He Pou a Rangi
Climate Change Commission

Advice on Agricultural Assistance

Technical Annex II: Methods of Financial Assistance

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1 Purpose of this technical annex

This document sets out further information on the assessment by He Pou a Rangi Climate Change Commission (the Commission) of the methods of financial assistance outlined in the *Terms of Reference*.

2 How financial assistance can support agricultural emissions pricing

The Government's *Terms of Reference* for this advice set out a range of methods for how financial assistance could be provided to the participants of a future pricing system for agriculture emissions. These methods each seek to use financial assistance to support agricultural emissions pricing using one of three general approaches:

- pricing all agricultural emissions at a low or discounted price
- pricing all agricultural emissions at a higher price accompanied by a rebate
- pricing only a portion of agricultural emissions at a higher price.

For the purpose of this analysis when all of a participant's agricultural emissions are subject to a price, we refer to this as 'fully exposed'. When only a portion of a participant's agricultural emissions are subject to a price, this is referred to as 'partially exposed'. Table 1 summarises our understanding of the methods of financial assistance provided directly to farmers, under a pricing system at the farm level.

The *Terms of Reference* also noted that, under a system that introduced pricing at the processor level, financial assistance could be provided either directly to processors or directly to farmers. Methods of assistance if emissions were priced at the processor level were not further scoped by the *Terms of Reference*. This report considered the two options assessed by the Interim Committee on Climate Change (ICCC) for providing assistance under such a system when it provided advice on agricultural emissions in 2019.[1] These are output based and proportional based methods.

Under these processor options, agricultural emissions would be calculated for meat, milk and fertiliser processors. This would be based on the quantity of product received from farms or the quantity of fertiliser sold to farms. Processors would be required to pay a price for these emissions and would be expected to pass this price onto their suppliers.

[1] Interim Climate Change Committee, "Action on Agricultural Emissions: Evidence, Analysis and Recommendations."

Table 1: Methods of financial assistance at the farm level

Type	Method	Description
Price all emissions	***Fully exposed, low price***	Participants pay a price for each tonne of emissions they produce. The price would be set at a lower level compared to, for instance, the price of NZUs, to reduce the risk of material financial hardship on participants.
Price all emissions accompanied by a rebate	***Historic baseline***	Participants pay a price for each tonne of emissions they produce. Participants receive a fixed rebate based on a portion of their emissions in a fixed year.
	Rolling average	Participants pay a price for each tonne of emissions they produce. Participants receive a rebate based on a portion of their emissions averaged over a recent period. This is similar to the *Historic baseline* method, but the rebate amount would shift over time.
	Carrying capacity	Participants pay a price for each tonne of emissions they produce. Participants receive a rebate based on a portion of their emissions based on a calculation of the carrying capacity of the land. This requires an assessment of the carrying capacity of each farm within the system based on the size, terrain and other characteristics. Carrying capacity – as opposed to calculating a rebate solely on land area – is necessary to avoid the perverse incentives that would favour extensive farms over intensive farms in the absence of a qualifier based on land characteristics.
	Output based	Participants pay a price for each tonne of emissions they produce. Participants receive a rebate based on a calculation using an emissions factor per unit of product of their product type. This requires creating national emissions factors per unit of each product type.
	Land and revenue hybrid	Participants pay a price for each tonne of emissions they produce. Participants receive a rebate based on a portion of their emissions unique to that farm based on their emissions per unit of area relative to all other participants. The discount rate could be varied by further factors, such as revenue-based emissions efficiency. This requires both an assessment of the farm area and an assessment of emissions factors for revenue.
Price only a proportion of emissions	***Proportional discount***	Participants pay a price for only a proportion of the emissions they produce. This proportion would be set by Government.
	Good management practices	Participants pay a price for only a proportion of the emissions they produce. This proportion would be determined based on their calculated emissions and what their emissions would have been otherwise, if a prescribed set of desirable actions were taken, without reducing production. This requires an understanding of each farming system and the actions that result in mitigation that are available to the participant within that system. This would allow the price per tonne of emissions to be higher than in the *Fully exposed, low price* method, to influence participants behaviour more effectively and incentivise reductions, while reducing the risk of material financial hardship on participants.
	Target baseline	Participants pay a price for only a proportion of the nitrous oxide emissions they produce, which are subject to the target of net zero long-lived gases under section 5Q of Climate Change Response Act 2002 (the Act). This proportion would be determined by setting a pathway to achieve the long-lived gases target and any nitrous oxide emissions over that pathway would incur a price.

3 Considerations for assessing the methods

The Terms of Reference asked the Commission to assess how the methods of financial assistance affect the following matters:

- creat[ing] effective incentives for and achieves emissions reductions that contribute to meeting New Zealand's emissions budgets and targets in the Act
- the practicality of implementation for farmers and growers, and the regulator
- any social and distributional impacts on farmers and rural communities
- the impacts on Māori interests, particularly where these might be disproportionate
- the risk of emissions leakage.

These considerations are highly aligned with the factors specified under section 5M of the Act that the Commission must consider when providing any advice to government. We consider the considerations to encompass and frame the section 5M considerations as relevant to assessing the methods of financial assistance.

