Action on agricultural emissions

Technical appendix 3

Analysis of regulatory options against criteria

Analysis of regulatory options against criteria

1. Purpose

This technical appendix sets out regulatory policy options to motivate reductions in agricultural greenhouse gas (GHG) emissions considered by the Interim Climate Change Committee, and summarises the analysis of those options against criteria developed by the Committee.

A range of non-regulatory (or companion) policy options were also considered by the Committee to support emissions reductions. These are described in the main report *Action on agricultural emissions*.

2. Assessment criteria

The Committee's Terms of Reference state *"the Committee will take into account… alignment with New Zealand Government environmental, social, economic and fiscal policy objectives and strategies*" when assessing policies designed to reduce agricultural emissions.

In developing its assessment criteria, the Committee considered principles and objectives of relevance for climate change policy highlighted in a range of Government environment, social and economic strategies, as well as perspectives and values heard through its engagement with the farmers and growers, Māori land owners, primary sector organisations, foresters, bankers and NGOs.

Underpinning the Committee's entire analysis is the principle of partnership and good faith with iwi/Māori. Partnership and good faith with iwi/Māori or the integration of a Te Ao Māori/Matauranga Māori perspective are not criteria to be traded off against other criteria. All the assessment criteria developed by the Committee have an iwi/Māori dimension, and the Committee has considered the unique characteristics of Māori land throughout their analysis.

Table 1: *Assessment criteria used for analysis*

1: Reduces emissions - Does the policy have the potential to reduce agriculture emissions in line with potential emissions budgets and targets (including different targets for different gases)? - Does the policy have the potential to deliver greater reductions in emissions over time?
2: Cost-effective emissions reductions - Will the policy be cost-effective for the agriculture sector and the NZ economy as a whole? - Will the policy start to drive behaviour change towards a low emissions economy? - Will the policy provide an incentive to reduce emissions both on existing land uses and by diversifying into other lower-emitting land uses?

3: Easy for participants to understand and comply with ***3a:*** - Can the policy be easily understood by farmers and/or agriculture processors, as well as the wider agriculture sector, other sectors and the wider NZ community? - Can the policy be designed so that it is simple for participants to navigate? - Will the policy encourage farmers to factor GHG emissions reductions into every day decisions, recognise the need to balance other goals that farm businesses have, and integrate with other systems that farmers already use? ***3b*** - Are the policy's administration and transaction costs reasonable for participants and the government?
4: Allows for innovation - Does the policy empower emitters to decide how best to reduce emissions? - Does it enable the development of new mitigations?
5: Rewards positive actions - Will the policy reward farmers for taking positive actions?
6: Assist the agriculture sector and rural communities through change - Will the policy package allow a gradual transition and avoid short term shocks? - Will the policy package disproportionately affect vulnerable communities?

Unlike Criteria 1-5, Criterion 6 is not applicable for analysing the merits of individual regulatory policy instruments as it depends on other decisions relating to policy implementation, such as choices regarding free allocation (see Technical Appendix 5) and companion measures. This criterion is therefore not included in the summary table for the analysis of policy options below. Instead, Criterion 6 has been applied to the Committee's assessment of the recommended policy package as a whole, including non-regulatory or companion policies such as farm environment plans and investment in training and extension services.

3. Policy options for methane and nitrous oxide emissions from livestock

3.1. Options considered for livestock emissions

The following regulatory policy options listed in Table 2 were considered by the Committee. They include policy options implementable at the farm and processor level. Options include those proposed by participants from the agriculture sector in the Agriculture Challenge and Review Group, and options proposed by the Productivity Commission in its report *Low-emissions economy*.

Table 2: *Regulatory policy options considered by the Committee*

Farm-level Policy Options	**Processor-level Policy Options**
Mandatory farm environment plans with prescribed good management practices	
Emission limits	
NZ ETS	NZ ETS
Dual cap ETS	Dual cap ETS
Methane quota system, and NZ ETS for nitrous oxide	
Emissions levy/rebate scheme	Emissions levy

A method for calculating emissions is integral to all the policy instruments considered below. Emissions could be calculated using simple or complex methods. Details on how emissions can be calculated are provided in Technical Appendix 2: Calculating agricultural emissions.

Detailed analysis on the extent and ways in which different policy options considered by the Committee could operate with a differentiated (split-gas) 2050 emission target is provided in Technical Appendix 4: Achieving differentiated (split-gas) 2050 emission targets.

A multi criteria analysis has been undertaken, assessing the extent to which options meet the criteria, with the removal of dominated alternatives. It is primarily a qualitative assessment with quantitative information taken into account wherever it was available.

The analysis below is focused on determining the best long-term policy option to reduce agricultural emissions. When deciding on the final policy package recommendations the Committee also considered timing for implementation. Any farm level policy cannot be robustly implemented until 2025 (see section 9.1 of the main report *Action of agriculture emissions* for more detail). A processor-level NZ ETS or levy is able to be implemented in a shorter timeframe – around 1 year.

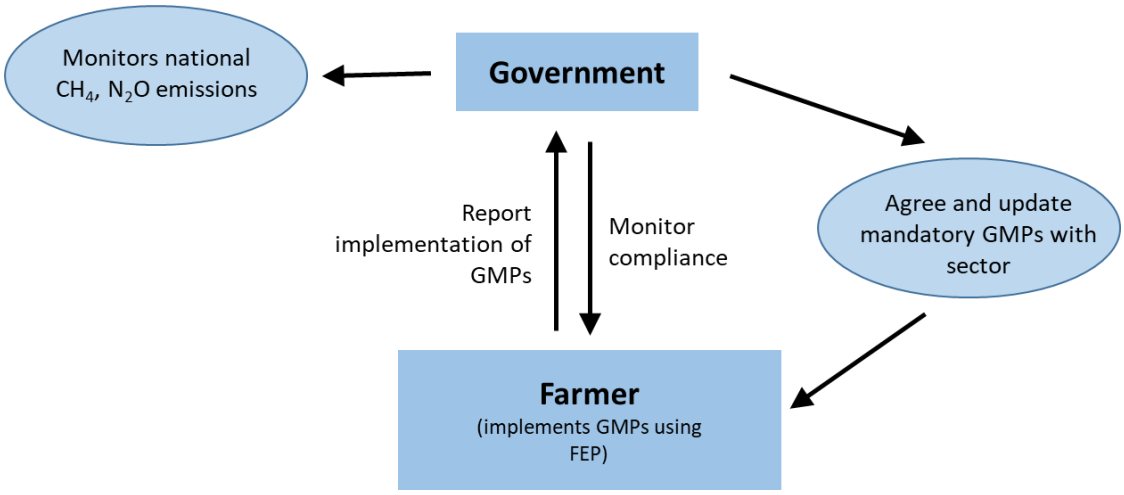
3.2. Description of options for livestock emissions

Mandatory farm environment plans with prescribed good management practices

Every farmer would be required to have a farm environment plan (FEP) and implement a set of good management practices (GMPs). The FEP would then be audited to check that it meets certain standards and that it is being implemented.

