He Waka Eke Noa

A delicate dance with demand

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Building a better working world

Over the last couple of months, there have been a lot of announcements about agricultural emissions pricing. He Waka Eke Noa (HWEN), an agricultural industry partnership, released its proposals for pricing agricultural emissions on 31 May 2022. The Climate Change Commission (CCC) released its review of the progress made by the agricultural sector towards measuring, reporting and pricing its emissions in June 2022.

The CCC included within its review an early opinion about the HWEN proposal, which said the HWEN proposal was a good start but it needed to be simplified if it was going to be ready for implementation in 2025 as required.

Pricing agricultural emissions

This article explains how the HWEN proposal works and the types of outcomes that its emissions price signal will incentivise. A central concept that we need to understand before we begin is that emissions pricing is often used to incentivise two outcomes in parallel:

1. Lowering the emissions intensity of production
2. Reducing emissions through lowering the volume of production

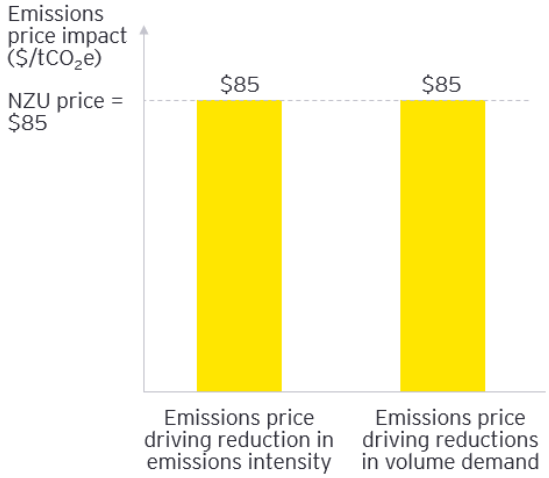
How much of each of these outcomes that occur is a function of the emissions price, the emissions pricing system design, and the responsiveness of exposed sectors to the emissions price signal (which itself is influenced by several factors). This article will explore how different emissions pricing systems can incentivise the balance between lowering emissions intensity and lowering production volumes within the agricultural sector.

While lowering emissions intensity through emissions pricing is a goal that everyone can support, there are a wide range of views on the impact of lowering the demand for volume of domestic agricultural products. These different views cover what is desirable and acceptable from a New Zealand perspective, as well as what is effective in reducing global emissions outcomes. To understand how this delicate dance with demand might play out, we first need to explain a few fundamentals about emissions pricing and its impact.

Starting simple – a household example

To begin this exploration, consider the simple emissions pricing example below of a household that uses natural gas for heating. Let's assume that it is exposed to an emissions price of $85/tCO$_2$e as this is the price assumption about the New Zealand Emissions Trading Scheme (NZ ETS) that the HWEN proposal makes for 2025. The emissions price signal that it experiences can be thought of as two different emissions price drivers:

- An emissions price driver that incentivises the household to reduce the emissions intensity of its heating, for example by installing an electric heat pump.
- An emissions price driver that incentivises the household to reduce its heating consumption, for example by installing more insulation (or just to suffer through colder weather and risk poor health outcomes).

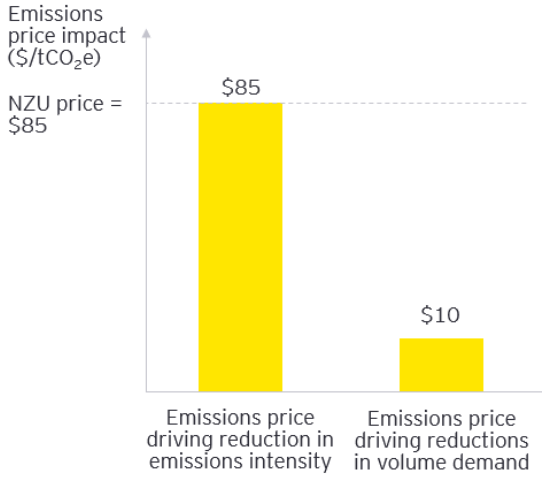


In the case of this household, $85/tCO$_2$e is the emissions price driver that will encourage the household to reduce the emissions intensity of its heating and $85/tCO$_2$e is also the emissions price driver that will encourage the household to reduce how much heating that it consumes. The design of this emissions pricing system is such that it incentivises each of these outcomes equally and doesn't prioritise one outcome over the other.

While it might seem that this equal balance of incentives should always be present, we can find lots of emissions pricing examples where this isn't the case.

The impact of free allocation

Consider the case of an industrial participant within the NZ ETS which receives free allocation. Activities within the NZ ETS that are considered highly exposed to the risk of emissions leakage (such as the manufacture of burnt lime and steel) currently receive 88% of their emissions exposure from the government for free through an annual allocation. This allocation is indexed to their production volumes, so if their production volumes rise then this allocation goes up, and if their production volume drop then they get less. The chart that we drew for the household with its gas heating looks quite different for these facilities.