The Commission assessed each method against these considerations using a form of multi-criteria analysis. A score of '+' indicated the method was not aligned with meeting the consideration while a score of '++++' indicated the method was highly aligned with meeting the consideration. This means that, for instance, a score of '++++' under social and distributional impacts indicates there is low social and distributional impacts (not high impact). The relative scoring compared to the other methods was considered more significant than the absolute score. Our understanding of each of the criteria is set out in the following sections.

3.1 Creates effective incentives and achieves emissions reductions that contribute to meeting New Zealand's emissions budgets and targets in the Act

We advised in the main report that the objective of agricultural emissions pricing policy should be to encourage and support, alongside other policies, reductions in gross emissions of both biogenic methane and long-lived gases from agriculture, in line with meeting Aotearoa New Zealand's statutory targets for emissions reductions.

There are a range of options for farmers to mitigate their emissions, with different costs. To be effective in changing practices on farm, incentives require a marginal cost of emissions that is sufficiently high that it makes economic sense to take these mitigation actions rather than just paying the emissions price without changing practices. Some financial assistance methods maintain the price signal to reduce emissions while others can dilute the incentive to make reductions, decreasing the overall effectiveness of the policy.

3.2 The practicality of implementation for farmers and growers, and the regulator

Incentives to reduce agricultural emissions will only be effective if the system can be implemented practically. Practicality depends on a range of factors:

- the complexity of the scheme, including the types of information required and the granularity of that data
- availability of the data needed to calculate obligations and assistance, including consistency over time and the ease that data can be verified by regulators

- the number of participants covered
- the level of administration costs.

The methods of financial assistance require different information to calculate the assistance to be received, as set out in Table 2. The availability, accuracy and reliability of these information sources will have a significant impact on the practicality of implementation for farmers and the regulator.

Table 2: Assistance methods by information required

Information required	Assistance methodology	Availability
Historical emissions	Historical baseline	No
Current or ongoing emissions	Proportional discount Full exposure, low price Rolling average	Not yet, but will be in the future
Current output	Output based	Yes
Land characteristics (topography, soil, climate)	Carrying capacity	No, but could be available with investment
Use of specific stock and land management practices	Good management practices Target baseline	No, but could be available with investment
Hybrids (output, revenue, topography, soil, climate, etc)	Land and revenue hybrid	Varies

The practicality of a method also considers the administrative cost of the system (separate from the price paid for agricultural emissions). As with any regulatory tool, there will be an administrative cost to implementing, administering and auditing the assistance system. Depending on the methodology, there will be different information requirements for farmers and the regulator to calculate the assistance they would be eligible to receive. If the assistance system requires extensive or complicated data entry or other complex new compliance activities, this may undermine the effectiveness of any financial assistance provided. Similarly, there will be costs on the regulator to administer and audit the system, which may differ significantly depending on the system's design. Where cost estimates are available, we have also considered these in assessing each method.

3.3 Any social and distributional impacts on farmers and local communities

Pricing agricultural emissions has the potential to create material financial hardship for some farmers as they pay for emissions that they are unable to reduce. Depending on the extent of this financial hardship, the policy may have social impacts broader than the participant within the scheme. Commonly raised examples include:

- farmers reducing spending on the businesses that service livestock farming
- reduced ability to service debt, and lower land-values reducing the ability of farmers to raise capital for improvements, or support retirement
- reduced employment, resulting in reduced incomes across the community while raising stress and mental health issues in farm operations and rural businesses.

If these impacts lead to land-use change (that is, livestock farms being converted completely to pine forestry), the effects may especially impact smaller communities:

> *These concerns arise particularly where climate change policies could result in land-use change from livestock farming, particularly sheep and beef farms, to scrub and forestry. Forestry offers lower average employment than the average sheep and beef farm per hectare, and new employment tends to be concentrated in places where forest contractors are located, which may not coincide with the location of new forest plantings. Also, the nature of work involved in each sector means that employment is not necessarily substitutable between agriculture and forestry.*[2]

Depending on its design, a pricing system may impact parts of the agriculture sector differently, and the impact may differ between different types of farms in the same sector. A key finding from the ICCC is that wholesale and rapid pace of change drives negative social impacts whereas a more measured rate of change better enables communities to absorb the cost of the transition. In assessing this element, we have considered the impact on profitability of the sector and the rate of the transition.

It should also be noted that Māori collectively-owned land used in agricultural production is predominantly sheep and beef. This means that the distributional impacts on sub-sectors – sheep and beef versus dairy – is also relevant to the next consideration.

3.4 The impacts on Māori interests, particularly where these might be disproportionate

Iwi/Māori are heavily involved in primary industries in Aotearoa. Māori collectively-owned land is defined here as any land that falls within the Māori Land Spatial Dataset created by the Ministry of Justice and Ministry for Primary Industries on behalf of the Māori Land Court. Note this does not cover all land that may be owned or managed by people or groups that identify as Iwi/Māori.

Māori collectively-owned land is estimated to comprise about 1.4 million hectares in Aotearoa with about $24 billion in primary sector assets. This includes 40% of the country's forestry, 30% of its lamb production, 30% of its sheep and beef production, 10% of its dairy production and 10% of kiwifruit production.

