Using an MPI cost-index[21], MPI's overall cost inflation has been running at about 2.1% per annum since June 2015. The true inflation rate for any particular service will differ from this. If costs and the accumulated deficit is 100% cost recovered, the weighted-average increase in charges is 15.6% per annum. Cost inflation explains about 13% of the deficit.
(c) MPI-specific increases in the costs of particular inputs beyond inflation	It is more important, compared to (b), that MPI be transparent about these costs. This information is likely to be held by MPI, rather than be in the public arena like general information, and MPI is likely to have greater levels of control from time to time in the level of cost (e.g. wage settlements). If MPI is not transparent, there is a risk that hard choices and questions about whether costs should be 100% recovered will be obscured.	No specific cost increases have been identified that go beyond general inflation, though these have not been recorded. Figure 10 sets out the breakdown of costs for ruminant germplasm exports in 2018/2019. MPI has not benchmarked these, including the balance of direct costs and overheads, against similar services in the public or private sector. MPI cannot readily provide data on the share of costs over time in a way that's comparable with the 2018/19 data. A new cost recovery model was established in 2018/19 and data prior to then was recorded in ways that are not comparable with the current approach. This means that total costs are comparable overtime, but not the breakdown of costs into their components. **Figure 10: Costs by type[22]** **Cost type** — **Share of costs** Personnel — 65% Contracts — 2%

[21] An index that indicates inflation in MPI costs. It is based on cost indexes produced by Statistics NZ and the costs in MPI's 2019/20 annual report.

[22] Business support costs include information technology, finance, human resources and other overheads. Operational support costs include management and administrative support.

		Business support costs	26%
		Operational support costs	3%
		Travel	3%
		Other	0%
(d) Level of resource required for a given service	While MPI has little and some control over (b) and (c) respectively, it has complete control over (d). It is very important that MPI is transparent about the level of effort/resource required to deliver services, including different ways of delivering the same outcome. For example, while export requirements are set by overseas countries, careful design can reduce regulatory costs. If MPI is not transparent, risks of cost inefficiencies or missed productivity improvements arise and questions about whether costs should be 100% recovered cannot be raised.	MPI's relevant business unit has reported that more onerous requirements by importing countries means greater time per OMAR. This information has also been reported to industry as part of ongoing consultation. MPI considers that more onerous requirements are a significant contributor to the deficit. No productivity improvements have been identified. These may not have been recorded, however.	
(e) Service levels	It is very important that MPI is transparent about choices around service levels. While export requirements are set by overseas countries, the actual countries New Zealand ends up having agreements with is a matter of choice. MPI and industry have significant control here. There is even more control for domestic standards, where the design of the standard is more within MPI's control (in consultation with industry). If MPI is not transparent, costs might not be as low as they can be, and service levels might be too high and legitimate questions about whether costs should be 100% recovered could be raised.	More or higher quality services is not considered to be a significant contributor to the deficit. The number of OMARs negotiated has been stable over time (see Figure 4). MPI meets with industry's Animal Trade Advisory Council each quarter to update on services and costs. These briefings and reports are comprehensive and industry takes the opportunity to question MPI staff. While changes to service levels and design were not considered in specific consultation on the unit charges, MPI considers that the ongoing consultation through the Animal Trade Advisory Council provides a good opportunity for industry to express preferences around services. For this reason, this CRIS does not consider options that change service levels and design. MPI received no submissions during specific consultation about service levels and design.	

APPENDIX 3: CROSS-SUBSIDISATION

This Appendix contains more description of how a cross-subsidy is established, particularly around the allocation of fixed costs.

Variable and fixed costs

Variable costs are those that vary with the level of use of MPI's services.

For a given level of service at a particular point in time, costs do not vary with the level of use by businesses.

For instance, for an already negotiated market access agreement, no further costs are incurred if the number of businesses exporting increases.

Additionally, MPI may have leased building space to house staff doing market access work. These costs are fixed until the lease expires.

Costs shift from being fixed to being variable over time. Leases expire and MPI can lease more or less floor space, and industry demand might see market access agreements renegotiated and strengthened.

The key determination of whether a cost is fixed or variable is time. Over a single year, many costs might be fixed. Over three years, all costs might be variable.

Direct costs and indirect costs

Within variable and fixed costs, some are direct and some are indirect. The difference between the two is not black and white. The terms are used approximately to describe costs that can easily be identified to a particular service and costs that cannot be so easily identified.

In market access, costs directly attributable to bovine germplasm will be staff time spent negotiating bovine germplasm market access rather than time spent negotiating other germplasm market access.

Other costs which are not so easily attributable might by legal or human resource costs which are not as strictly recorded against those services that generate the need.

Indirect costs are allocated using a proxy in MPI. It is assumed that indirect costs fall roughly in proportion to staff time. That is, the more time spent working on a service, the greater chance that legal or human resources will be needed. This is in line with Treasury's and the Office of the Auditor General's guidelines.

Allocating variable costs

Variable costs should be allocated to those that generate them. This ensures that those businesses are not under- or over-charged and, therefore, do not over- or under-demand services.

Allocating fixed costs

Allocating fixed costs equitably might see costs being allocated in the same proportion as services are demanded.

Allocating fixed costs efficiently depends on the time period over which costs are being recovered (that is, whether costs are truly fixed or are variable).

A simple illustration

Hypothetically, let's imagine MPI provides one service to two Customers. Demand by Customer 1 is relatively elastic (price sensitive) – they provide products to the market on a short-term basis; some days having customers and on other days not. Customer 2 is inelastic – they have iron-clad contracts to provide products over the year and will pay whatever MPI charges to secure MPI services in order to avoid being taken to court by their own customers.

For simplicity and ease of illustration of the key issue, let's assume there is only one type of cost: the cost of leasing buildings.

In the very short run, MPI's building costs are fixed. MPI has its own iron-clad lease contracts.

If MPI charges both Customers a share of the costs, there would be reductions in demand and production by Customer 1, but not by Customer 2. Customer 1 provides product only when there is immediate demand and when it is profitable. Customer 2 keeps paying the cost because of its iron-clad contracts.

If, instead of sharing costs, MPI charges just Customer 2, there is no reduction in demand and production at all.

Things change in the long run, however.

Customer 2 might still have iron-clad contracts each year, but they expire and are renewed. Charging Customer 2 all the costs would see them disappear after year 1 and no costs recovered from then.

Additionally, costs change from being fixed to being variable (MPI's leases progressively end and more or less building space can be leased) so not charging Customer 1 means higher-than-efficient levels of demand. Customers 1 demands more MPI services because the cost is being paid by someone else (Customer 2).

Which scenario is MPI operating in?

MPI is setting charges over the long-term. MPI aims for charges that are appropriate for at least three years. If MPI was to charge one customer all of the short-term fixed costs (that is, all of the costs of the services covered by this CRIS), then that customer would, over-time, reduce its exports and deficits would arise again.

As MPI charges over the long-term and as all fixed costs are variable over the long term, MPI has allocated all costs as if they were variable. The greater the staff time spent on a service, the greater the need for legal and human resource cost and the greater the need for building space.

The result of this scenario is that bovine germplasm exporters generate 45% of costs and exporters of other germplasm generate 55% of costs. As bovine germplasm exporters are paying 99% of the revenue, they are being overcharged and other germplasm exporters are being undercharged. This is the cross-subsidisation.

APPENDIX 4: MEMORANDUM ACCOUNT CALCULATIONS

Figure 11: Cost base for live animal unit charges

Cost type	FY2018-19 budget ($)
Personnel	705,558
Training	
Contracts and Board fees	18,418
Travel, Entertainment	34,178
Vehicle Costs	325
Equipment Costs	11
IT Costs	1,524
Communication Costs	4,849
Consumable Materials	589
Financial, Legal	635
Operating Costs	3,404
Property	
Interbranch All	
Other direct	
Overhead costs from Technology One	289,548
Support cost	
Total	1,059,039
Memo account deficit[23]	222,961
Total cost to be recovered	**1,282,000**

Figure 12: Share of time and export volume[24]

Category	Share of time	Export volume (units)
Bovine semen	**8.4%**	**1,377,821**
Caprine and ovine semen	**5.3%**	**8,630**
Cervine semen	**0.9%**	**1,488**
Embryos/ova	**4.1%**	**2,312**
Total ruminant germplasm	**18.7%**	**1,390,251**

Figure 13: Calculating Option (1)

Step	Value
Total cost to be recovered	**$1,282,000**
Multiply: Average % time	**18.7%**
Equals: Cost applicable to ruminant germplasm	**$239,435**
Divide: Average volume	**$1,390,251**
Option (1) unit rate	$0.17

[23] $222,961 being the $668,883 accumulated deficit spread over a three-year recovery period.

[24] Note that the volumes used for this modelling differ from those in Appendix 6. The modelling in Appendix 2 was done based on 2018/19 data. The analysis in Appendix 6 was done based on updated data.