This option would require approximately 24,000 livestock farmers over a certain size[1] to:

1. Have an FEP that included any prescribed GMPs
2. Confirm they comply with the FEP requirements to the implementing agency (compliance could be assessed using a third party verification process)



[1] Based on the report by BECA. (2018). Assessment of the administration costs and barriers of scenarios to mitigate biological emissions from agriculture. Prepared for the Ministry for Primary Industries (Biological Emissions Reference Group).

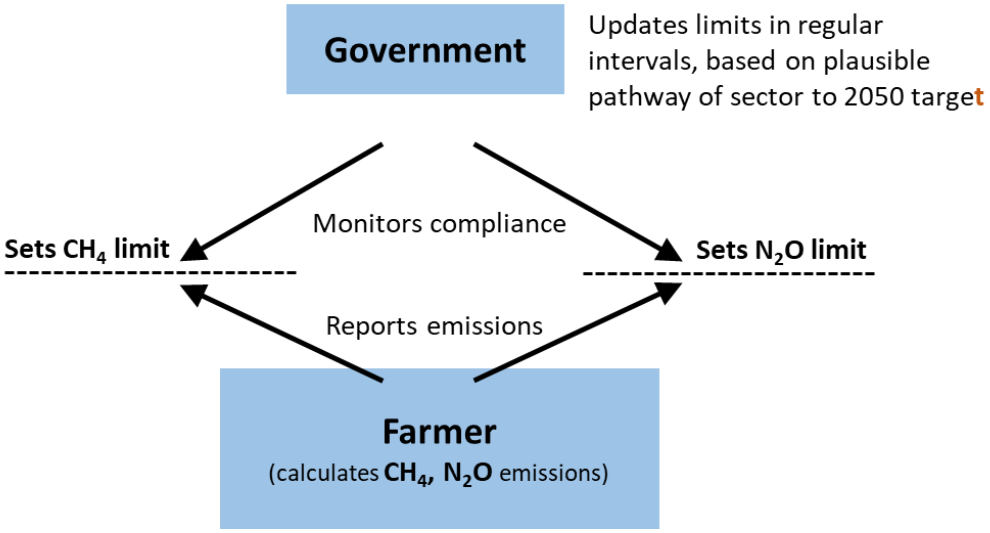
Farm-level emissions limits

Farmers could be required to reduce methane and nitrous oxide emissions to within certain limits. This would put an implicit price on emissions for each farm, because there would be a cost to some farmers from actions to achieve those limits.

There are various ways that limits could be set. At the crudest level, every farm could be required to reduce emissions by the same proportion relative to a base year, or there could be a maximum emissions limit per hectare, per tonne of product, or per stock unit. Limits could be differentiated by farm type, region or land use potential.

This option would require 24,000 livestock farmers over a certain size to:

1. Calculate their emissions
2. Reduce their emissions in line with any limit
3. Confirm they comply with the limit to the implementing agency (compliance could be assessed using a third party verification process)



Farm-level methane quota system, and farm-level NZ ETS for nitrous oxide

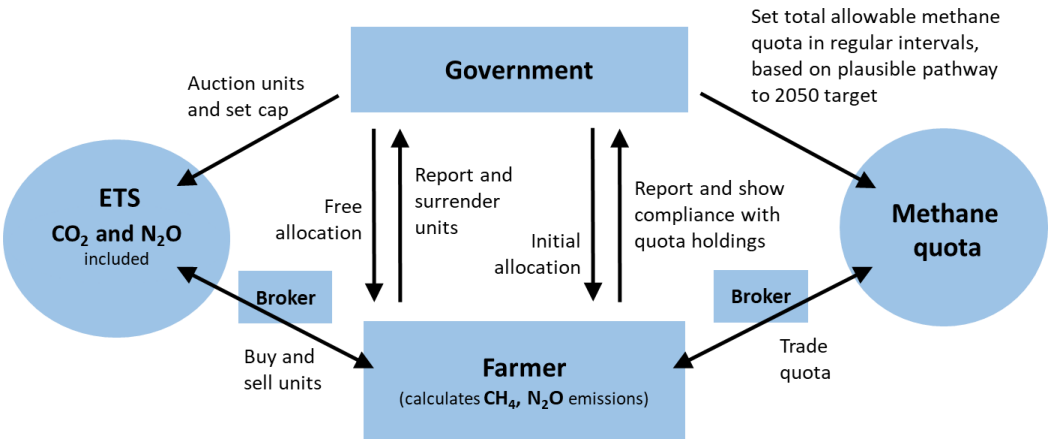
Under this policy, suggested by the Productivity Commission, methane emissions are covered by a separate instrument – a methane quota system. Nitrous oxide emissions from animals are included in the NZ ETS. The methane quota system works by putting a cap on the level of methane that can be emitted in a year (the quota or total allowable methane (TAM)). Each farmer is allocated a percentage share of this TAM at the beginning of the scheme (i.e. this allocation only happens once). The share allocated is determined by each farmer's historical production levels.[2] The quota is tradable.

The TAM declines over time, according to a schedule set in advance by the Government, to meet the long-term methane emissions target. This means that each year a farmer would have to work out the absolute amount of methane that they can emit as permitted by the amount of quota they own. They either have to keep their emissions within that amount, or if they emit more, they have to buy quota from someone else.

This option would require 24,000 livestock farmers over a certain size to:

1. Calculate the amount of methane emissions their quota holdings permit them to emit in that year (based on % of the TAM for that year)
2. Calculate their actual methane and nitrous oxide emissions
3. Fill out forms to apply for their free allocation for nitrous oxide from the EPA
4. Trade units in the NZ ETS market for nitrous oxide emissions
5. Trade quota in the methane quota system for methane emissions
6. Report their emissions and surrender units for nitrous oxide emissions to the Government via an online transaction by the compliance deadline
7. Report their methane emissions and demonstrate compliance with their quota holdings to the Government under the methane quota system.

Livestock farmers would have to think about two different emission prices, and form expectations about how those two emission prices might change over time, in order to factor these prices into their operational and investment decisions.