These assets are significant, but Iwi/Māori face challenges and limitations to developing much of these assets as a result of historic grievances.

Iwi/Māori have been returned less productive land

All land in Aotearoa has been classified by Manaaki Whenua Landcare Research based on its capability to sustain continuous production (See Box 1). This information can be combined with that in the Māori Land Spatial Dataset to understand the capacity of Māori collectively-owned land, including in comparison to other land.

[2] Interim Climate Change Committee, "Action on Agricultural Emissions: Technical Appendix 6: Distributional Impacts of Agricultural Climate Change Policy," 1.

Box 1: Land use capability in Aotearoa

Manaaki Whenua Landcare Research, a Crown Research Institute, maintains the Land Use Capability (LUC) dataset. LUC classifies land from 1 to 8 based on its capability to sustain continuous production. Class '1' is the most productive land while '8' is the least productive.

1 Land with virtually no limitations for arable use and suitable for cultivated crops, pasture or forestry
2 Land with slight limitations for arable use and suitable for cultivated crops, pasture or forestry
3 Land with moderate limitations for arable use, but suitable for cultivated crops, pasture or forestry
4 Land with moderate limitations for arable use, but suitable for occasional cropping, pasture or forestry
5 High producing land unsuitable for arable use, but only slight limitations for pastoral or forestry use
6 Non-arable land with moderate limitations for use under perennial vegetation such as pasture or forest
7 Non-arable land with severe limitations to use under perennial vegetation such as pasture or forest
8 Land with very severe to extreme limitations or hazards that make it unsuitable for cropping, pasture or forestry

Te Tiriti o Waitangi/The Treaty of Waitangi settlements have left many Iwi/Māori with steeper, less versatile land. Nearly 60% of all Māori collectively-owned land is considered marginal land. Figure 1 sets out Commission research showing Māori collectively-owned land by Land Use Capability, using the Manaaki Whenua Landcare dataset. It shows that 42% of Māori collectively-owned land is in classes 7 and 8, which are defined as "Non-arable land with severe limitations to use under perennial vegetation such as pasture or forest" and "Land with very severe to extreme limitations or hazards that make it unsuitable for cropping, pasture or forestry", respectively. Only 9% of Māori collectively-owned land falls within the most productive classes 1-3.

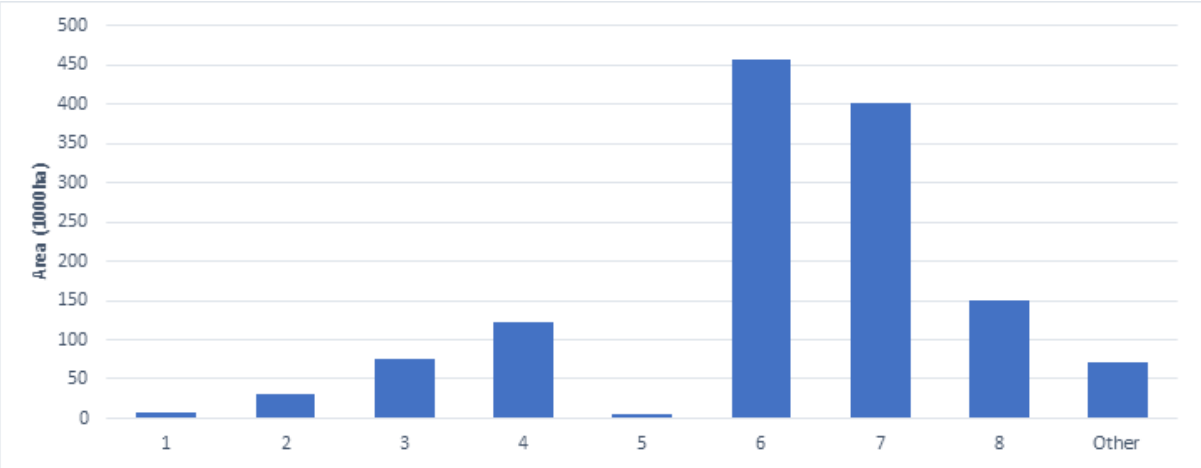

Figure 1: Māori collectively-owned land – Land Use Capability distribution

This distribution of Māori collectively-owned land across the LUC classes differs significantly from the distribution of other land. It is twice as likely for non- Māori collectively-owned land to be in the highly productive classes while classes 7-8 on Māori collectively-owned land are almost double that of other land. Māori collectively-owned land is therefore over-represented in the highly marginal

land classes and under-represented in the highly productive land classes as demonstrated in Figure 2.