Figure 14: Calculating Option (2)

Step	Bovine semen	Caprine and ovine semen	Cervine semen	Embryos/ ova
Total cost to be recovered	$1,282,000	$1,282,000	$1,282,000	$1,282,000
Multiply: Average % time	8.4%	5.3%	0.9%	4.1%
Equals: Cost applicable to sub-categories	$107,389	$67,946	$11,752	$52,348
Divide: Average volume	1,377,821	8,630	1,488	2,312
Option (2) unit rates	$0.08	$7.87	$7.90	$22.64

Figure 15: Calculating options (3a) to (3d)

Step	Tag	and calculation	Bovine semen	Caprine and ovine semen	Cervine semen	Embryos/ ova
Total costs for ruminant germplasm	A		$239,435			
Pooled volume	B		1,390,251			
Volume per category	C		1,377,821	8,630	1,488	2,312
Option (3a)						
Pooling option	D		25%			
Pooled costs	E	A×D	58,859			
Pooled rate	F	E÷B	0.04	0.04	0.04	0.04
Cost balance for distribution	G	A-E	179,576			
Average time	H		8.4%	5.3%	0.9%	4.1%
Cost distribution by average time	I	G÷H	80,542	50,960	8,814	39,261
Balance of cost by category	J	I÷C	0.06	5.91	5.92	16.98
Option (3a) unit rates	K	F+J	0.10	5.95	5.96	17.02
Option (3b)						
Pooling option	D		50%			
Pooled costs	E	A×D	119,717			
Pooled rate	F	E÷B	0.09	0.09	0.09	0.09
Cost balance for distribution	G	A-E	119,717			
Average time	H		8.4%	5.3%	0.9%	4.1%
Cost distribution by average time	I	G÷H	53,694	33,973	5,876	26,174
Balance of cost by category	J	I÷C	0.04	3.94	3.95	11.32
Option (3b) unit rates	K	F+J	0.13	4.02	4.03	11.41
Option (3c)						
Pooling option	D		75%			
Pooled costs	E	A×D	179,576			
Pooled rate	F	E÷B	0.13	0.13	0.13	0.13
Cost balance for distribution	G	A-E	59,859			
Average time	H		8.4%	5.3%	0.9%	4.1%
Cost distribution by average time	I	G÷H	26,847	16,987	2,938	13,087
Balance of cost by category	J	I÷C	0.02	1.97	1.97	5.66
Option (3c) unit rates	K	F+J	0.15	2.10	2.10	5.79
Option (3d)						
Personnel costs	D		705,558	705,558	705,558	705,558
Average % time	E		8.4%	5.3%	0.9%	4.1%
Cost applicable to sub-categories	F	D×E	59,102	37,395	6,468	28,810

Non-personnel and overhead costs applied only to bovine semen	G	A-(sum of F)	107,660			
Total cost applicable to sub-categories	H	D+F	166,762	37,395	6,468	28,810
Average volume	I		**1,377,821**	**8,630**	**1,488**	**2,312**
Option (3d) unit rates	J	G÷H	0.12	4.33	4.35	12.46

APPENDIX 5: IDENTIFYING OPTIONS

This appendix contains more description of the options and, by running through each element of the 'Overall approach to cost recovery' section above and the Cost Recovery Principles, how they were identified:

- that beneficiaries pay, unless:
  - MPI has not or cannot sufficiently met the Transparency and Justifiability principles
  - administration costs are prohibitive
  - there are externalities such that someone other than the beneficiary should pay
  - or there are equity reasons.

How the options were identified

Beneficiaries pay

'Beneficiaries pay' means paying for the costs of their services and only the costs of their services. This means an option that fully recovers costs and which has no cross-subsidisation should be considered.

This is Option (2).

Options (3a) to (3d) each fully recover costs and reduce, but not eliminate, the cross-subsidisation.

Transparency and Justifiability

Transparency

MPI consulted with industry through two channels: several rounds of specific consultation on the proposals through consultation documents, and ongoing consultation through the Animal Trade Advisory Council.

One submitter asserted that specific consultation didn't set out complete cost and revenue information and had limited information about service levels and design.

However, industry has a strong other avenue for consultation through the Animal Trade Advisory Committee. MPI meets with industry's Animal Trade Advisory Council each quarter to update on services and costs. These briefings and reports are comprehensive about levels of service, where MPI could be allocating its effort and factors impacting on cost, and industry takes the opportunity to question MPI staff..

Justifiability

The precise identification and allocation of costs is difficult. The relevant business unit works hours that are specific to categories. These are recorded and are directly attributable to said categories. However, they also do work that benefit multiple categories / the entire system. Historically, this work has been attributed at the staff member's discretion. These issues would have existed historically but were only identified in 2020. It is not feasible to go back and work out how historical costs might have been reallocated, but it can be done for future costs. Because of this, we consider that the Justifiability principle would not be met if future costs were allocated on a basis that might be incorrect.

MPI considers that there are sufficient questions about the appropriate way to allocate costs of work that benefit multiple categories / the entire system (see the 'Administration costs' section) that further work is needed before we commit to an approach. Industry has been informed of this ongoing work through the Animal Trade Advisory Council.

For this reason, all the options are limited to recovering the accumulated deficit to 2018/19 only. Current and future costs may be recovered once MPI has a clearer idea of the appropriate allocation.

Administration costs

MPI's cost recovery regime operates, with industry approval, on a basis of frequent reviews to ensure significant surpluses and deficits do not arise or are addressed quickly when they do.

It is administratively easy for MPI to change the levels of charges. It is expected to be administratively easy for businesses to change their accounting settings too. The minor administration costs of frequent changes are already factored into MPI's approach of frequent reviews and changes.

No other administration cost issues have been identified.

No options are required to address administration costs.

Externalities

Market access provides industry and their customers with private benefits. MPI considers that there are no positive or negative externalities.

No options are required to address externalities.

Equity

MPI has identified two elements of fairness that could be relevant to the analysis.

Phasing out the cross-subsidisation

First, some of the charges are increasing substantially and reasonable people could consider it fair that charges are gradually increased over time. Options (3a) to (3d) each partially reduce the cross-subsidisation and could be selected before to moving to Option (2) later.

Mitigating the impacts of Covid

Second, the upheaval of Covid including higher business costs means producers are looking for cost savings. While the Government has so far preferred to deal with the impacts on businesses through central supports such as the wage subsidy and through supports to banks (to then support bank customers), arguments could be made for deferring cost increases of Government services.

Options (4) and (5) partially or fully defer costs.

Description of options

Option (1): Same unit charge across germplasm categories

MPI would continue group expenditure on all livestock germplasm types together and recover the cost against all units from any category.

The single unit charge would increase from 6 cents per unit to 17 cents.

This option would:

- fully recover the accumulated deficit to 2018/19 and partially recover costs from 2019/20 onwards
- not reduce or eliminate the cross-subsidisation.

Option (2): Individualised category rates

MPI would set different unit charges for different livestock germplasm categories. Direct costs such as staff time maintaining market access are directly allocated to the relevant categories, and indirect costs such as legal advice and human resources are allocated in proportion to the staff time spent on each category.

This option would:

- fully recover the accumulated deficit to 2018/19 and partially recover costs from 2019/20 onwards.
- eliminate cross-subsidisation.

Option (3): Partly individualised

MPI would set different unit charges for different livestock germplasm categories, but with only some the attributable costs (direct and indirect) actually being directly allocated to each category.

Option (3a) directly allocates 75% of attributable costs with 25% shared.

Option (3b) directly allocates 50% of attributable costs with 50% shared.

Option (3c) directly allocates 25% of attributable costs with 75% shared.

Option (3d) allocates all indirect costs to bovine semen, and direct costs to each category (including bovine semen). This option was identified and considered during consultation, but MPI has subsequently determined that this option was based on an incorrect economic rationale and is contrary to guidance from Treasury and the Office of the Auditor General.

Option (3) could also be used as a temporary option: in place for a limited number of years to smooth the transition to other options such as Option (2).

These options would:

- fully recover the accumulated deficit to 2018/19 and partially recover costs from 2019/20 onwards
- reduce the cross-subsidisation (greater reduction with the greater the direct allocation of attributable costs).

Option (4): Increase levies to maintain the deficit

Option (4) could have any variation similar to Options (1) to (3) whereby cross-subsidisation is addressed to varying degrees. For the equivalent to Option (1), the unit charges would increase from 6 cents per unit to 14 cents.

These options would:

- maintain the deficit at the current level through to 2023/24 and the next review period
- cross-subsidisation depends on the unit charge levels across categories, for example, cross-subsidisation could be eliminated if the equivalent to Option (2) was chosen.

Option (5): Defer increases for one year

Deferring increases for one year would see:

- one year's deficit written-off with the impact after then determined by whatever option among Options (1) to (5) is selected in subsequent years
- cross-subsidisation continues for a year with the impact after then depends on which option is subsequently chosen

APPENDIX 6: ESTIMATED FINANCIAL AND ECONOMIC IMPACTS

Introduction

This section sets out the immediate financial impact of options on the market and at the business-level, and then estimates how the financial impact feeds through to changes in prices and volumes over the medium- to long-term.

Level of confidence

Because of uncertainties around some of the assumptions, and in particular how sensitive demand is to price increases, the estimated magnitude of impacts should be treated as a rough indication of the true impact rather than reasonably precise.

The order of options and the relative magnitude of impacts of options should be reasonably precise, e.g. an option that reduces half the cross-subsidy has half the impact of an option that reduces all of the cross-subsidy.

That Option (2) maximises Efficiency is not uncertain.

Assumptions and method

Market-level impact

The market-level impact is estimated by taking market prices, adding the increase in unit charges to find a new market price, and estimating how much demand for New Zealand exports would reduce because of the higher price. Illustrations of this method can be found in Appendix 7.

MPI has used by the following data and assumptions to estimate the market-level impacts:

- The following current prices per unit and volumes are assumed:

bovine semen	$5.00	1,515,926 units
ovine and caprine semen	$20.00	12,097 units
cervine semen	$40.00	1,578 units
embryos/ova	$250.00	1,261 units

  The prices are the rounded weighted average price using the export values in Figure 1 and volumes in Figure 2 for the three years 2016/17 to 2018/19.

  The units are the average from Figure 2 for the same three years.

- That businesses have a profit margin of 10%.
- It is assumed that businesses can easily scale up and down production in the long-run (that supply is perfectly elastic)
- That demand has a constant elasticity of demand form and that the maximum price a consumer would pay is 5 times the current price above.
- MPI was not able to identify economic analyses of elasticities of demand (how price sensitive consumers are) for germplasm, so two sets of assumptions have been used.

  The first assumes an elasticity of demand of 1 for every germplasm category. An elasticity of 1 is the elasticity of the average product from across the economy and means that a 1% increase in price causes a 1% reduction in demand. MPI has no information about whether the true elasticity would be higher or lower than this. Niche exports such as embryos may have a relatively less elastic demand, as compared to high-volume bovine germplasm, if customers are after a very particular product. Alternatively, it may be that niche exporting is only done when customers can't source product from other countries, and is more highly price sensitive.