[2] Note that alternatively, the quota could be auctioned or allocated for free on some other basis (e.g. historic emissions per hectare, a land based proxy etc). Grandparenting based on historic production was proposed by the Productivity Commission in its report.

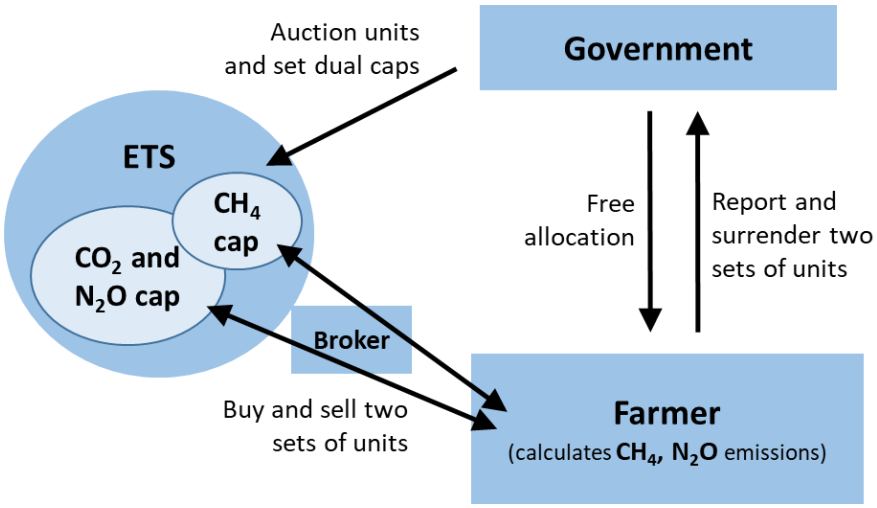
Farm-level dual cap ETS

Methane and nitrous oxide are included in a dual cap ETS, with separate caps for long-lived (carbon dioxide and nitrous oxide) and short-lived gases (methane). This essentially creates two separate trading systems.

This option would require 24,000 livestock farmers over a certain size to:

1. Calculate their emissions
2. Fill out forms to apply for their free allocation from the EPA
3. Trade nitrous oxide under the long-lived gases cap
4. Trade methane under the short-lived gases cap
5. Report their emissions and surrender units to the Government via an online transaction by the compliance deadline

Livestock farmers would have to think about two different emission prices, and form expectations about how those two emission prices might change over time, in order to factor these prices into their operational and investment decisions.

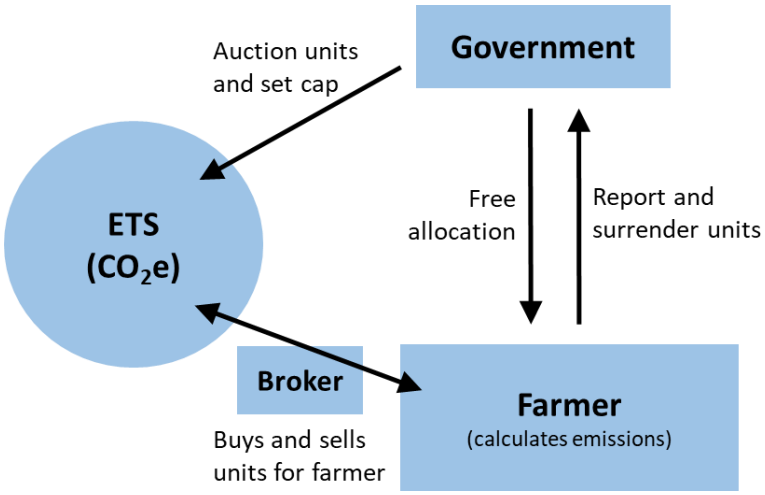


Farm-level NZ ETS

Methane and nitrous oxide (both from animals and from fertiliser) are included in the NZ ETS at farm level.

This option would require 24,000 livestock farmers over a certain size to:

1. Calculate their emissions
2. Fill out forms to apply for their free allocation from the EPA
3. Trade units on the NZ ETS market
4. Report their emissions and surrender units to the Government via an online transaction by the compliance deadline



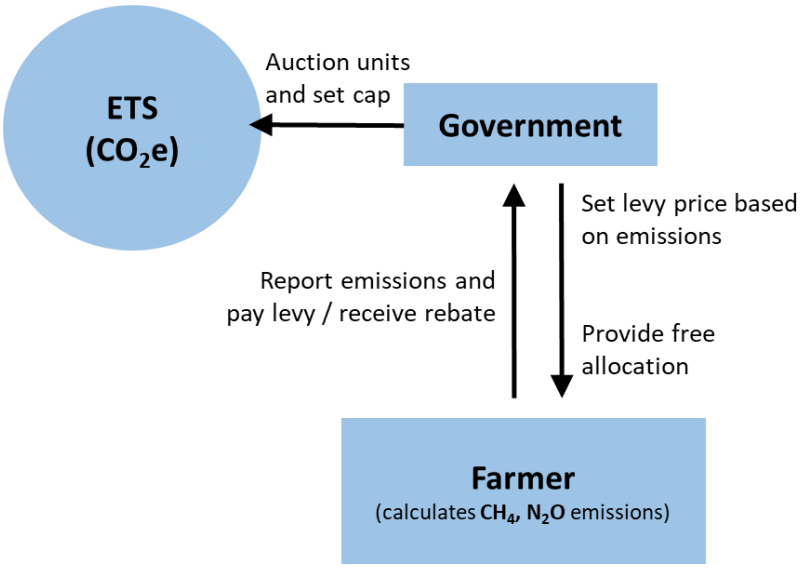
Farm-level emissions levy/rebate scheme

An emissions levy/rebate scheme is implemented at farm level to cover methane and nitrous oxide from ruminant livestock. The levy is collected by Government, and the levy price is linked to the emissions price in the NZ ETS but factors in each farmer's free allocation.

Some farmers would pay the levy while others would receive a rebate based on the method for providing free allocation (see Technical Appendix 5: Free allocation for agriculture).