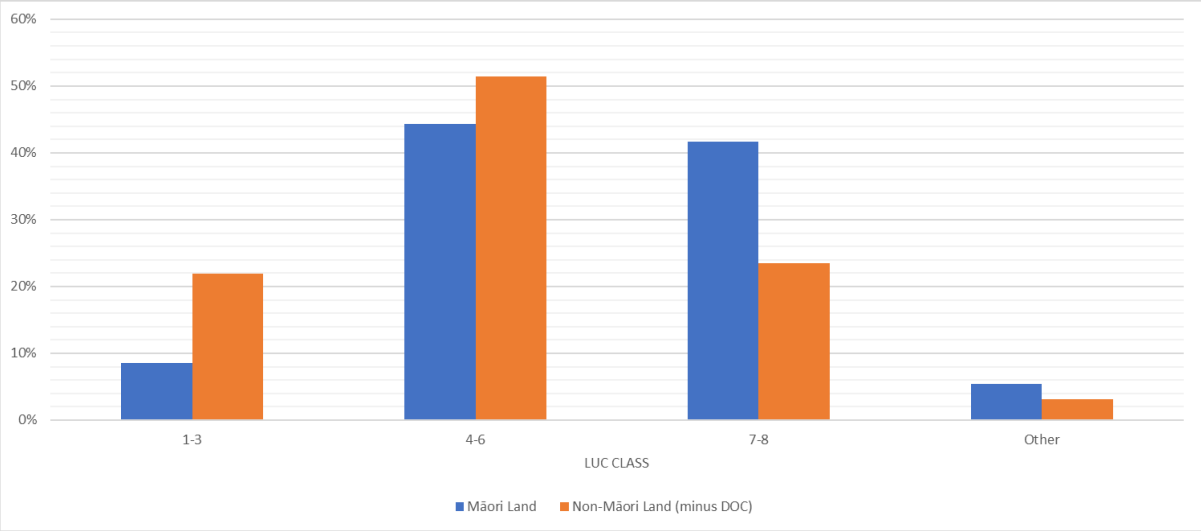

Figure 2: Māori collectively-owned land – LUC distribution compared to other land

Iwi/Māori have been returned highly fragmented land

Māori collectively-owned land is also disproportionately small and fragmented, as set out in Figure 3. This is a direct consequence of the historical grievances. Commission research indicates that 39.5% of Māori collectively-owned land blocks are less than one hectare in size, and a further 29.3% are between one to ten hectares in size. This severely limits the economies of scale necessary to invest and develop such land to its full potential. Compounding this dynamic, some Māori collectively-owned land is also, in effect, land-locked with no public access to it. This limits the ability of Māori governance entities to develop this land.[3]

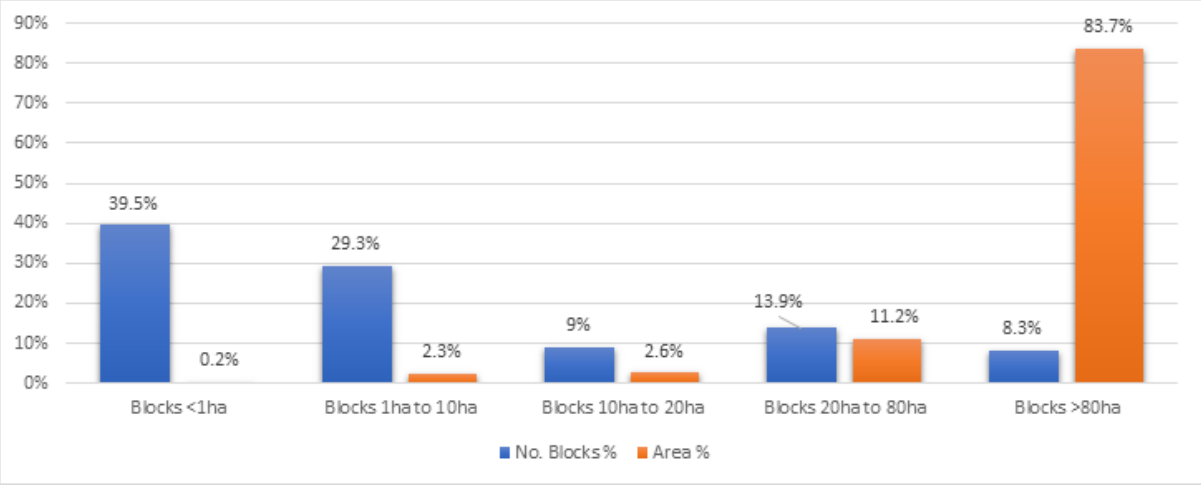

Figure 3: Māori collectively-owned land – Distribution of area and number of blocks

[3] New Zealand Government, Te Ture Whenua Māori Act 1993. A statutory definition of 'landlocked land' is provided within section 326A of Te Ture Whenua Māori Act 1993. The land must be Māori freehold land or general land owned by Māori with 'no reasonable access to it'.

Māori governance structures are complex

Governance arrangements for Māori collectively-owned land are often complex, including because of the legislative instruments that create the governance entities enabling collective ownership, such as those established under Te Ture Whenua Māori Act (1993).[4,5]. It can have an ownership base ranging in number from one to more than 10,000 people. The total number of owners recorded for Māori collectively-owned land is approximately 3.8 million. This significantly exceeds the total Māori population in Aotearoa (approximately 875,000), indicating frequent ownership in multiple blocks, a high proportion of deceased and untraceable Māori owners, and likely errors or inconsistencies in the data. This creates significant challenges to developing Māori collectively-owned land.