  The second uses the export values and volumes in Figure 1 and Figure 2 to construct demand curves and estimate elasticities of -0.9 for the semen categories and -1.3 for embryos/ova. This

means that a 1% increase in price causes a 0.9% reduction in semen demand and 1.3% reduction in embryo/ova demand.

This second set of estimates is very crude being based on only a five years' data and do not account for any factor between 2014/15 and 2018/19 other that could have affected demand such as changes in overseas competitors' prices or increasing world wealth or population. The estimation of these elasticities is presented in Appendix 7.

Estimated impacts from variations to the assumed elasticity are presented in Appendix 8.

Business-level impact

The business-level impact is estimated using two illustrative exporter profiles.

There are only a small number of businesses – up to eight in in recent years – that export livestock germplasm, and each exporter more or less fits one of the two profiles. Export volumes for each profile are based on approximate averages for each type of business over the last three years.

Profile 1: A large bovine genetics business with diversified services

This profile represents the small number of large bovine genetic businesses which focus mainly on dairy.

These businesses have large and diversified domestic operations.

They also export large volumes of bovine semen (large compared to Profile 2).

They occasionally export small amounts of other germplasm.

Overall, they are responsible for the large majority of livestock germplasm exports.

Profile 2: A smaller, specialist livestock reproductive service provider

This profile represents most livestock germplasm exporters which provide technical reproductive services to breeders, including extracting, processing and storing semen; laboratory analysis and testing services; artificial insemination; embryo and/or ova transfer; and animal health checks.

Because of the technical, procedural and regulatory requirements for germplasm export, this provider also facilitates the export of germplasm on behalf of breeder clients.

Most livestock germplasm exports that are not made by large specialised bovine semen businesses (profile 1) are made by a provider similar to this.[25]

Figure 16 shows the export volumes of the two profiles. They represent typical annual export volumes for these types of exporters based on export volume data held by MPI.

Figure 16: Export volumes of illustrative exporters

Category	Large, diversified bovine semen business	Smaller, specialist animal reproductive services provider
Bovine semen	737,000	9,000
Ovine and caprine semen	100	3,000
Cervine semen	0	400
Embryos/ova	0	700
Total	737,100	13,100

[25] The balance are hybrids of these two business types.

Immediate market-level and business-level financial impacts

Market-level impacts

Figure 17 sets out the estimated total cost in the immediate term by category and option. Annual financial impact in the immediate term[26].

Figure 17: Annual financial impact in the immediate term

Category	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)
Bovine semen	$90,960	$257,710	$121,270	$151,590	$197,070	$227,390	$181,910
Ovine and caprine semen	$730	$2,060	$95,200	$71,980	$48,630	$25,400	$52,380
Cervine semen	$90	$270	$12,420	$9,390	$6,340	$3,310	$6,830
Embryos/ova	$80	$210	$9,960	$7,510	$5,080	$2,650	$5,480
Total	$91,850	$260,250	$238,850	$240,470	$257,120	$258,750	$246,600

Business-level impacts

Figure 18 and Figure 19 show the financial impact on the large and smaller indicative exporters respectively.

The biggest absolute impact is on the large exporter because of the volume of its exports. The smaller exporter faces the bigger per unit impact – e.g. $3.37 per unit under Option (2) compared to $0.08 for the large exporter – due to a greater proportion of non-bovine exports.

Figure 18: Annual financial impact on a representative large bovine semen exporter

Category	Units exported	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)
Bovine semen	737,000	$44,220	$125,290	$58,960	$73,700	$95,810	$110,5500	$88,440
Ovine semen	100	$10	$20	$790	$600	$400	$210	$430
Cervine semen	0	$0	$0	$0	$0	$0	$0	$0
Embryos/ ova	0	$0	$0	$0	$0	$0	$0	$0
Total	737,100	$44,010	$125,310	$59,750	$74,300	$96,2100	$110,760	$88,870
Per unit		$0.06	$0.17	$0.08	$0.10	$0.13	$0.15	$0.12

Figure 19: Annual financial impact on smaller germplasm exporters

Category	Units exported	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)
Bovine semen	9,000	$540	$1,550	$700	$910	$1,130	$1,340	$1,090

[26] Values in tables are rounded. Totals may appear to differ from a sum of categories due to rounding.

Ovine semen	3,000	$180	$520	$23,620	$17,840	$12,070	$6,290	$13,000
Cervine semen	400	$20	$70	$3,160	$2,390	$1,610	$840	$1,740
Embryos/ ova	740	$40	$120	$15,850	$11,920	$7,980	$4,050	$8,720
Total	737,100	$790	$2,260	$43,330	$33,060	$22,790	$12,520	$24,550
Per unit		$0.06	$0.17	$3.37	$2.57	$1.77	$0.97	$1.91

Medium- to long-term market-level impacts

Introduction

Changes in unit charges are changes in business costs. This feeds through to business margins and, over the medium- to longer-term, to market prices and quantities.

When prices rise/fall, the quantity demanded for New Zealand exports falls/rises. This causes a decrease/increase in production at an industry level. Businesses will, on average, sell less/more. The business-level impact can range from all businesses producing less/more, or some businesses exiting the market and remaining businesses producing the same.

The scale of the impact depends on the size of the cost (price) increase and the elasticity of demand (how price sensitive overseas customers are) and supply (how easily the industry can scale up and scale down production over the long term).

How quickly this market change happens is market-specific. MPI has not identified evidence for germplasm. In principle, changes could begin within weeks or months of changes in unit charges but, if production is capital intensive, could take years to settle (the long-term is defined as how long it takes businesses to reallocate resources elsewhere, including capital like buildings and technology).

This section presents final long-term impacts focussing on Options (1) and (2) as opposite ends of the cross-subsidisation spectrum. Appendix 6 contains figures setting out the full set of estimates for all options. Figure 12 sets out the estimates of impacts on prices and volumes. Figure 13 turns the impacts on price and volumes into estimates of the impacts on:

- wealth transfers from cross-subsidies
- industry revenue net of unit charges
- industry profit
- consumer surplus
- deadweight loss from cross-subsidies.

Industry revenue and industry profit should be commonly understood terms.

‘Consumer surplus’ in the context of this discussion document is a term reflecting the gains from trade enjoyed by purchasers of New Zealand’s exports. The difference between the what value these purchasers put on exporters and what they actually pay is the consumer surplus. Reductions in trade and distortions in the market reduce revenue to New Zealand businesses and reduce the overall consumer surplus.

Wealth transfers occur through some businesses paying higher costs so that others can pay lower costs. Much of the wealth transfer is captured by overseas purchasers as increases in consumer surplus.

Deadweight loss is the amount of value lost because otherwise profitable production doesn’t take place because of overcharging or otherwise unprofitable production happens because of undercharging.

To aide readers in using the table, the example results discussed below are colour-coded and matched to the figures in this appendix. The figures present estimated impacts compared to the status quo and also compared to Option (2) if people consider that the appropriate comparator.

Prices and quantities

The unit charge increases feed through to export prices with, under Option (2), prices are expected to rise by less than 1% for bovine semen, 39% for ovine and caprine semen, 20% for cervine semen, and 3% for embryos/ova. At the other end of spectrum, Option (1)'s price changes are estimated at 2% for bovine semen and less than 1% for the other categories.

Because of the assumption of perfect elasticity of supply, the price increases are the same for different elasticities of demand. The elasticities of demand do matter for the volume changes.

If elasticities of demand for germplasm are -1, we would, for Option (2) and compared to the status quo, expect to see reductions in exports of about 28% for ovine and caprine semen, about 16% for cervine semen, and about 3% for embryos/ova. While bovine semen benefit from the eliminated cross-subsidisation, the higher unit charge will reduce exports, though it's expected to be less than 1%. Volume reductions under Option (1) are estimated at 2% for bovine semen and less than 1% for the other categories.

If the elasticities are -0.9 for semen and -1.3 for embryos/ova, then the reductions in exports are slightly lower for semen at less than 1% for bovine semen, 26% for ovine and caprine semen, 15% for cervine semen and slightly higher at 4% for embryos/ova under Option (2) and less than 2% for bovine semen and less than 1% for the other categories under Option (1).

Wealth transfers

The size of wealth transfers is large for some categories. For example, the total surplus from ovine and caprine semen without cross-subsidy would be between $273,000 and $297,000 depending on the elasticity assumptions. Under Option (1), ovine and caprine semen exporters receive cross-subsidies of about $93,000, helping boost total surplus to between $358,000 and $382,000.[27]

Revenue net of unit charges accrued to businesses

Whatever the true scale of the market impact, MPI considers that the options will not have a significant impact on the overall livestock genetic industry.

While MPI estimates some big volume changes under some options, including MPI's preferred option, these categories make up only a small amount of industry production (see Figure 2).

Option (2) is expected to reduce revenue (net of unit charges) by about 1.2% and 1.4% depending on the elasticity assumptions. Option (2) has the smallest reduction in net revenue compared to the status quo because it eliminates the cross-subsidy which distorts business decision-making away from the most profitable business activities. Note that there is only a reduction relative to the status quo because the status quo involves persistent deficits.

Compared to Option (2), Option (1) reduces net revenue by between 0.4% and 0.6%.

Industry profit

With supply assumed to be highly elastic over the long-run, industry profit will fall by the same percentages as revenue does above.

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[27] The totals of subsidies is funding coming in or leaving the market overall. For instance, the $147,000 represents the amount of funding that would be needed from external sources to cover the deficit as compared to Option (2), and Option (1) with a value of -$20,000 means that the accumulated deficit is paid off at a faster rate than in Option (2). Ideally, other than the status quo, the options would be revenue-neutral. They are revenue neutral in the unit charge setting process, but that uses different data and methods – including not accounting for demand responses. MPI will be looking at how to better align its unit charge modelling and the modelling contained in this discussion paper.