This option would require 24,000 livestock farmers over a certain size to:

1. Calculate their emissions
2. Report their emissions and pay the emissions levy via an online transaction to the Government each year



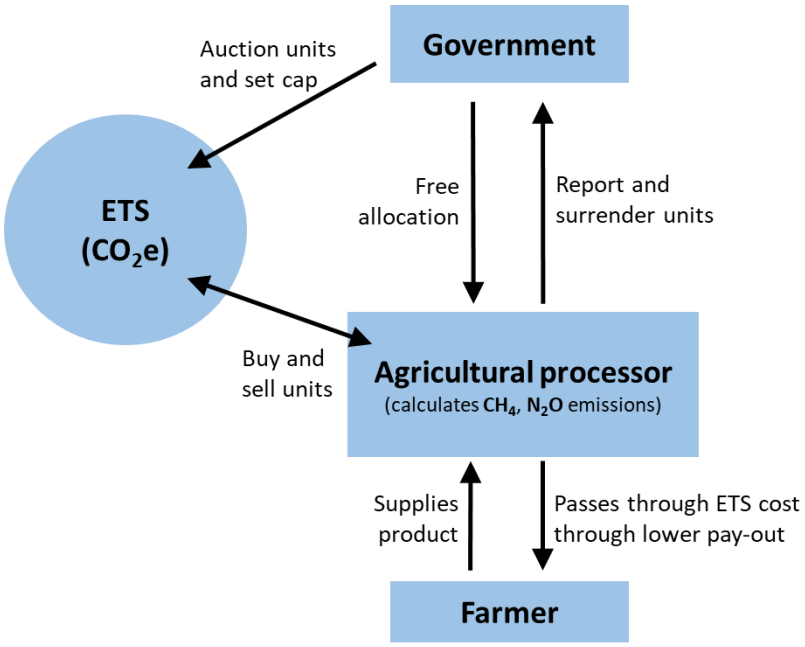
Processor-level NZ ETS

Methane and nitrous oxide from livestock are included in the NZ ETS at processor level.

Meat and dairy processors already report on methane and nitrous oxide emissions to the EPA. They submit their emissions returns by the end of March each year. They calculate their emissions using a simple calculation of: tonnes of product x emission factor.

This option would require the 81 processors to:[3]

1. Fill out forms to apply for their free allocation from the EPA
2. Trade units on the NZ ETS market
3. Report their emissions and surrender units to the Government via an online transaction by the compliance deadline



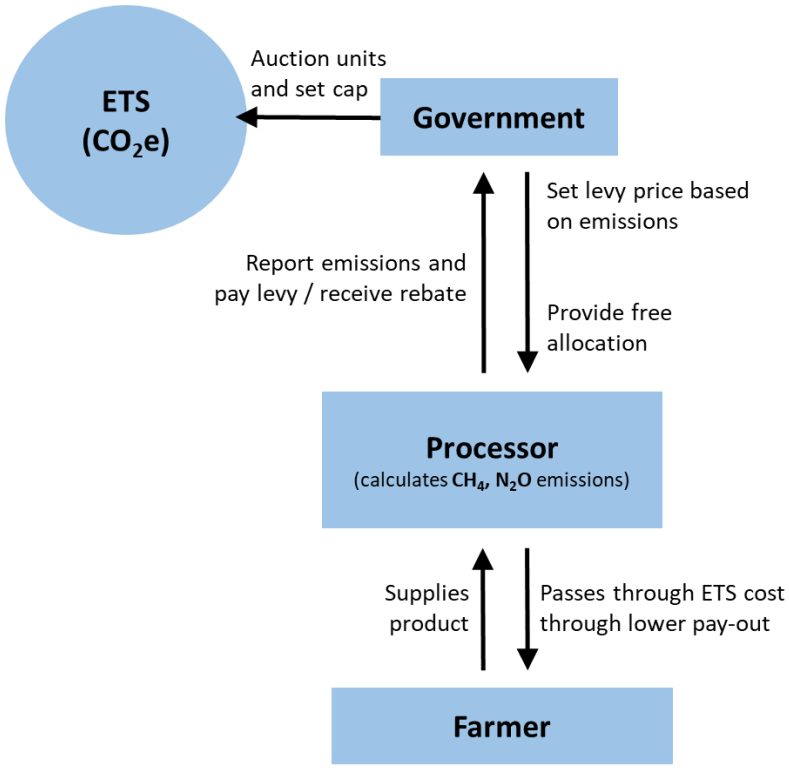
[3] Based on agriculture processors listed in the ETS registry currently required to report emissions; see https://www.emissionsregister.govt.nz/Authentication/Logon.aspx?ReturnUrl=%2f

Processor-level emissions levy

An emissions levy is implemented at processor level to cover methane and nitrous oxide from ruminant livestock. The levy is collected by government, and the levy price is linked to the emissions price in the NZ ETS.

This option would require the 81 processors to:

1. Calculate their emissions
2. Report their emissions and pay the emissions levy via an online transaction to the Government each year



3.3. Options not considered

Negotiated Target

A negotiated target with farmers, processors or sectors/sector bodies was also raised by stakeholders as a potential option to drive agricultural emission reductions.

Under a negotiated target each farmer/processor/sector negotiates a 'baseline' or 'target' with the government. This baseline would be set for some years into the future and would reduce over time. Each year, the farmer/processor/sector would receive units for emissions reductions made below the agreed baseline, which they could then sell.

A negotiated target is similar to an ETS at processor or farm level, but with the free allocation presented in a particular way. The baseline is essentially the same as providing free allocation at a particular level that declines over time. It is similar to the Negotiated Greenhouse Gas Agreements (NGAs) agreed prior to the introduction of the NZ ETS with Refining NZ and Oceania Gold.

This option has not been considered by the Committee because:

- Negotiating a baseline or free allocation trajectory separately with every farm would be unworkable.
- A negotiated target with processors is essentially the same as processor level ETS with free allocation – it is therefore considered to be included in the assessment of processor level NZ ETS.
- It is unclear how compliance with any negotiated target with the sector or sub sector could be enforced. Sectors/sector bodies do not have the ability to require farmers to undertake activities if the target is not met.

Project Crediting

This option involves providing payments or credits for projects to reduce agricultural emissions instead of pricing agricultural emissions through an ETS or tax. Participation would be voluntary, with farmers taking part to gain income from the credits or payments earned by reducing emissions in ways that are considered additional to business as usual practice.

It would operate in a similar way as the Clean Development Mechanism under the Kyoto Protocol, Australia's Carbon Farming Initiative (now subsumed into the Emissions Reduction Fund), or California's Compliance Offset Protocols.

This option has not been considered by the Committee because:

- It wouldn't reduce emissions at scale. Participation would be voluntary only so it wouldn't encourage all farmers to reduce emissions
- It would imply that all emissions reductions that can be achieved in the agriculture sector have to be paid for by other sectors, or taxpayers in general
- There are limited activities that can be demonstrated to be additional in the context of New Zealand farming practices i.e. emission reductions achieved through business-as-usual productivity gains would not be eligible for credit under this scheme
- It would be expensive to run as it would only cover a limited number of farmers with projects with a small emission reduction benefit.