Due to these factors, Māori collectively-owned land is frequently underutilised. The Ministry for Business, Innovation and Employment estimates that one third of Māori land has potential for development or increased utility. As the Commission noted in the key principles for a low-emissions transition strategy in *Ināia tonu nei*: *a low emissions future for Aotearoa*,[6] the path Aotearoa takes should aim to reduce or even reverse inequities on different groups of society, not compound historic grievances with Iwi/Māori.

Many Iwi/Māori have reduced the intensity of their production in line with a te ao Māori view. As *Ināia Tonu Nei* noted, "when agricultural emissions are priced, [assistance] should be provided in a way that does not disadvantage operators who were already managing resources in alignment with their kaitiaki values."[7] This has implications for assessing the impact of methods of assistance on Iwi/Māori. For instance, if assistance to participants were based on historic emissions, the relatively underdeveloped state of Māori collectively-owned land would mean a lower level of assistance would be provided to Māori, and potentially would create barriers to further developing land.

It should also be noted that there are significant challenges in assessing the impact of each methodology of assistance on Māori interests. For instance, the modelling undertaken by He Waka Eke Noa is based on a selection of land typology models. This included Iwi/Māori farms, but it is not possible to disaggregate Iwi/Māori farms from this modelling.

3.5 The risk of emissions leakage

The risk of emissions leakage from a pricing system for agricultural emissions is discussed in more detail in *Technical Annex I: Risk of Emissions Leakage*. As that annex notes, emissions leakage occurs if efforts to reduce emissions in one location cause an increase in emissions elsewhere. Emissions leakage risk is created by the uneven implementation of climate policies around the world.

The design of the system to price emissions from agriculture, including the method for providing assistance to farmers, could impact on the risk of emissions leakage. For instance, some methods of assistance are more likely to incentivise farmers to reduce output as a means of reducing emissions. Others are more likely to incentivise farmers to maintain output through more emissions-efficient approaches. There may also be different impacts and incentives for different parts of the agricultural sector, for instance between dairy and beef or livestock and horticulture.

In assessing methodologies for assistance, we have considered the impact on output as an indicator for the risk of emissions leakage.

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4 Coffin, "Barriers to the Development of Maori Freehold Land."
5 BERL, "Te Ōhanga Māori: The Māori Economy 2018."
6 He Pou a Rangi The Climate Change Commission, "Ināia tonu nei: a low emissions future for Aotearoa."
7 He Pou a Rangi The Climate Change Commission, 159.

4 Assessing the methods of assistance

Table 3: Assessment of methods of assistance

Methods of assistance for pricing at the farm-level					
Method	Achieves emissions reductions	Practicality to implement	Social and distributional impacts	Impact on Māori collectively-owned land	Risks of emissions leakage
Indicator	Emissions reduction by 2030	Availability of information Cost to implement	Minimises risk of widespread material financial hardship	Equity impacts to Māori collectively-owned land	Minimising production impacts on the sector
Fully exposed, low price	+	++++	++++	++++	++++
	While a low price manages the total cost impact on farmers, there is a low marginal cost on each additional tonne of emissions produced. This creates a weak incentive to reduce emissions.	This method would be simple to implement for both farmers and regulators as, in effect, calculating emissions would be all that would be required under this method of assistance. It could be achieved in step with farm level pricing.	The low price is likely to mean a low impact on profitability. This is likely to be slightly greater for sheep and beef than dairy due to current profit margins. Land use change impacts would come from the price under the NZ ETS, external to farm level pricing, and this method would do little to address that.	There is unlikely to be impacts on Māori collectively-owned land disproportionate to other land. While Māori collectively-owned land is disproportionately underdeveloped, the low marginal price on emissions would not create a material barrier to developing such land.	The low price is likely to mean a low impact on production and therefore minimal risk of emissions leakage.
Historical baseline	++++	+	+	+	+++
	This method retains full incentives to reduce emissions from the historical baseline. It would incentivise all mitigation options (improving efficiency, reduced production and changed land use).	This method requires the regulator to choose the baseline year and determine or audit baseline emissions for each farm. Historic emission numbers do not yet exist but could be achieved by 2025. This method would be practical for farmers as, once set, the rebate level would be simple to understand.	This method would maintain a full marginal price on emissions while reducing overall cost to farmers. This reduces the risk of material financial hardship to farmers. There are generally less mitigation options available for sheep and beef farmers so this sector may have a larger impact on profitability. This method may disadvantage early movers if they don't benefit from action taken to reduce their emissions prior to the baseline.	Māori collectively-owned land is disproportionately underdeveloped due to historic and legislated conditions. This method disadvantages underdeveloped land if the baseline year is prior to any recent development.	Reduced production is one mitigation option incentivised by this method. This could create a risk of emissions leakage.