For the same reason, the gains from cross-subsidies largely accrue to overseas consumers (by a ratio of between 12:1 and 15:1). The $93,000 subsidy for ovine and caprine semen exporters, for example, is expected to generate only between $5,000 and $7,000 in additional profit for those exporters using the 10% profit margin assumption.

Consumer surplus

Option (2) has the smallest reduction in consumer surplus compared to the status quo at about 1%. Again, note that there is only a reduction in consumer surplus relative to the status quo because the status quo involves persistent deficits.

Compared to Option (2), Option (1) reduces consumer surplus by about 0.3%.

Total surplus

The benefits to New Zealand businesses and the overseas purchases of their exporters can be combined into an estimate of total surplus.

Because consumer surplus is much bigger than industry profit, the impact on total surplus mirrors that of consumer surplus. Option (2) has the smallest reduction in consumer surplus compared to the status quo at about 1%. Compared to Option (2), Option (1) reduces consumer surplus by about 0.3%.

Deadweight loss and wealth transfers

As Option (2) involves businesses paying the costs of their demand and, therefore no cross-subsidy, it has no deadweight loss or wealth transfer.

In comparison, Option (1) has between $15,000 and $17,000 of deadweight loss per annum. Overall, this is a relatively small amount when considered against total surplus of $12.0 million when cross-subsidies are eliminated.[28]

[28] Note that the deadweight loss estimate for the status quo does not include the deadweight loss from charging whichever parties would end up paying the accumulated deficit (e.g. the Crown, future businesses).

Figure 20: Medium- to long-term market-level impact under the two elasticity assumption sets

Category	Elasticity	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)
		Price							**Volume**						
Bovine semen	-1.0	$5.00	$5.11	$5.02	$5.04	$5.07	$5.09	$5.06	1,515,926	1,483,261	1,509,880	1,503,883	1,494,975	1,489,095	1,497,932
Ovine and caprine semen	-1.0	$20.00	$20.11	$27.81	$25.89	$23.96	$22.04	$24.27	12,097	12,030	8,697	9,342	10,096	10,976	9,966
Cervine semen	-1.0	$40.00	$40.11	$47.81	$45.89	$43.96	$42.04	$44.27	1,578	1,573	1,320	1,375	1,435	1,501	1,425
Embryos/ova	-1.0	$250.00	$250.11	$257.84	$255.90	$253.97	$252.04	$254.29	1,261	1,260	1,222	1,232	1,241	1,250	1,239
		Change in price relative to the status quo							**Change in volume relative to the status quo**						
Bovine semen		0.0%	+2.2%	+0.4%	+0.8%	+1.4%	+1.8%	+1.2%	0.0%	-2.2%	-0.4%	-0.8%	-1.4%	-1.8%	-1.2%
Ovine and caprine semen		0.0%	+0.6%	+39.1%	+29.5%	+19.8%	+10.2%	+21.4%	0.0%	-0.5%	-28.1%	-22.8%	-16.5%	-9.3%	-17.6%
Cervine semen		0.0%	+0.3%	+19.5%	+14.7%	+9.9%	+5.1%	+10.7%	0.0%	-0.3%	-16.4%	-12.8%	-9.0%	-4.9%	-9.7%
Embryos/ova		0.0%	+0.0%	+3.1%	+2.4%	+1.6%	+0.8%	+1.7%	0.0%	-0.0%	-3.0%	-2.3%	-1.6%	-0.8%	-1.7%
		Change in price relative to Option (2) (no deficit, no cross-subsidisation)							**Change in quantity relative to Option (2) (no deficit, no cross-subsidisation)**						
Bovine semen		-0.4%	+1.8%	0.0%	+0.4%	+1.0%	+1.4%	+0.8%	+0.4%	-1.8%	0.0%	-0.4%	-1.0%	-1.4%	-0.8%
Ovine and caprine semen		-28.1%	-27.7%	0.0%	-6.9%	-13.8%	-20.7%	-12.7%	+39.1%	+38.3%	0.0%	+7.4%	+16.1%	+26.2%	+14.6%
Cervine semen		-16.3%	-16.1%	0.0%	-4.0%	-8.1%	-12.1%	-7.4%	+19.5%	+19.2%	0.0%	+4.2%	+8.8%	+13.7%	+8.0%
Embryos/ova		-3.0%	-3.0%	0.0%	-0.8%	-1.5%	-2.2%	-1.4%	+3.1%	+3.1%	0.0%	+0.8%	+1.5%	+2.3%	+1.4%

Category	Elasticity	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)
		Price							**Volume**						
Bovine semen	-0.9	$5.00	$5.11	$5.02	$5.04	$5.07	$5.09	$5.06	1,515,926	1,486,525	1,510,489	1,505,093	1,497,076	1,491,780	1,499,738
Ovine and caprine semen	-0.9	$20.00	$20.11	$27.81	$25.89	$23.96	$22.04	$24.27	12,097	12,037	8,991	9,589	10,281	11,084	10,163
Cervine semen	-0.9	$40.00	$40.11	$47.81	$45.89	$43.96	$42.04	$44.27	1,578	1,574	1,344	1,394	1,449	1,509	1,440
Embryos/ova	-1.3	$250.00	$250.11	$257.84	$255.90	$253.97	$252.04	$254.29	1,261	1,260	1,211	1,223	1,235	1,247	1,233
		Change in price relative to the status quo							**Change in volume relative to the status quo**						
Bovine semen		0.0%	+2.2%	+0.4%	+0.8%	+1.4%	+1.8%	+1.2%	0.0%	-1.9%	-0.4%	-0.7%	-1.2%	-1.6%	-1.1%
Ovine and caprine semen		0.0%	+0.6%	+39.1%	+29.5%	+19.8%	+10.2%	+21.4%	0.0%	-0.5%	-25.7%	-20.7%	-15.0%	-8.4%	-16.0%
Cervine semen		0.0%	+0.3%	+19.5%	+14.7%	+9.9%	+5.1%	+10.7%	0.0%	-0.2%	-14.8%	-11.6%	-8.1%	-4.4%	-8.7%
Embryos/ova		0.0%	+0.0%	+3.1%	+2.4%	+1.6%	+0.8%	+1.7%	0.0%	-0.1%	-3.9%	-3.0%	-2.0%	-1.1%	-2.2%
		Change in price relative to Option (2) (no deficit, no cross-subsidisation)							**Change in quantity relative to Option (2) (no deficit, no cross-subsidisation)**						
Bovine semen		-0.4%	+1.8%	0.0%	+0.4%	+1.0%	+1.4%	+0.8%	+0.4%	-1.6%	0.0%	-0.4%	-0.9%	-1.2%	-0.7%
Ovine and caprine semen		-28.1%	-27.7%	0.0%	-6.9%	-13.8%	-20.7%	-12.7%	+34.5%	+33.9%	0.0%	+6.7%	+14.4%	+23.3%	+13.0%
Cervine semen		-16.3%	-16.1%	0.0%	-4.0%	-8.1%	-12.1%	-7.4%	+17.4%	+17.1%	0.0%	+3.8%	+7.8%	+12.3%	+7.2%
Embryos/ova		-3.0%	-3.0%	0.0%	-0.8%	-1.5%	-2.2%	-1.4%	+4.1%	+4.0%	0.0%	+1.0%	+2.0%	+3.0%	+1.8%

Figure 21: Medium- to long-term impact on net revenue, consumer surplus, industry profit, wealth transfers and deadweight loss

Category	Elasticity	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)
		Revenue net of unit charges							**Consumer surplus**						
Bovine semen	-1.0	$7,489,000	$7,327,000	$7,459,000	$7,429,000	$7,385,000	$7,356,000	$7,400,000	$10,500,000	$10,335,000	$10,470,000	$10,440,000	$10,395,000	$10,365,000	$10,410,000
Ovine and caprine semen	-1.0	$241,000	$240,000	$173,000	$186,000	$201,000	$219,000	$199,000	$335,000	$334,000	$255,000	$273,000	$291,000	$312,000	$288,000
Cervine semen	-1.0	$63,000	$63,000	$53,000	$55,000	$57,000	$60,000	$57,000	$87,000	$87,000	$76,000	$79,000	$81,000	$84,000	$81,000
Embryos/ova	-1.0	$315,000	$315,000	$306,000	$308,000	$310,000	$313,000	$310,000	$437,000	$436,000	$427,000	$429,000	$432,000	$434,000	$431,000
Total		$8,108,000	$7,945,000	$7,990,000	$7,978,000	$7,954,000	$7,947,000	$7,965,000	$11,360,000	$11,193,000	$11,229,000	$11,221,000	$11,200,000	$11,195,000	$11,211,000
		Change in net revenue relative to the status quo							**Change in consumer surplus relative to the status quo**						
Bovine semen		0.0%	-2.2%	-0.4%	-0.8%	-1.4%	-1.8%	-1.2%	0.0%	-1.6%	-0.3%	-0.6%	-1.0%	-1.3%	-0.9%
Ovine and caprine semen		0.0%	-0.5%	-28.1%	-22.8%	-16.5%	-9.3%	-17.6%	0.0%	-0.4%	-23.8%	-18.6%	-13.0%	-7.0%	-14.0%
Cervine semen		0.0%	-0.3%	-16.4%	-12.8%	-9.0%	-4.9%	-9.7%	0.0%	-0.2%	-12.9%	-9.9%	-6.8%	-3.6%	-7.3%
Embryos/ova		0.0%	0.0%	-3.0%	-2.3%	-1.6%	-0.8%	-1.7%	0.0%	0.0%	-2.2%	-1.7%	-1.1%	-0.6%	-1.2%
Total		0.0%	-2.0%	-1.4%	-1.6%	-1.9%	-2.0%	-1.8%	0.0%	-1.5%	-1.2%	-1.2%	-1.4%	-1.4%	-1.3%
		Change in net revenue charges relative to Option (2) (no deficit, no cross-subsidisation)							**Change in consumer surplus relative to Option (2) (no deficit, no cross-subsidisation)**						
Bovine semen		+0.4%	-1.8%	0.0%	-0.4%	-1.0%	-1.4%	-0.8%	+0.3%	-1.3%	0.0%	-0.3%	-0.7%	-1.0%	-0.6%
Ovine and caprine semen		+39.1%	+38.3%	0.0%	+7.4%	+16.1%	+26.2%	+14.6%	+31.2%	+30.7%	0.0%	+6.8%	+14.1%	+22.0%	+12.9%
Cervine semen		+19.5%	+19.2%	0.0%	+4.2%	+8.8%	+13.7%	+8.0%	+14.8%	+14.5%	0.0%	+3.4%	+7.0%	+10.7%	+6.4%
Embryos/ova		+3.1%	+3.1%	0.0%	+0.8%	+1.5%	+2.3%	+1.4%	+2.3%	+2.2%	0.0%	+0.6%	+1.1%	+1.7%	+1.0%
Total		+1.5%	-0.6%	0.0%	-0.2%	-0.5%	-0.5%	-0.3%	+1.2%	-0.3%	0.0%	-0.1%	-0.3%	-0.3%	-0.2%