Overall it was considered unworkable in the New Zealand situation.

3.4. Additional background information for analysis of policy options

Incentives to reduce emissions

As set out in Chapter 7 of the main report, Table 3 shows how policies implemented at the farm or processor level create incentives to reduce emissions across the high level categories of mitigations available. Mitigation actions can reduce emissions through:

- reducing livestock production via land use change or diversification,
- reducing livestock production via de-intensification,
- reducing emissions intensity.

Table 3: *The incentives for farmers to reduce livestock emissions differ for a processor-level as compared to a farm-level point of obligation*

	Processor-level point of obligation	Farm-level point of obligation
De-intensification	✓	✓
Land use change or diversification	✓	✓
Mitigations on-farm that reduce emissions intensity	✗	✓
Novel technologies that reduce emissions intensity	✗	Can be included

A processor level policy would likely lead to processors passing on any costs of the policy though reduced pay-outs for milk or meat. All farmers would face the same costs per unit of product despite the variability in their individual emissions per unit of product. Farmers could respond to this cost by reducing output, either through diversifying, changing land use or by de-intensifying their operation. But they would have no incentive individually to reduce emissions intensity on-farm if this does not change their total production.

In contrast, a farm level policy would create an incentive to reduce emissions from the entire available range of mitigation practices and technologies – both those that reduce emissions through reducing production and those that reduce emissions through reducing emissions intensity. The range of emission reduction options encouraged by a farm level point of obligation is expected to increase as more mitigations become available over the next 30 years.

The synthesis report of the Biological Emissions Reference Group concluded that widespread adoption of currently available mitigation options could achieve up to about a 10% reduction in absolute biological emissions from pasture-based livestock. The report notes that some farmers might achieve such reductions without significant negative impacts on profitability. For others the economic impact could be large, with costs depending on a range of factors, including the particular mitigation option, skill levels, farm systems, and milk and meat pay-outs and labour costs. The report also concludes that a greater than 10% reduction in absolute biological emissions will likely require a combination of on-farm mitigation and land-use change.[4]

[4] BERG. (2018). Final report of the Biological Emissions Reference Group (BERG).

A review of existing economic model studies of agricultural GHG abatement, commissioned by the Committee, indicates a wide range of potential mitigation outcomes, costs and preferred abatement responses, reflecting divergent model inputs and assumptions.[5]

Administration and Transaction Costs

The administration and transaction costs of a limits-based approach, farm level ETS and processor level ETS were estimated in a report commissioned by the Biological Emissions Reference Group.[6] The administrative costs associated with these policies were shown in Table 4. These costs assume that OVERSEER, i.e. a complex method, is used for calculating emissions.

Table 4: *Estimated administration and transaction costs for a set of policy options.*

Policy option		**Annual administration costs for government and sector**
Emission limit	low	$11,000,000 (simple calculation tool, 5% of farmers above limit/require FEP)
	high	$27,000,000 (complex calculation tool, 15% of farmers above limit/require FEP)
Farm level ETS	low	$16,000,000 (simple calculation tool, reduced brokerage costs)
	high	$39,000,000 (complex tool, high brokerage costs)
Processor level ETS		$2,7000,000

In estimating the administration costs of an emission limit approach, several assumptions were made about how the limit would be implemented. The report assumed only 5-15% of farmers would start above any limit and only those farmers above the limit would require a Farm Environment Plan incorporating an emissions calculation using OVERSEER. Using Canterbury Regional Councils approach to setting nitrogen limits as an example, a limits-based approach would require all farmers to have a farm environment plan and emissions calculation to determine on going compliance with any limit. This has not been incorporated in the costs of the report and so the costs of a limit approach could be significantly higher than the estimates suggested in Table 4.

The costs of any farm level policy can be significantly reduced by using a simple calculation method that does not involve the associated use of a farm consultant (see Technical Appendix 2). The BECA report estimates that for a farm level ETS this could reduce administration costs by around $9 million per annum.

For a farm level ETS brokerage costs were estimated to be between $50 and $500 per farmer per year; $1 million - $12million per year for the sector as a whole. A levy/rebate based approach would avoid all transaction costs associated with brokerage.

For any farm-level policy, a government body (e.g. the EPA) would undertake desktop checks of emission returns or compliance with emission limits or implementation of GMPs, but may also contract third parties to undertake more thorough audits on a selection of participants. This approach is currently used in the NZ ETS, i.e. the government bears most of the verification and audit costs.

[5] Daigenault. (2019). Review of Recent NZ Modelling on Costs and Effectiveness to Mitigate Agricultural GHG Emissions. Report for the Interim Climate Change Committee.

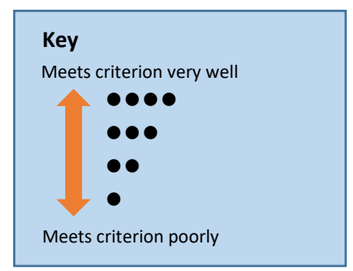
[6] BECA. (2018). Assessment of the administration costs and barriers of scenarios to mitigate biological emissions from agriculture. Prepared for the Ministry for Primary Industries (Biological Emissions Reference Group).

4. Summary of analysis of policy options for livestock emissions against criteria

Table 5 summarises the Committee's assessment of the different policy options for livestock emissions against criteria.