Rolling average	++	++++	+++	+	+++
	This method is a variation on historical baseline, except the baseline – in effect – would adjust over time. Since the emissions calculated on farm would contribute to both the price paid for emissions and an input into calculating the rebate received, the inventive to reduce emissions is diluted.	This method requires a record of annual emissions on farm to determine the rebate. These numbers do not yet exist but may be available for all farms by 2025.	The rolling average approach may reduce the impact of year-to-year fluctuations in emissions that is inevitable due to varied weather conditions.	Māori collectively-owned land is disproportionately underdeveloped due to historic and legislated conditions. This method is a modification of the historical baseline and therefore has a similarly disproportionate impact on Māori.	Reduced production is one mitigation option incentivised by this method. This could create a risk of emissions leakage.
Carrying capacity	++++	++	++	+++	++
	This method creates strong financial incentives to improve emissions efficiency within the capacity of each farm. Across the sector, this would incentivise farms to change production in line with their assessed carrying capacity: - Farmers operating *above* carrying capacity would be incentivised to reduce their intensity. - Farmers operating *below* their carrying capacity would be incentivised to increase their intensity. This could incentivise increased emissions on some farms.	This method requires the regulator to create an accurate national map that determines carrying capacity for each farm. It is unlikely that this will be possible to create by 2025. Once in place, such a map would need to be updated periodically to reflect land use change.	This method favours more extensive farms relative to intensive farms. More intensive farms operating above a defined carrying capacity would have a greater proportion of their emissions exposed to a price.	Māori collectively-owned land is disproportionately underdeveloped due to historic and legislated conditions. It is also disproportionately fragmented and smaller in area. This method advantages more extensive farms and less intensive farms. Under this method, the equity impact on Māori collectively-owned land will depend significantly on the farm. It may incentivise development of underdeveloped land.	Given that this method incentivises farms to move toward their carrying capacity, modelling indicates limited reduction in production overall. Some farms may increase production while others reduce. The risk of leakage from this method is therefore likely to be low.

Output based	+++	+++	++	+++	+++
	This method creates strong financial incentives to reduce emissions while maintaining production. This method rewards livestock systems that are most emissions efficient per unit of product and provides a strong incentive for farms to improve emissions efficiency. This could incentivise increased emissions on some farms if they are able to increase production in an efficient manner.	Basing financial assistance on output would be relatively straight forward to calculate. The information is likely to be very accessible to participants and able to be verified by the regulator.	Output-based assistance compares the output efficiency between 'like' farming systems. This would enable the Government to limit the distributional impact between agricultural sectors. Not all farms have final output. An effective system would require pass-through of this rebate through the supply chain or have the emissions price apply to farms with output.	This method creates an incentive to improve emissions efficiency. It therefore would be unlikely to inhibit development of underdeveloped land, which is disproportionately Māori collectively-owned land.	Given that this method creates incentives to reduce emissions while maintaining production, the risk of leakage from this method is likely to be low.
Land and revenue hybrid	++++	++	++	++++	++
	This method combines elements of the incentives from the carrying capacity method with an adjustment based on revenue. It would create strong incentive to reduce intensity relative to farms of the same type.	This hybrid requires an assessment of an emissions factor unique to each farm based on their emissions per unit of area relative to all other participants. It is unlikely that this will be possible to create by 2025. This would require complex administrative and compliance processes to audit and monitor land and output factors.	This method uses characteristics of different farming systems and different characteristics of individual farms within those systems to calculate the level of financial assistance. It would therefore have similar impacts as the output and carrying capacity methods.	Māori collectively-owned land is disproportionately of lower Land Use Capability classes. This method would take that into consideration when assessing the level of financial assistance and would, therefore, be responsive to this characteristic of Māori collectively-owned land.	This method creates a strong incentive to reduce intensity relative to farms of the same type, rather than to reduce production. The risk of emissions leakage is expected to be low.
Proportional discount	+	++++	++++	++++	++++
	This method provides only weak incentives for farmers to reduce emissions either through reducing emissions intensity or through reducing production. The amount of financial assistance received would increase as emissions	This method would be relatively straight forward to implement as it only requires information on the farmer's emissions to determine the amount of financial assistance.	Assumptions on both the level of the emissions price and the level of the discount are required to assess the impact on profitability.	This method is unlikely to disproportionately impact Māori. It does not penalise underdeveloped land as the proportional discount would be consistent as a percentage across farm types.	Any reduction in production would be limited to the portion of emissions exposed to the price. As the level of the discount is anticipated to be high, risk of emissions leakage is expected to be low.