Category	Elasticity	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)
		Revenue net of unit charges							**Consumer surplus**						
Bovine semen	-0.9	$7,489,000	$7,343,000	$7,462,000	$7,435,000	$7,396,000	$7,369,000	$7,409,000	$11,271,000	$11,106,000	$11,241,000	$11,210,000	$11,165,000	$11,135,000	$11,180,000
Ovine and caprine semen	-0.9	$241,000	$240,000	$179,000	$191,000	$205,000	$221,000	$203,000	$360,000	$358,000	$279,000	$296,000	$316,000	$336,000	$312,000
Cervine semen	-0.9	$63,000	$63,000	$54,000	$56,000	$58,000	$60,000	$58,000	$94,000	$94,000	$82,000	$85,000	$88,000	$91,000	$87,000
Embryos/ova	-1.3	$315,000	$315,000	$303,000	$306,000	$309,000	$312,000	$308,000	$357,000	$357,000	$348,000	$350,000	$352,000	$355,000	$352,000
Total		$8,108,000	$7,961,000	$7,997,000	$7,988,000	$7,967,000	$7,962,000	$7,977,000	$12,082,000	$11,915,000	$11,949,000	$11,942,000	$11,921,000	$11,917,000	$11,932,000
		Change in net revenue relative to the status quo							**Change in consumer surplus relative to the status quo**						
Bovine semen		0.0%	-1.9%	-0.4%	-0.7%	-1.2%	-1.6%	-1.1%	0.0%	-1.5%	-0.3%	-0.5%	-0.9%	-1.2%	-0.8%
Ovine and caprine semen		0.0%	-0.5%	-25.7%	-20.7%	-15.0%	-8.4%	-16.0%	0.0%	-0.4%	-22.5%	-17.6%	-12.3%	-6.6%	-13.1%
Cervine semen		0.0%	-0.2%	-14.8%	-11.6%	-8.1%	-4.4%	-8.7%	0.0%	-0.2%	-12.1%	-9.3%	-6.4%	-3.4%	-6.9%
Embryos/ova		0.0%	-0.1%	-3.9%	-3.0%	-2.0%	-1.1%	-2.2%	0.0%	0.0%	-2.7%	-2.0%	-1.4%	-0.7%	-1.5%
Total		0.0%	-1.8%	-1.4%	-1.5%	-1.7%	-1.8%	-1.6%	0.0%	-1.4%	-1.1%	-1.2%	-1.3%	-1.4%	-1.2%
		Change in net revenue charges relative to Option (2) (no deficit, no cross-subsidisation)							**Change in consumer surplus relative to Option (2) (no deficit, no cross-subsidisation)**						
Bovine semen		+0.4%	-1.6%	0.0%	-0.4%	-0.9%	-1.2%	-0.7%	+0.3%	-1.2%	0.0%	-0.3%	-0.7%	-0.9%	-0.5%
Ovine and caprine semen		+34.5%	+33.9%	0.0%	+6.7%	+14.4%	+23.3%	+13.0%	+29.1%	+28.6%	0.0%	+6.4%	+13.3%	+20.6%	+12.1%
Cervine semen		+17.4%	+17.1%	0.0%	+3.8%	+7.8%	+12.3%	+7.2%	+13.8%	+13.6%	0.0%	+3.2%	+6.5%	+10.0%	+6.0%
Embryos/ova		+4.1%	+4.0%	0.0%	+1.0%	+2.0%	+3.0%	+1.8%	+2.8%	+2.7%	0.0%	+0.7%	+1.4%	+2.0%	+1.2%

Total	+1.4%	-0.5%	0.0%	-0.1%	-0.4%	-0.4%	-0.3%	+1.1%	-0.3%	0.0%	-0.1%	-0.2%	-0.3%	-0.1%

Figure 21 continued

Category	Elasticity	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)
		Total surplus							**Industry profit**						
Bovine semen	-1.0	$11,249,000	$11,068,000	$11,216,000	$11,183,000	$11,133,000	$11,101,000	$11,150,000	$749,000	$733,000	$746,000	$743,000	$739,000	$736,000	$740,000
Ovine and caprine semen	-1.0	$359,000	$358,000	$273,000	$291,000	$312,000	$334,000	$308,000	$24,000	$24,000	$17,000	$19,000	$20,000	$22,000	$20,000
Cervine semen	-1.0	$94,000	$94,000	$81,000	$84,000	$87,000	$90,000	$87,000	$6,000	$6,000	$5,000	$5,000	$6,000	$6,000	$6,000
Embryos/ova	-1.0	$468,000	$468,000	$457,000	$460,000	$463,000	$465,000	$462,000	$32,000	$31,000	$31,000	$31,000	$31,000	$31,000	$31,000
Total		$12,170,000	$11,987,000	$12,028,000	$12,018,000	$11,995,000	$11,990,000	$12,007,000	$811,000	$794,000	$799,000	$798,000	$795,000	$795,000	$797,000
		Change in total surplus relative to the status quo							**Subsidy – wealth transfer part**						
Bovine semen		0.0%	-1.6%	-0.3%	-0.6%	-1.0%	-1.3%	-0.9%	+$30,000	-$133,000	$0	-$30,000	-$75,000	-$104,000	-$60,000
Ovine and caprine semen		0.0%	-0.4%	-24.1%	-18.9%	-13.3%	-7.2%	-14.2%	+$94,000	+$93,000	$0	+$18,000	+$39,000	+$63,000	+$35,000
Cervine semen		0.0%	-0.2%	-13.1%	-10.1%	-7.0%	-3.7%	-7.5%	+$12,000	+$12,000	$0	+$3,000	+$6,000	+$9,000	+$5,000
Embryos/ova		0.0%	0.0%	-2.3%	-1.7%	-1.2%	-0.6%	-1.3%	+$10,000	+$10,000	$0	+$2,000	+$5,000	+$7,000	+$4,000
Total		0.0%	-1.5%	-1.2%	-1.2%	-1.4%	-1.5%	-1.3%	+$147,000	-$19,000	$0	-$7,000	-$26,000	-$25,000	-$15,000
		Change in total surplus relative to Option (2) (no deficit, no cross-subsidisation)							**Subsidy – deadweight loss part**						
Bovine semen		+0.3%	-1.3%	0.0%	-0.3%	-0.7%	-1.0%	-0.6%	$61	$1,191	$0	$60	$371	$724	$238
Ovine and caprine semen		+31.7%	+31.2%	0.0%	+6.8%	+14.2%	+22.3%	+13.0%	$14,732	$14,218	$0	$635	$2,827	$7,085	$2,350
Cervine semen		+15.1%	+14.9%	0.0%	+3.4%	+7.1%	+10.9%	+6.5%	$1,067	$1,034	$0	$54	$229	$546	$192
Embryos/ova		+2.3%	+2.3%	0.0%	+0.6%	+1.1%	+1.7%	+1.0%	$82	$80	$0	$5	$20	$45	$17
Total		+1.2%	-0.3%	0.0%	-0.1%	-0.3%	-0.3%	-0.2%	$15,942	$16,522	$0	$753	$3,447	$8,399	$2,796

Category	Elasticity	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)	Status quo	Option (1)	Option (2)	Option (3a)	Option (3b)	Option (3c)	Option (3d)
		Total surplus							**Industry profit**						
Bovine semen	-0.9	$12,020,000	$11,840,000	$11,987,000	$11,954,000	$11,905,000	$11,872,000	$11,921,000	$749,000	$736,000	$746,000	$744,000	$741,000	$738,000	$742,000
Ovine and caprine semen	-0.9	$384,000	$382,000	$297,000	$316,000	$336,000	$358,000	$333,000	$24,000	$24,000	$19,000	$20,000	$21,000	$22,000	$21,000
Cervine semen	-0.9	$100,000	$100,000	$88,000	$91,000	$94,000	$97,000	$93,000	$6,000	$6,000	$5,000	$6,000	$6,000	$6,000	$6,000
Embryos/ova	-1.3	$389,000	$389,000	$378,000	$381,000	$383,000	$386,000	$383,000	$43,000	$43,000	$43,000	$43,000	$43,000	$43,000	$43,000
Total		$12,893,000	$12,711,000	$12,749,000	$12,741,000	$12,718,000	$12,713,000	$12,730,000	$823,000	$810,000	$813,000	$812,000	$810,000	$810,000	$811,000
		Change in total surplus relative to the status quo							**Subsidy – wealth transfer part**						
Bovine semen		0.0%	-1.5%	-0.3%	-0.5%	-1.0%	-1.2%	-0.8%	+$30,000	-$133,000	$0	-$30,000	-$75,000	-$104,000	-$60,000
Ovine and caprine semen		0.0%	-0.4%	-22.7%	-17.8%	-12.4%	-6.7%	-13.3%	+$94,000	+$93,000	$0	+$18,000	+$39,000	+$63,000	+$35,000
Cervine semen		0.0%	-0.2%	-12.3%	-9.4%	-6.5%	-3.4%	-7.0%	+$12,000	+$12,000	$0	+$3,000	+$6,000	+$9,000	+$5,000
Embryos/ova		0.0%	0.0%	-2.8%	-2.1%	-1.4%	-0.7%	-1.6%	+$10,000	+$10,000	$0	+$2,000	+$5,000	+$7,000	+$4,000
Total		0.0%	-1.4%	-1.1%	-1.2%	-1.4%	-1.4%	-1.3%	+$147,000	-$19,000	$0	-$7,000	-$26,000	-$25,000	-$15,000
		Change in total surplus relative to Option (2) (no deficit, no cross-subsidisation)							**Subsidy – deadweight loss part**						
Bovine semen		+0.3%	-1.2%	0.0%	-0.3%	-0.7%	-1.0%	-0.5%	$54	$1,072	$0	$54	$334	$652	$214
Ovine and caprine semen		+29.4%	+28.9%	0.0%	+6.4%	+13.3%	+20.8%	+12.2%	$13,389	$12,927	$0	$587	$2,601	$6,482	$2,164
Cervine semen		+14.0%	+13.8%	0.0%	+3.2%	+6.6%	+10.1%	+6.0%	$965	$935	$0	$49	$208	$495	$175