	Criterion 1: Reduces emissions	Criterion 2: Cost-effective emissions reductions	Criterion3a: Easy for participants to understand	Criteria 3b: Administration and transaction costs	Criterion 4: Allows for innovation	Criteria 5: Rewards positive actions
Farm level policy options						
Mandatory farm plans with prescribed Good Management Practice (GMP)	● to ●● No confidence that required emissions reductions will be achieved but some future GMPs such as methane inhibitors could achieve more predictable reductions	● to ●● Does not incentivise uptake of all cost effective abatement in agriculture sector. Future GMPs such as methane inhibitors might deliver some cost effective abatement.	●●●● A familiar approach for some farmers	●● to ●●● Significant administration costs for both farmers and the government to develop, verify and audit farm environment plans.	●● Evolution of GMPs over time but no incentive to innovate on-farm beyond a given GMP	● Does not reward farmers for any action taken beyond GMP
GHG emission limits	●●●● Can directly link national emission reduction target/s to farm specific limits.	● Cost of reducing emissions varies widely across farms. Some farmers will bear high costs, while others could do more cost-effectively than their limit drives them to do. *	●●● A familiar approach for some farmers. But complexity dependent on way limit is set.	●● to ●●● Significant admin costs but will depend on how limit is implemented. Costs can be reduced by using a simple calculation method.	●●● Farmers can choose what actions they take up to the limit but does not incentivise innovation beyond the limit.	● Does not reward farmers for any action taken beyond the limit
Methane quota system, and nitrous oxide included in the NZ ETS (farm level)	●●●● Can limit emissions in line with national emission reduction target/s through cap on quota/units.	●●●● Cost effective – can incentivise full suite of emission reductions. Farmers reduce emissions as far as it makes financial sense for them to do so given the emissions price/s. *	● Greater complexity than all other options as farmers required to operate in two completely separate systems.	● Greater admin and transaction costs than all other options due to set up and running two separate systems.	●●●● Supports innovation – farmer chose what action they take in response to quota	●●● If quota allocated on basis of historical production or emissions, penalises underdeveloped land or those who have taken early action to reduce emissions
Dual Cap ETS (farm level)	●●●● Can limit emissions in line with national emission reduction target/s through caps on units.	●●●● Same as above	● Slightly greater complexity than other options as Farmers need to buy and sell two different units and think about two different prices	● Significant admin and transaction costs; Costs can be reduced by using a simple calculation method.	●●●● Supports innovation – farmers chose what action they take in response to emissions prices. Funds raised can be used to support farmers to reduce emissions	●●●● The lower the farm's emissions, the less units required to be surrendered. If emissions are below the allocation, farm has surplus units to sell
NZ ETS (farm level)	●●●● Can limit emissions in line with national emission reduction target/s through cap on units.	●●●● Same as above	● Unfamiliar approach for farmers.	● to ●● Same as above	●●●● Same as above	●●●● Same as above
Emissions Levy/Rebate (farm level)	●●●● Can limit emissions in line with national emission reduction target/s through integration with ETS cap and adjustments to levy price.	●●●● Same as above	●●● Farmers familiar with paying levies and taxes. Reporting/ payment could be integrated with existing processes, e.g. GST returns, to minimise additional effort.	●● to ●●● Farmers don't require broker or third party for services associated with buying and selling units. Costs can be reduced further by using a simple calculation method.	●●●● Same as above	●●●● The lower the farm's emissions, the lower the levy amount due – and if the emissions are below the allocation, a rebate is received
Processor level policy options						
Dual Cap ETS (processor level)	●●●● Can limit emissions in line with national emission reduction target/s through caps on units.	●● to ●●● Moderately cost effective - incentivises changes that reduce production but not practices that reduce emissions intensity.	●● Slightly greater complexity that the NZ ETS or levy. Processors buying and selling two different units.	●●● 	●● Only incentive for farmers to innovate in a way that reduces production or changes land use. Funds raised can be used to support farmers to reduce emissions	●● Treats all farmers the same – does not differentiate or reward farmers who have taken action to reduce emissions through emission intensity improvements.
NZ ETS (processor level)	●●●● Can limit emissions in line with national emission reduction target/s through cap on units.	●● to ●●● Same as above	●●● Avoids any administration or transaction effort and cost for farmers.	●●●● Administrative and transition costs for the sectors and the government are relatively low – minimised as much as they can be.	●● Same as above	●● Same as above
Emissions Levy (processor level)	●●●● Can limit emissions in line with national emission reduction target/s through integration with NZ ETS cap and adjustments to levy price.	●● to ●●● Same as above	●●● Same as above.	●●●● Same as above	●● Same as above	●● Same as above

***Table 5**: Summary of the Committee's assessment of the different policy options for livestock emissions against criteria*



* The choice of emissions calculation method will affect which specific mitigations are recognised

4.1. Reduce emissions

All policy options with the exception of Mandatory Farm plans with Good Management Practices (GMP) have the potential to drive emission reduction in line with national target/s.

The adoption of GMPs, such as they can currently be envisaged for GHG emissions, does not lead to predictable outcomes for greenhouse gas emissions. This is because it is not one but a series of context-specific decisions, implemented with various degrees of ambition, that will determine the actual impact of implementation of GMPs on emissions.

Some potential future mitigation options, such as use of a methane inhibitor, might be more amenable to a GMP with more predictable outcomes. Hence the Committee's assessment of mandatory GMPs is that it is poor to moderate in achieving emissions reductions.

4.2. Cost effective emission reductions

All price based policy options are superior to Mandatory Farm plans with GMP and Emission Limit options in terms of their ability to achieve emission reduction targets cost effectively.

Because of the wide diversity in the costs and benefits of reducing emissions on individual farms, a policy approach based on farm-level limits, regardless of the way that limit is set[7], will mean some farmers will bear high costs, while others could do more at lower cost than their limit drives them to do. In contrast, under a policy that explicitly prices emissions, farmers that can reduce emissions at a cost lower than the emission price have an incentive to do so, while other farmer may choose to pay for their emissions when it doesn't make financial sense to reduce them.

Farm level pricing policies can deliver emission reductions more cost effectively than processor level pricing policies. As set out in section 3.4, farm level pricing policies can incentivise the entire available range of mitigation practices and technologies, while processor level pricing policies only create an incentive to reduce emissions through reducing production. This means under any farm level pricing policy there is an incentive for farmers to take up all cost effective mitigation on their farm.

The current evidence base is not sufficient to tell us how much more cost-effective a farm-level policy would be compared to a processor-level policy, given divergent data and expert judgements about the potential of farmers to reduce emissions without curtailing production. If only a few farmers can reduce their emissions intensity now, then pricing emissions at processor level will be similarly cost-effective in the near term as pricing emissions at farm level. However, options to reduce emissions intensity at farm level are expected to expand in the future, making a farm-level policy more and more cost-effective over time compared to processor-level policy.

The choice of method to calculate emissions at the farm level will affect which specific mitigations are recognised. A simple method that does not recognise all mitigation options could reduce the cost effectiveness of a farm-level policy compared to a processor level policy. See Technical Appendix 2: Calculating Agricultural emissions for more information on the potential for different calculation methods to recognise different mitigations.

[7] for example, a limit on emissions per hectare or a % emission reduction from historic level of emissions

4.3. Easy for participants to understand

A Mandatory farm plan with GMPs would likely be familiar and easy for farmers to understand. This is because GMPs and use of Farm Environment Plans have been widely promoted to manage water quality across New Zealand.

Policy options that involve trading of units (ETS and quota system) are the least likely to be easy for farmers to understand. The need to make decisions about when and how to buy and sell units in an ETS or quota system creates additional effort and complexity, particularly if farmers have to trade two separate units/quota.