	increase and decrease as emissions decreased.			As historically underdeveloped land is developed, the price would increase at a consistent rate as emissions increased.	
Good management practices	++	+	++++	++	++++
	This method would provide incentives to apply specific good management practices to reduce emissions. It would create little or no incentive to reduce emissions below the baseline established for the practices.	This method requires detailed and accurate emissions factors for each mitigation covered and assessment of the mitigations available on each farm. These would need to be regularly assessed and audited, creating a substantial on-going administrative activity. Complementary regulatory schemes under the Resource Management Act may be able to address some of these limitations.	This method would differentiate between agricultural sectors, and it would also differentiate between individual farms within those sectors. This approach is likely to minimise social and distributional impacts where farmers are doing the best they can.	This method favours farms that are well developed and use the full range of good management practices. This is likely to impose higher costs of underdeveloped farms, where it will be more challenging to apply the good management practices.	This method focuses on good management practices, which are likely to improve emissions efficiency on farm. It is therefore unlikely to lead to reduced production.
Target baseline	++	+	++++	++	++++
	This method applies to emissions of nitrous oxide only. The incentives it creates, apply primarily to that gas and have little or no direct impact on emissions of biogenic methane. (Reduced fertiliser use could contribute to reduced feed, and therefore reduce biogenic methane but this would be indirect and would not affect the rebate.) This method would create little or no incentive to reduce nitrous oxide emissions below the target baseline.	This method requires the regulator to set a pathway to achieve the long-lived gases target and determine how this applies to each farm. The pathway would likely need to be adjusted over time as it is unlikely that, in practice, reduction in nitrous oxide emissions will match the pathway without deviation. Given that nitrous oxide is covered by the 2050 target for long-lived gases, and therefore also the emissions budgets, this method would need a complicated mechanism to align the pathway with the budgets.	Most nitrogen used in Aotearoa is applied to dairy as well as cropping farms. This method would likely have a lower impact on the profitability of sheep and beef farms than on dairy farms. This method is therefore unlikely to exacerbate the pressure for conversion to forestry that is driven by the NZ ETS price.	The impact on Māori will depend on how the pathway and baselines are set. If set in relation to average fertiliser use, then underdeveloped farms – which are disproportionately Māori collectively-owned land – may not be disadvantaged. If set for each farm based on an estimate of historic nitrous oxide emissions, then it could disadvantage underdeveloped farms. It would be possible to set baseline in a way that would not penalise underdeveloped land.	Whether this method creates a risk of emissions leakage will depend on the pathway and baselines. However, it is unlikely to create a risk of emissions leakage on its own given that it would have little or no direct impact on emissions of biogenic methane, which is more closely linked to production.

Methods of assistance for pricing at the processor-level					
Indicator	Emissions reduction by 2030	Availability of information Cost to implement	Minimises risk of widespread material financial hardship	Equity impacts to Māori collectively-owned land	Minimising production impacts on the sector
Assistance to processors (output based or proportional)	**+**	**++++**	**++ - ++++** (depending on approach)	**+++**	**+++**
	Under this method, processors are expected to pass the cost onto farmers through a reduced pay out for product or an increased cost of fertiliser. Financial assistance provided to processors would dilute the incentive passed onto farmers to reduce their emissions. All farmers would face the same cost per unit of product irrespective of their individual farm's emissions. They could reduce this cost only by reduced output or land use change. They would have no incentive individually to reduce emissions intensity on-farm if this does not change their total production	This method would involve significantly fewer participants than methods that provide financial assistance to farmers, significantly reducing the complexity of the system.	The social and distributional impact of this method will depend on the approach chosen and the extent to which the price is passed on to farmers. It is likely to be consistent with the scores given under the corresponding farm level pricing method of financial assistance (output based or proportional).	This method is unlikely to disproportionately impact Māori. All farmers would face the same cost per unit of product irrespective of their individual farm's emissions. Underdeveloped farms, which are likely to be less emissions efficient than the average farm, would benefit from this approach compared to the most efficient farms.	Reduced production by farmers is the main mitigation option incentivised by this method. This could create a risk of emissions leakage.
Assistance to farmers (output based or proportional)	**++**	**++**	**++ - ++++** (depending on approach)	**+++**	**++++**
	Under this method, processors are expected to pass the cost onto farmers through a reduced pay out for product or an increased cost of fertiliser. Depending on how it is designed, financial assistance to farmers could more effectively maintain a marginal price signal to farmers than the above option and incentivise farmers to improve emissions efficiency.	While pricing would involve all processors, this method would require all farmers to also be involved in the system. This creates the same difficulties seen under pricing systems at the farm level.	The social and distributional impact of this method will depend on the approach chosen but are likely to be consistent with the scores given under the corresponding farm level pricing method of financial assistance (output based or proportional).	This method is unlikely to disproportionately impact Māori. All farmers would face the same cost per unit of product irrespective of their individual farm's emissions. Underdeveloped farms, which are likely to be less emissions efficient than the average farm, would benefit from this approach compared to the most efficient farms.	Depending on how this is designed, it is likely that farmers would have additional choices to reduce emissions than reduced production. This, combined with weak incentives to reduce emissions, means the risk of emissions leakage is expected to be low.

5 Judgements on methods of financial assistance

In drawing conclusions from these assessments, we gave more weight to the ability to be effective (create clear long-term incentives that support investments and changes to deliver emissions reductions in line with meeting statutory targets) and practical (able to start pricing emissions from 1 January 2025 in a way that encourages active participation and enforcement to drive emissions reductions)

5.1 Financial assistance if pricing at the farm level

Of the methods of financial assistance, the **fully exposed, low price** and **proportional discount** options would be practical to implement but would not retain the full marginal price incentive for emissions reductions required to reach desired outcomes. In reducing the total cost impact on participants these methods would reduce the marginal incentive for emissions reduction by lowering the effective price on emissions. With a low marginal price on emissions, this method is unlikely to incentivise on-farm behaviour change. A "low" price in this instance is used to refer to an emissions price that would not create widespread material financial hardship that leads to abrupt and disruptive change, and is also unlikely to help Aotearoa New Zealand achieve its targets.

The **rolling average** method adjusts financial assistance to farmers based on average emissions over a period of time. As this is based on a farmer's recent emissions, if a farmer reduces emissions their financial assistance will also reduce, but over a number of years. While this approach will smooth out the pricing impact, by keeping the rebate calculation based on recent historical emissions the incentive to reduce emissions is diluted.