Embryos/ova	+2.9%	+2.8%	0.0%	+0.7%	+1.4%	+2.1%	+1.3%	$197	$191	$0	$12	$47	$106	$39
Total	+1.1%	-0.3%	0.0%	-0.1%	-0.2%	-0.3%	-0.2%	$14,606	$15,126	$0	$702	$3,191	$7,736	$2,592

APPENDIX 7: METHOD FOR ESTIMATING THE MARKET-LEVEL IMPACT

The impacts at the market-level are estimated using demand and supply. The costs of supply include the costs of MPI's charges.

There are three inefficiencies considered in this CRIS:

(A) That MPI provides inefficient levels and quality of services, or at unreasonably high costs.

(B) The inefficiency from charges not being high enough to cover the reasonable costs of MPI's services. This inefficiency results in businesses being under-charged, and greater volumes of exports than is efficient. The deficit must then be recovered either from general taxation or reductions in other government services or from higher-than-efficient charges on businesses in the future.

(C) That MPI, through cross-subsidisation, overcharges some businesses and undercharges others. This results in lower volumes of exports than is efficient by those businesses overcharged, and higher volumes of exports than is efficient by those businesses undercharged. These inefficiencies do not offset each other, but add together.

The demand and supply method can estimate each of these inefficiencies, as well as the changes in export volumes and the transfers of wealth from some businesses/customers to others through cross-subsidisation.

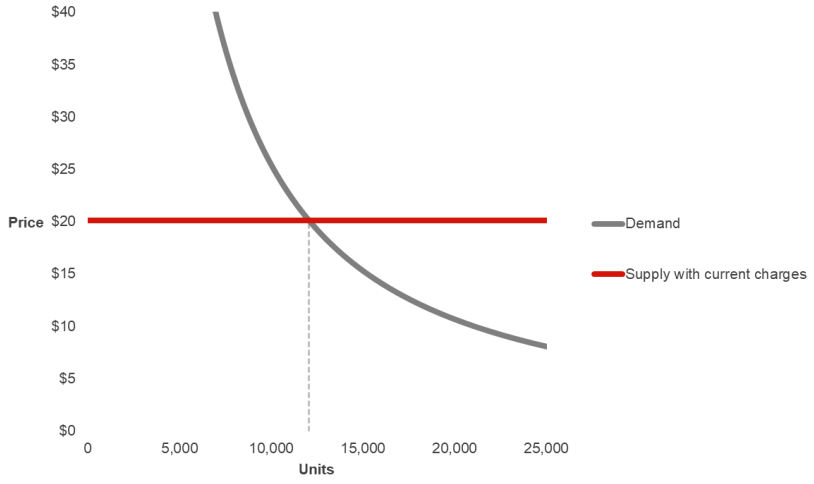
The assessment of this CRIS is that MPI has met the Transparency, Justifiability and Efficiency principles, such that any inefficiency in (A) is negligible.

This leaves inefficiencies (B and (C).

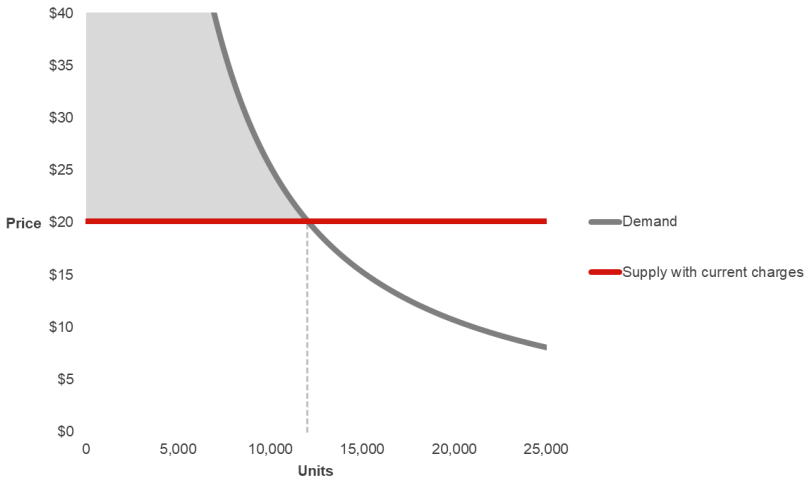
(B) Charges are lower than the reasonable costs of providing the service

The method, with illustrations, is set out below:

Overseas customers demand New Zealand exports, which New Zealand is able to meet at a price including MPI's current charges.

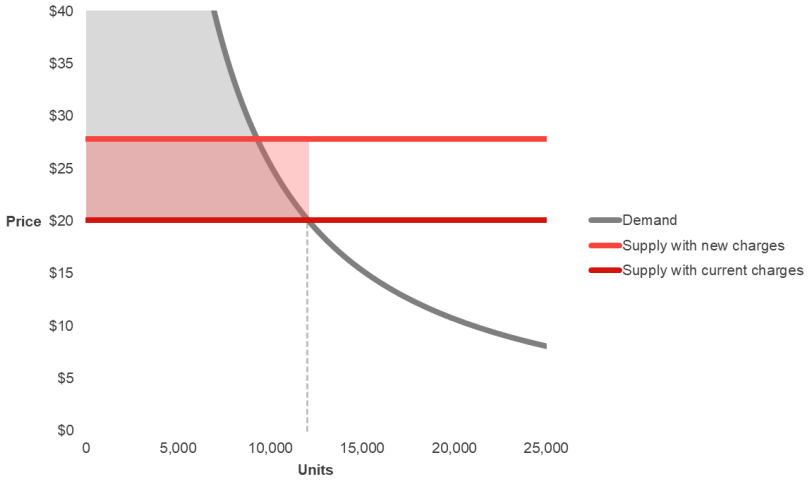


Overseas customers pay a price of $20, but are willing to pay up to the level in the demand curve. The difference is the net value to overseas customer (‘consumer surplus’)

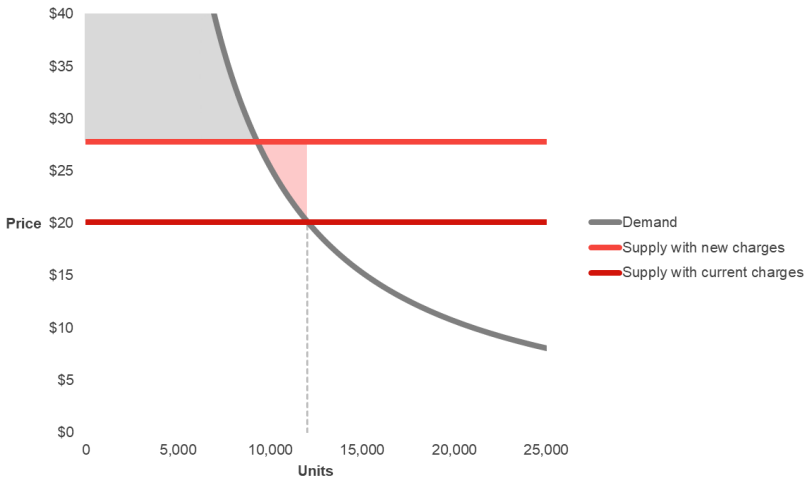


To recover reasonable costs, charges would need to increase to increase. This would increase supply costs to $27.

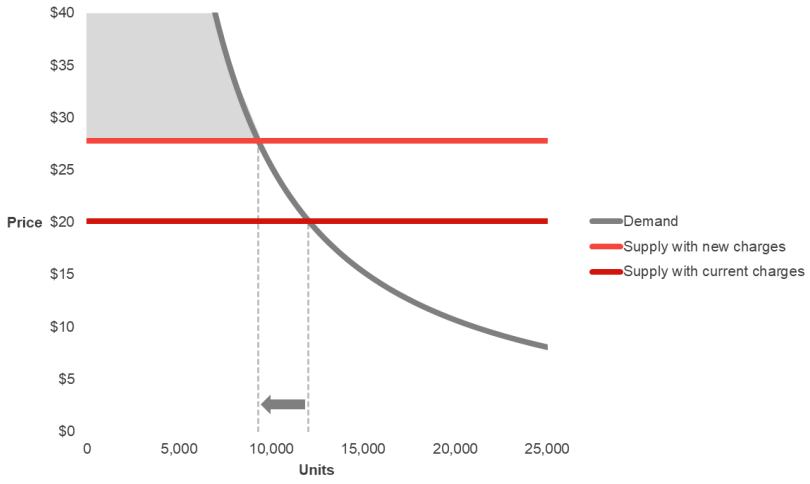
At the volumes currently exported and the current charges, there is a subsidy being the difference between the two supply curves. The total subsidy is shaded red.