A farm level levy/rebate scheme avoids emissions trading and has the potential to be integrated with existing processes such as GST returns. Of the farm level pricing policies this is likely to be the easiest for farmers to understand.

Processor level policies are all likely to be relatively easy for processors to understand and comply with. Processors already report on their emissions in the NZ ETS. A dual cap ETS is considered to be slightly more complex as it requires buying and selling of two different types of units. Farmers would not need to engage in emissions calculations at all but respond only to the economic signal sent by processors in the form of reduced payouts.

4.4. Administration and transaction costs

All processor level policies considered by the Committee have lower administration and transaction costs than farm level policies.

Of the farm level policies, Mandatory Farm plan, Emissions Limit and Emissions Levy approaches have lower administration and transaction costs than policies that involve trading of units because they avoid brokerage costs and the need to make trading decisions.

4.5. Allows for innovation

All price based farm level policy options give a strong incentive to innovate. In addition, any funds raised through the pricing mechanism can be recycled back to farmers to directly support emission reductions.

Mandatory farm plan with GMPs and Emission Limit options allow for some innovation but do not create an incentive to innovate beyond the prescribed GMPs or limits.

All processor level options only create an incentive to innovate in a way that reduces production, either through changing land use or through de intensification.

4.6. Rewards positive actions

Price based farm level policy options have the greatest potential to reward positive farmer actions. In an ETS system, the lower a farm's emissions the fewer units are required to be surrendered and if emissions are below the allocation given, they will have surplus units to sell. In the case of an emission levy, the lower the emissions the lower the levy. If emissions are lower than the allocation given, farmers will get a rebate.

In a Methane Quota Systems, farmers who reduce their emissions below their quota can sell excess quota. However, if a Methane Quota is allocated on the basis of historical production or emissions, those who have undeveloped land or those who have taken early action to reduce emissions would be penalised.

Both a Mandatory farm plan with GMP and a limit approach do not reward farmers for any action taken beyond GMP or the limit.

Processor level options do not reward individual farmer's efforts to improve emission efficiency. Positive actions by individual farmers are only rewarded in so far as they lead to a decrease in production while maintaining overall profitability. Actions by farmers to reduce emissions intensity could only be rewarded collectively through unique emission factors (see Technical Appendix 2). Hence the Committees assessment that they only partially meet this criteria.

4.7. What do farmers think?

The Committee consistently heard from farmers and agriculture sector representatives that, if a policy was put in place to address agriculture emissions, they would strongly prefer a farm-level policy. At the same time, environmental NGOs voiced strong support for including agricultural emissions in the NZ ETS as soon as possible to ensure that agriculture plays its part in New Zealand meeting emission targets.

In February 2018 the Committee ran 5 workshops with farmers, rural professionals and rural community members. In total 150 participants across 5 regions (Waikato, Northland, Manawatu, Canterbury Southland) attended the workshops. Workshops were by invitation only. Invite lists were put together by NZ Landcare Trust in discussion with DairyNZ, B+L, Deer Association NZ, Fed Farmers, Rural women and Rural support trust.

At these workshops attendees were asked to indicate their preferred policy option based on a choice of 3 farm level policy options – Mandatory farm plans with prescribed Good Management Practices, GHG emissions limits and a farm level emissions levy. The large majority of attendees (around 95%) preferred a levy over a prescribed GMP or limit-based approach. The key reasons identified for this preference were the ability for the levy to incentivise action beyond prescribed limits or prescribed practices and because it retains full flexibility for how to respond.

Attendees were also asked to indicate their preference for an interim option of a processor-level NZ ETS. The majority of attendees (around two-thirds) did not support the interim option. Some attendees gave conditional support for the option based on:

- ability for processors to differentiate between farmers in pay-out
- a low price i.e. $25/tonne
- only if revenue was effectively used by industry to educate farmers
- only if it has a sunset clause (to start the farm level levy)

Note this feedback should not be construed as being the view of the average farmer or the sector but the view of the 150 farmers that attended our workshops.

4.8. Summary and conclusion for livestock emissions

The key trade-off for the policy options considered is the ability of the policy to incentivise all farmers to take up all the available cost-effective mitigations options on their farm versus administration and transaction costs.

Overall the Committee considers that a farm level emissions levy/rebate scheme is the best policy option in the long term to drive agricultural emissions reductions. This is because:

- it can drive emission reductions in line with national emissions targets, with the levy rate linked to the NZ ETS emissions price, but allowing for a separate price on methane emissions if the Zero Carbon Bill provides for a separate 2050 target for methane
- it enables targets to be met cost effectively for the agriculture sector as a whole, by providing an incentive for all farmers to take up the full suite of mitigation options available on farm where it is cost effective for them to do so
- it is has less complexity and lower administration and transaction costs than trading schemes such as a single- or dual-cap ETS or Quota based approach.

The downside of any farm-based policy is that it cannot be implemented in the short term (i.e. within less than five years).

While a processor-level NZ ETS policy does not incentivise the full range of emission reductions, it incentivises some mitigation options and has low administration and transaction costs. It can be implemented in the short term. It is therefore considered by the Committee to have considerable value as a starting point for agriculture emissions policy. Further information on pricing livestock emissions through the NZ ETS at the processor level as a transitional measure, is outlined in Chapter 9 of the main report Action on Agriculture Emissions.

5. Policy options for emissions from fertiliser

5.1. Options considered for fertiliser emissions

Table 6: *Regulatory policy options for fertiliser emissions considered by the Committee*

Farm level Policy Option	Processor level Policy Options
NZ ETS	NZ ETS
Emissions levy/rebate	Emissions levy

For fertiliser and livestock policy options, the same pros and cons apply to Mandatory farm plans with prescribed Good Management Practice and GHG Emissions limits options. Therefore these have not included in in Table 7 and the discussion below. The summary focuses only on the price options (NZ ETS and Emissions levy at the processor and farm level).

5.2. Additional background information for analysis of policy options

Incentives to reduce emissions

The local factors that may impact on nitrous oxide emissions from fertiliser (such as soil moisture and type, or application rates) are not yet sufficiently supported by scientific evidence and data to be incorporated in emissions calculations in a robust way at national or farm level. This is a key difference to water quality, where it is relatively better understood how local conditions (climate, soil, and farm management) contribute to nutrient losses.