Providing financial assistance using the **historical baseline** method would provide the full marginal price incentive for farmers to reduce emissions. However, this method would unfairly disadvantage farmers who face barriers to developing their land due to land tenure constraints, e.g., whenua Māori. This option also rewards farmers with high recent emissions and may penalise farmers who have already made improvements and reduced their emissions.

We also have concerns about the practicality of implementing a historical baseline method. The historic emissions for each farm would have to be estimated in a consistent way. Alternatively, if the baseline was set using a future year's emissions this might encourage farmers to increase emissions in order to receive more financial assistance, increasing total gross emissions in the short term.

There are significant practicality challenges with implementing both the **target baseline** and **good management practice** options at a farm level. The target baseline as defined in the terms of reference is only for nitrous oxide emissions, and so would provide no incentive to reduce biogenic methane. The good management practice method would require detailed and accurate emissions factors for each action that reduces emissions. We understand that this is challenging given the state of current research. It would also require an assessment of the available actions that could reduce emissions on each farm. These would need to be regularly assessed and audited, creating a substantial on-going administrative burden.

We consider that both these methods would be impractical to implement in time for emissions pricing to start in 2025 without major investment.

In addition, for these two methods we understand that emissions below the baseline would not be priced. This would provide no incentive for farmers who could undertake further actions to reduce their emissions below the baseline.

Output-based assistance would provide financial assistance proportional to the output (for example, milk or finished stock) of each farm. If farmers can reduce emissions while maintaining production their financial assistance would not reduce. This would maintain the full marginal price incentive to improve emissions intensity of agricultural production. If farmers chose to reduce their emissions by producing less, this would reduce their financial assistance. Therefore, the incentives for reducing emissions via reduced output are lower.

This also means that output-based financial assistance would provide stronger incentives to retain production and protect against the risk of emissions leakage. In addition, because financial assistance is based on current output, this would not disadvantage those landowners, including Iwi/Māori, who choose to further develop their land.

The incentive to reduce absolute emissions is greatest for farms with the highest emissions intensity, and lowest for those with the lowest emissions intensity. The ICCC found that output-based financial assistance would provide incentives for some lower intensity farmers to increase their output but the degree to which this occurs will depend on other factors relevant to their ability to expand production, including freshwater regulations.

There is an implementation challenge related to providing financial assistance to those farms which do not have a final output of finished stock or milk. The ICCC identified this issue and ways in which this could be addressed. These include using a proxy for output, based on animal numbers. Estimation of animal numbers is expected to be a component of any farm level emissions pricing system.

The **carrying capacity** option (also referred to as the land based option) would base financial assistance to farmers on the area and quality of land they farm. This would benefit those farms with lower stocking rates and lower emissions per hectare. This method would retain the full incentive for farmers to reduce emissions by improving the emissions intensity of their farms and through reducing output.

There are implementation challenges with this method being ready for pricing to start in 2025 as a measure of the carrying capacity of each farm would need to be created. It would take some time to develop this as it would likely need to incorporate a range of factors to fairly represent the carrying capacity of each farm. However, there may be other benefits from a national map of carrying capacity, which should be considered in deciding whether to pursue this option.

If the Government wants to pursue developing the **carrying capacity** option this should not delay a pricing scheme for agricultural emissions being put in place by 1 January 2025.

The **land and revenue hybrid** method would use both a farm's emissions per unit of land and a measure of emissions efficiency per unit of revenue to calculate the financial assistance to each farmer. We understand this method builds upon the land and output method of assistance that was recommended by the ICCC. While this method would retain the full marginal price incentive for emissions reductions, a concern is that using revenue as a proxy for output would be subject to greater fluctuation. This may mean that financial assistance to farmers would vary year to year due to changes in prices for agricultural outputs.

5.2 Financial assistance if pricing at the processor level

If pricing were introduced at the processor level, financial assistance could be provided to processors. This would involve significantly fewer participants than if pricing were implemented at a farm level. Therefore, financial assistance to processors is likely be significantly more practical to implement than assistance to farmers. When it considered a processor-levy pricing system, the ICCC

considered two approaches to providing financial assistance to processors: a proportional-based method and an output-based method. These would operate in a similar manner to the equivalent farm level methods discussed above.

The ICCC found that both methods resulted "in identical incentives and cost impacts."[8] This is because at the processor level both emissions and financial assistance are calculated based on output (emissions per kilograms of milk solids or kilograms of meat).

Where output based and proportional-based methods differ is where it is possible for processors to prove if their suppliers (or the suppliers themselves if financial assistance is provided to farmers) are undertaking actions to reduce emission on farm which would reduce their emissions below the national average. Under an output based method, processors may then be able to claim a reduction in emissions while retaining their financial assistance.

Another option would be to price emissions at the processor level but provide the assistance directly to farmers based on their output. This option could provide greater incentives for emissions reductions than proportional discount. However, implementing this would face the same difficulties as a farm level pricing system, require involving all processors and all farms within the system, that are avoided by pricing at the processor level.

[8] Interim Climate Change Committee, "Action on Agricultural Emissions: Evidence, Analysis and Recommendations", page 95.

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