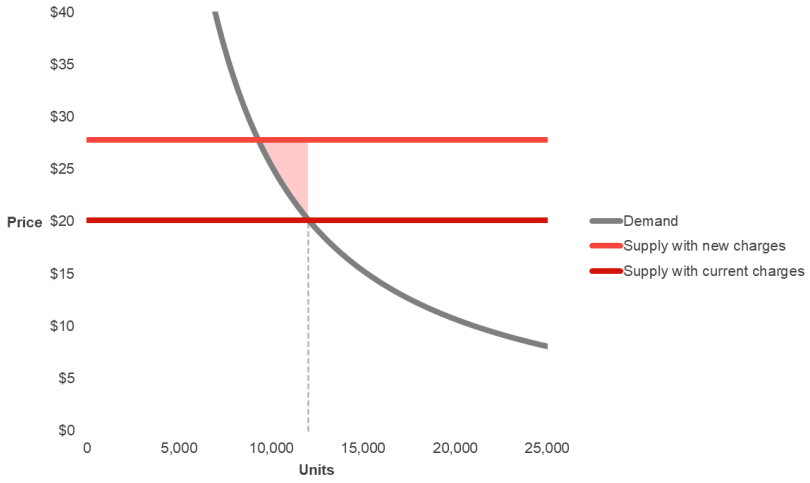
Removing the areas where benefits to customers and the subsidy overlap (cancel each other out), leaves the grey area minus the area in red as the total net benefit (‘total surplus’)



If charges were increased, demand would reduce and the total surplus would be just the grey area. The red area is eliminated.



The red area is, therefore, the economic efficiency of having charges lower than needed to cover reasonable costs.



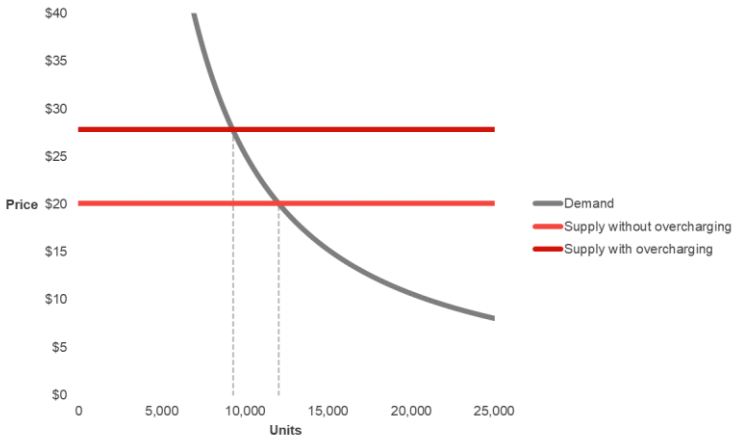
(C) Cross-subsidisation

Estimating the inefficiency from businesses charged less than their reasonable costs is methodically the same as for (B) by replacing the label ‘Supply with current charges’ with ‘Supply with undercharging’.

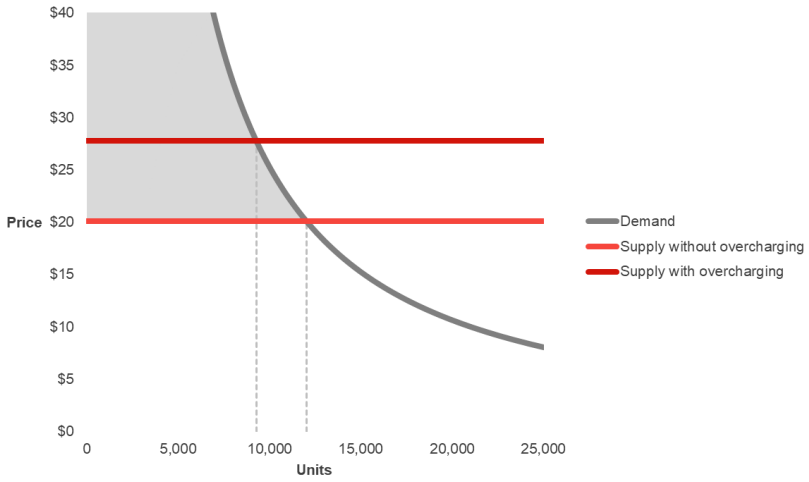
The method, with illustrations, for estimating the inefficiency of overcharging businesses is set out below:

Overseas customers demand New Zealand exports illustrated by the demand curve.

Business are able to meet more of that demand if the costs of supply don’t involve being overcharged for MPI services.



When businesses are not overcharged, demand is higher and the consumer surplus is the area in grey.

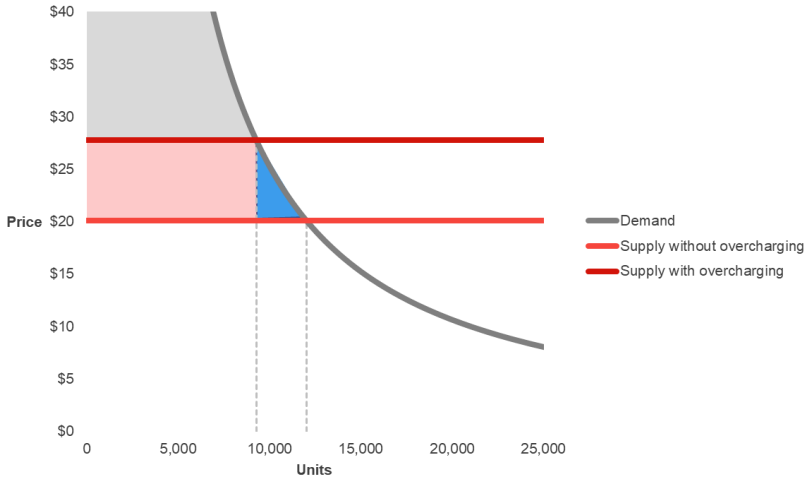


Demand is reduced when businesses are overcharged. The businesses pay the overcharge on every unit at this new demand (for a total overcharge of the area in red).

Consumer surplus (in grey) is reduced.

The extra revenue in red is transferred to other businesses – cross-subsidise other businesses.

The inefficiency is the reduction in consumer surplus (blue).



APPENDIX 8: ELASTICITY OF DEMAND ESTIMATES

The elasticities of demand were estimated by:

- taking the export values in Figure 1 and dividing by the volumes in Figure 2 to get export prices per unit
- finding the median volumes in Figure 2 for each category and standardising them.
- standardising the export prices by setting each category's export price that corresponds with the median volume to 1.
- plotting a line of best fit using a constant elasticity of demand function $P = AQ^{\frac{1}{\varepsilon}}$ where P is price (export prices), Q is quantity (export volumes), ε is the elasticity of demand, and A is a coefficient.

Figure 23 shows these plots.

The bovine and cervine plots generate exponent values of about 1.1 which, when inverted, gives elasticity figures of about 0.9.

The ovine and caprine plot generates an exponent value of about 0.3 which implies an elasticity of about 3.5. However, if the plot point furthest to the left is an outlier, this germplasm category also returns an elasticity of about 0.9.

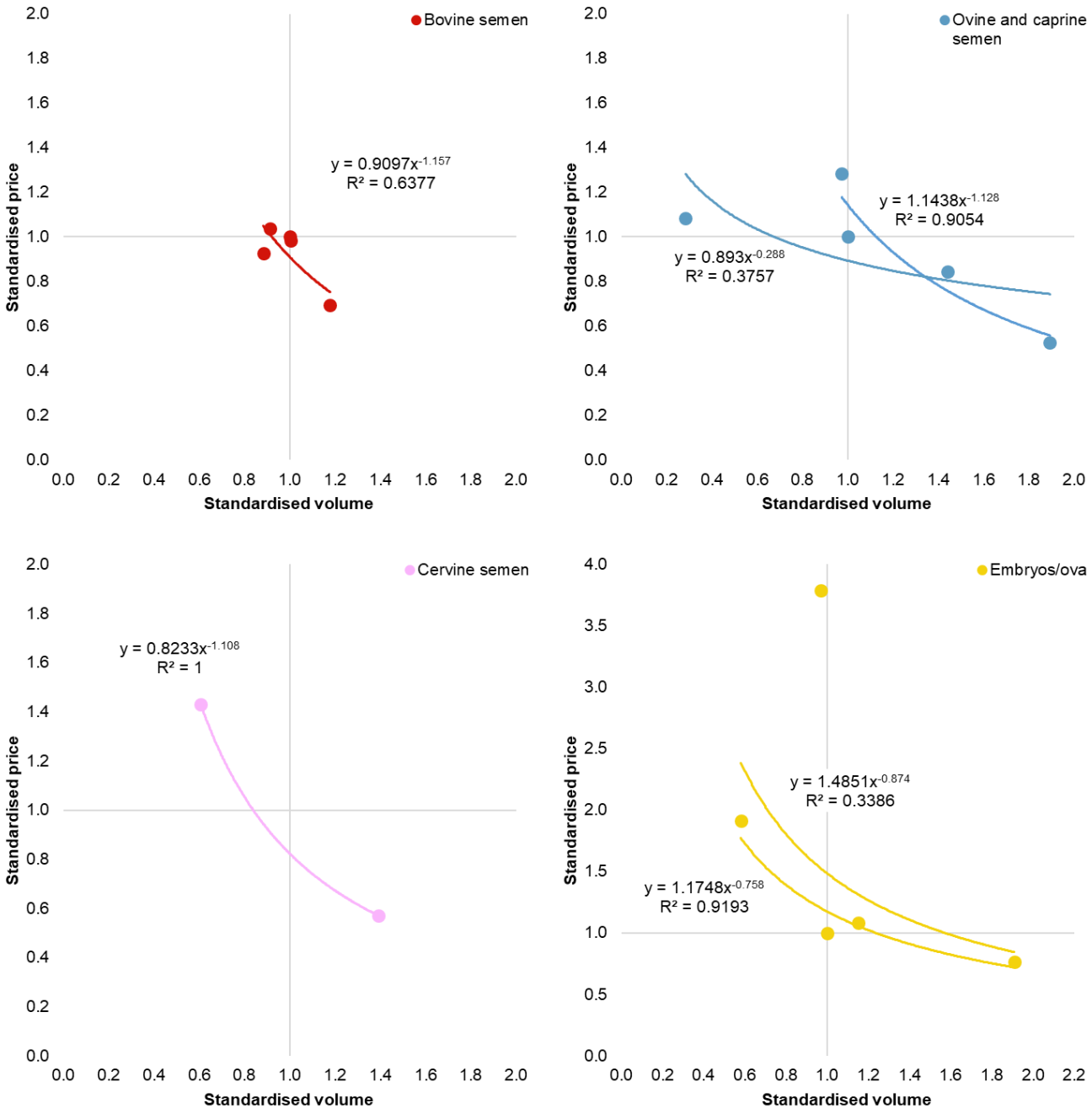
The embryo/ova plot generates an exponent value of about 0.9 which implies an elasticity of about 1.1. However, if the highest plot point is an outlier, the exponent is about 0.8 and elasticity 1.3.