If an emissions price were placed on fertiliser manufacturers and importers, they would be likely to pass emissions costs on through the price of their products. So, farmers who use less fertiliser would reduce their emissions and would directly benefit through reduced exposure to the emissions cost. If an emissions price were imposed at the farm level those farmers using less fertiliser would reduce their emissions and their exposure to the emissions cost.

As a result, there is no difference in the incentives for farmers to reduce emissions from pricing fertiliser the farm a processor level. If fertiliser is priced at producer/importer level and those costs are passed on, the incentive to use less fertiliser would apply to all users of fertiliser, including livestock, arable and horticulture farmers.

Emissions related to the use of fertilisers coated with urease inhibitors have lower nitrous oxide emissions and would see a lower price.

Administration and transaction costs

Sector estimates suggest that there are at least 5,000 horticulture farmers.[8] A farm level policy that includes both livestock and fertiliser emissions would have to apply to livestock, arable and horticulture farmers and growers. This would mean a farm level policy would have around 30,000 participants (up from 24,000 participants for a policy for livestock emissions only).

5.3. Summary of analysis of policy options

Table 7 summarises the Committee's assessment of the different policy options for livestock emissions against criteria

[8] Horticulture New Zealand. (2018). A food story: Annual report 2018.

Table 7: *Summary of the Committee's assessment of the different policy options for fertiliser emissions against criteria*

	Criterion 1: Reduces emissions	Criterion 2: Cost-effective emissions reductions	Criterion 3a: Easy for farmers to understand	Criteria 3b:Administration and transaction costs	Criterion 4: Allows for innovation	Criteria 5: Rewards positive actions
Farm level policy options						
NZ ETS (farm level)	●●●● Can limit emissions in line with national emission reduction target/s through cap on units	●●●● Cost effective - Incentivises less and more efficient fertiliser use and use of fertiliser with an inhibitor. Farmers reduce emissions as far as it makes financial sense for them to do so given the emissions price – i.e. they take actions that cost less than the emissions price	● Unfamiliar approach for farmers Emissions and associated cost from fertiliser is made obvious to farmers	● Significant administration costs as it would require horticulturists (who don't have livestock) to report, and transaction costs to buy/sell units in addition to livestock farms	●●●● Supports innovation - farmers choose what actions they take in response to the ETS price	●●●● The lower the farm's emissions, the less units required to be surrendered
Emissions Levy/Rebate (farm level)	●●●● Can limit emissions in line with national emission reduction target/s through integration with ETS cap and adjustments to levy price	●●●● Cost effective - Farmers reduce emissions as far as it makes financial sense for them to do so given the emissions price – i.e. they take actions that cost less than the emissions price	●●●● Farmers familiar with paying levies and taxes on basis of product or input Emissions and associated cost from fertiliser is made obvious to farmers	●● Administration and estimation issues are the same as NZ ETS at farm level but lower transaction costs as no trading of units	●●●● Supports innovation - farmers choose what actions they take in response to the levy price	●●●● The lower the farm's emissions, the lower the levy amount due
Processor level policy options						
NZ ETS (processor level)	●●●● Can limit emissions in line with national emission reduction target/s through cap on units	●●●● Cost effective - Farmers reduce emissions as far as it makes financial sense for them to do so given the emissions price Processors would have several options to manage emissions price risk, such as hedging or forward contracts	●●● Easy to understand for producers/importers Use of Farm Environment plans could help recognising the role of fertiliser emissions in overall farm system emissions	●●●● Relatively low, fertiliser manufacturers/suppliers already report emissions	●●●● Supports innovation - farmers choose what actions they take in response to the ETS price	●●●● The less fertiliser used by the farmer the less exposure they have to the emissions price
Emissions Levy (processor level)	●●●● Can limit emissions in line with national emission reduction target/s through integration with NZ ETS cap and adjustments to levy price	●●●● Same as above but Fertiliser manufacturers and importers would need to manage their emissions price risk indirectly	●●● Same as above	●●●● Same as above	●●●● Supports innovation - farmers choose what actions they take in response to the levy price	●●●● Same as above

Key
Meets criterion very well
●●●●
●●●
●●
●
Meets criterion poorly

Reduce emissions / cost-effective emissions reductions

All policy options considered for fertiliser can cost effectively drive emission reductions in line with emission reduction targets. At both processor and farm level, farmers are incentivised to take up the full current range of mitigation options available to them, that is, use less fertiliser more efficiently or use fertiliser coated with a urease inhibitor.

The approach could be extended to fertilisers coated with nitrification inhibitors once they become available, as they would have lower emissions and hence attract lower emission costs.

At the processor level, inclusion in the NZ ETS gives processors several options to manage emissions price risk such as hedging or forward contracts. In a processor level levy system, fertiliser manufacturers and importers would need to manage their emissions price risk indirectly.

Easy for farmers to understand

A farm level levy is considered to be the policy option that is most easy for farmers to understand. The emissions cost associated fertiliser emissions would be made clear to farmers.

At the processor level all policies considered are likely to be relatively easy for processors to understand and comply with. However, the emissions cost and associated price for fertilisers will likely be absorbed into the overall price of fertiliser and will therefore be less obvious to farmers.

Use of Farm Environment Plans could help highlight the role of fertiliser emissions in the overall emissions profile for a farm and the management options to reduce these emissions.

Administration and transaction costs

Farm level policies have higher administration and transaction costs than processor level policies, even if livestock emissions are priced at the farm level, as it would require an additional 5,000 or so non-livestock farmers and growers (i.e. horticulturists and arable farmers) to participate in a farm level scheme.

Allow for innovation/Rewards positive actions

All policy options give an equal and full incentive to innovate to reduce fertiliser emissions and reward positive actions taken to reduce emission from fertiliser.

5.4. Conclusion for fertiliser emissions

Table 6 summarises the Committee's assessment of the different policy options for fertiliser emissions against criteria.

Overall the Committee considers that pricing fertiliser emissions at the processor level is currently the optimal policy option to drive fertiliser emissions reductions. This is because:

- the same incentives to reduce emissions are created through a processor level policy and a farm level policy
- pricing emissions at the processor level has less administration and transition costs than a farm level policy as it avoids the administration and transaction costs associated with an additional circa 5000 horticulture participants, in addition to livestock farmers
- inclusion in the NZ ETS rather than in a processor level levy enables fertiliser manufacturers and importers to manage price risk directly through hedging or forward contracts.

The Committee consider that their recommendation to include fertiliser emissions in the NZ ETS at the processor level be reconsidered once science and supporting data have progressed such that farm-specific mitigation options can be monitored, reported and verified, and there would be a material benefit of pricing these emissions at the farm-level.