Figure 22 collects the results an identifies the elasticities used in Appendix 6.

Figure 22: Crude elasticity of demand estimates

Category	Exponent		Elasticity		
	All points	Outlier removed	All points	Outlier removed	Elasticity used in Appendix 6
Bovine semen	-1.157		0.9		0.9
Ovine and caprine semen	-0.288	-1.128	3.5	0.9	0.9
Cervine semen	-1.108		0.9		0.9
Embryos/ova	-0.874	-0.758	1.1	1.3	1.3

Figure 23: Crude elasticity of demand estimates



APPENDIX 8: DETAILED ANALYSIS OF SUBMISSIONS

In 2019

Bovine semen exporters

Two large exporters of bovine semen supported the option that completely eliminated the cross-subsidisation. This option which would result in the smallest increase in charges for them, although they would still bear the majority of the overall increase in costs for livestock germplasm. The other options would (to varying degrees) continue to involve bovine semen subsidising other germplasm types, which in their view would be inconsistent with MPI's cost recovery principles of equity, efficiency, justifiability and transparency.

One of these two pointed out that other germplasm types that would be subsidised under other options generate little export revenue. Although bovine semen generates considerably more revenue, they submitted that their ability to bear higher cost increases to subsidise other germplasm types under

other options is limited, given high levels of competition and price-sensitivity in the international bovine semen market.

Other germplasm exporters

Two submissions were received from smaller livestock genetic specialists whose operations mainly involved germplasm types other than bovine semen. These submissions were supported by three similar exporters and (in general terms) by one of the two large bovine semen exporters discussed above.

These submissions were that the current approach employed by MPI to maintain market access for non-bovine semen categories is inefficient. The submissions provided detailed suggestions on how costs can be reduced to a level that they deemed more workable (around $2 per unit for semen and $5 per unit for embryos). Higher rates than these would make many export consignments unprofitable. They were also keen to enter into a dialogue with MPI more generally about how costs can be contained, which MPI will do at regular stakeholder meetings.

One other small exporter expressed support for an option that only partially addressed cross-subsidisation, but the only reason provided was that it would result in the smallest increase for them.

In 2021

Bovine semen exporters

One bovine semen exporter supported the option that eliminated the cross subsidisation as it fully addressed both problems are resulted in the smallest (though still negative) impact on them. The exporter noted the importance of MPI keeping costs low as they said that Covid had increased freight costs and reduced profit margins.

A second bovine semen exporter supported the same option and also emphasized the importance of keeping costs low due to international competition. This exporter noted that if smaller exporters of other germplasm stopped exporting, that this would risk them not operating at all and impact on the larger producers (who the smaller ones also supply). This exporter suggested the government could subsidise exporters because of the value to the world beyond just the export price (e.g. genetic gains).

Other germplasm exporters

One exporter of other germplasm preferred the option that did not address cross-subsidisation. Their second preference was the option that eliminated 25% of the cross-subsidisation. They said other options would result in little or no product being exported and worried about having to write-off the effort they'd made in establishing export opportunities. They also said the China would, for goat semen, shift to importing live animals and noted the animal welfare risks of that.

MPI response

Export volumes

Many of the options, including MPI's preferred option at consultation, result in large increases in rates for all non-bovine semen exporters. MPI and the submitters agree that this will result reductions in exports including significant reductions in at least some situations. One exporter said it would mean essentially the cessation of exports for them. The exporter did not say whether they consider that to be typical for other non-bovine exporters.

Our analysis estimates that, if exporters were to pass through costs to overseas customers, export prices would rise by about 39% for ovine and caprine semen, 20% for cervine semen, 2% for embryos/ova, and less than 1% for bovine semen.

Exports of non-bovine germplasm are unlikely to cease completely. Figure 24:

- sets out the average value of exports by category for each of the five years to 2018/19
- finds the weighted-average of those values

- adds the increase in unit charges to find a new weighted-average
- counts the number of years between 2014/15 and 2018/19 where the actual average value for that year exceeded the new weighted-average.

Figure 24: Average export values, count method

Category	2014/15	2015/16	2016/17	2017/18	2018/19	Average	Average plus increase in charges	No. of years where higher
Bovine semen	$4.58	$5.11	$3.43	$4.85	$4.94	$4.58	$4.60	3
Ovine and caprine semen	$24.97	$23.07	$19.44	$29.61	$12.13	$21.84	$29.65	0
Cervine semen				$63.56	$25.37	$44.46	$52.27	1
Embryos/ ova	$177.85	$616.76	$980.90	$164.56	$315.03	$451.02	$458.86	2

One of two years for cervine semen has seen the average export value higher than the overall average with the new charges. Two out of five years have seen embryos/ova with higher export values than the overall average with the new charges.

The most at-risk category is ovine and caprine semen where the average export value plus new charges would result in an average export value that is higher than seen in any of the five years (just higher than in 2017/18). This is the same category singled out in the one non-bovine exporter submission.

Another approach to exploring the same issue is to use an assumption that prices have a normal distribution. Figure 25:

- notes the weighted averages and new weighted averages from Figure 24
- calculates the standard deviations of the five annual values between 2014/15 and 2018/19
- uses the weighted average and standard deviation to work out how frequently we would expect to see export values greater than the new weighted averages if not for the increases in unit charges.

Figure 25: Average export values, normal distribution method

Category	Average price	Standard deviation	% of years where price is higher than average	Average price plus increase in charges	Percent of years where price is higher than the new average
Bovine semen	$4.58	$0.67	50%	$4.60	49%
Ovine and caprine semen	$21.84	$6.55	50%	$29.65	12%
Cervine semen	$44.46	$27.00	50%	$52.27	39%
Embryos/ova	$451.02	$347.64	50%	$458.86	49%

Again, ovine and caprine semen is the most at-risk category with expectations that, over a longer time period, we'd only expect prices to have previously been as high as they will on average be after the unit charge increases 12% of the time (one in eight years) rather than 50% of the time.

As set out in the CRIS, there are many limits with this analysis including a short time series and not controlling for other factors affecting prices and volumes. Overall, we consider it highly unlikely that

exports of non-bovine semen will cease completely (or nearly completely), but there will be some big impacts.

The CRIS estimates the volume reductions at 28% for ovine and caprine semen, 16% for cervine semen, 2% for embryos/ova, and less than 1% for bovine semen. These estimates are very crude and uncertain. Because of this, MPI will monitor volume changes in case the volume impact turns out to be much worse and the Government wishes to revisit any decision it makes (unit charges will be reviewed again soon to consider how to allocate and recover costs post 2018/29). It is also worthwhile monitoring the impacts in order to understand how well our rough modelling performs and to improve on the method or description of how reliable its estimates are.

Provided MPI's costs are Justifiable and Efficient, the reduction in export volumes is because those exports are not commercially viable when all costs (including MPI costs) are taken into account.

Impact on larger producers

Submitters are likely correct that loss of export income will result in fewer domestic producers of non-bovine germplasm and that this could impact on the supply of that germplasm for domestic production through higher prices and less ready supply.

There is no efficiency argument, however, for the public to ensure this supply through general taxation. If large producers were keen to see supply continue, they could have submitted in favour of continued cross-subsidisation. Other mitigating actions will include bringing some of that production in-house within large bovine exporters (as some do at the moment).

Impact on genetic gains

Just as there's no efficiency argument for the public to support domestic producers, there is no efficiency argument to support the enrichment of world genetic stock. The beneficiaries of this are overseas producers and consumers and, if they demand NZ genetic stock highly enough, will continue to pay for it.

Animal welfare impacts

Some countries shifting some demand from germplasm to live animals is plausible, but animal welfare issues (within New Zealand's jurisdiction) are regulated already. The potential impacts here are noted, but likely to be negligible. As the submissions note, there is international competition in germplasm and it would seem that the vast amount of lost trade with New Zealand is made up by importing germplasm from other countries rather than from live animals.

Covid-19

The consultation document noted that germplasm volumes were not significantly different from recent years. This partially covers the revenue side of exporters.

One submitter said that Covid disruptions mean that freight costs are higher. We have not verified this for the germplasm industry in particular, but disruption and higher freight costs has been reported generally in the news. It is highly likely that profit margins are temporarily lower due to higher freight costs and, possibly, lower prices due to recessions overseas.

Agriculture remains, however, one of the least affected industries. Additionally, the Government's preference for dealing with impacts on business has been to support banks to support businesses and to provide other central supports.

Nevertheless, the concerns raised by industry here are ones of fairness. The CRIS has been updated to discuss these Equity issues.

Cost savings

MPI's view is that improvements can be made to the Transparency and Justifiability of charges, but on balance that MPI has met these principles. Consultation in 2019 resulted in industry offering suggestions to lower costs. These turned out not to generate the cost savings industry anticipated.

Nevertheless, because there's a further opportunity to review unit charges during the consideration of costs post-2018/19, MPI will work with small livestock germplasm exporters on ways to reduce costs. If successful, MPI will consider partially waiving the new unit charge rates to reflect the lower costs incurred.