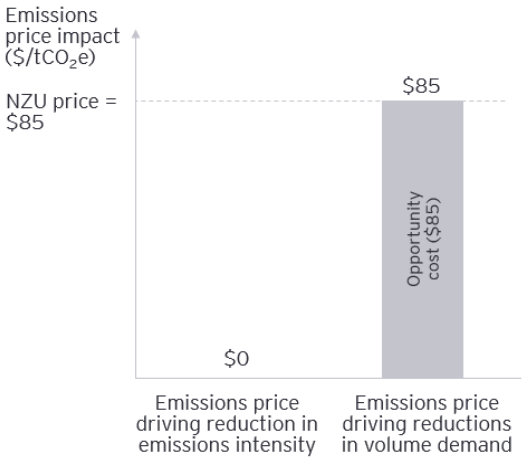
What we can see from this chart is that the emissions price incentive to reduce emissions intensity has stayed the same, at the full $85/tCO$_2$e that the household experienced. However, the emissions price driver that impacts changes in volume demand has now declined to $10/tCO$_2$e (12% of $85/tCO$_2$e) as a result of the 88% free allocation and its indexation to production volumes. This means that these facilities face two different price incentives to reduce emissions:

- Facilities which can find opportunities to reduce their emissions intensity at less than $85/tCO$_2$e should pursue them as this will save them money by allowing them to buy fewer units.[1]
- Facilities will need to pay for any residual emissions at the cost of $10/tCO$_2$e, which they can try and pass on to their customers. Regardless of whether they pay this cost, or their customers pay [2], it is the $10/tCO$_2$e which is the incentive to reduce production/consumption, not the full $85/tCO$_2$e.

We can see that the impact of the free allocation is therefore to retain the incentive to reduce the emissions intensity of production, but to weaken the signal to reduce production volumes.

Agricultural emissions pricing – the status quo

Before we look at the potential impact of the HWEN proposal, it is important to first consider what the status quo is for agricultural emissions pricing. While it might seem straightforward to say that because agriculture isn't in the NZ ETS that it isn't exposed to the NZ ETS price signal, this conclusion overlooks the impact of the afforestation incentive that the NZ ETS creates. The NZ ETS doesn't currently generate any direct cost for agricultural emissions, but it does create an *opportunity cost*. This opportunity cost is the revenue that farmers forgo by choosing not to convert agricultural land into forestry.



[1] In the short term, improvements in emissions intensity don't change the free allocation volumes given to these activities. In the longer term, this picture is less clear as the Government attempts to calibrate its industrial allocation support over time. The NZ Government is currently reviewing its industrial allocation rules.

[2] In order to qualify for these free allocations within the NZ ETS, the activities must demonstrate they face international competition for pricing. This means that it is likely to be quite challenging for them to pass this $10 charge onto their customers.

To illustrate what this means for the emissions reduction incentives that the status quo represents, we have re-drawn the same chart that we used earlier for the agricultural sector. The incentives have shifted around again.

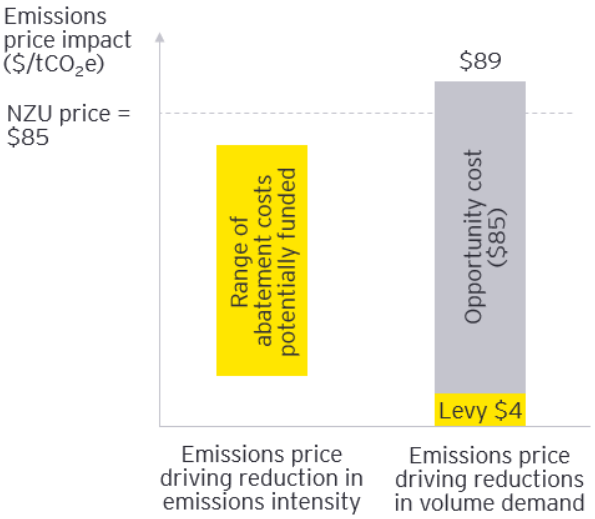
- The emissions price signal to reduce the emissions intensity of agricultural production is currently $0/tCO$_2$e. Neither farmers nor the agricultural processors that they sell to[3] face any financial cost for biological agricultural emissions so there is no money to be saved by improving the emissions intensity of production.
- The emissions price signal that drives changes in agricultural production volumes is the full $85/tCO$_2$e from the NZ ETS afforestation incentive. The objective of this afforestation incentive is not specifically to reduce agricultural production volumes, but the more that farmers choose to move areas of their land into forestry, the more that agricultural output will decline.

As with all of the examples that we have used so far, the afforestation price signal of $85/tCO$_2$e might or might not be enough to create changes in the choices that farmers make about their land use. $85/tCO$_2$e might not be high enough to encourage the household to install a heat pump and $85/tCO$_2$e might not be high enough to see industrial facilities reduce their emissions intensity. In addition, the fact that the emissions price incentive is there doesn't force any of these parties to take decisions that they don't want to, it just makes decisions that reduce emissions more financially attractive.

What we do know from economic studies[4] that have been carried out previously, is that for some farmers $85/tCO$_2$e is high enough to be a strong driver of change. The land where this $85/tCO$_2$e is likely to have the strongest impact is sheep and beef hill country farms with land use capability class of 5 and above. These land classes are where we see most new forest planting occur. The reason that the current emissions price can generate these land use changes is both the high breeding component of livestock carried on steeper country as compared to finishing farms,[5] and the limited options beyond on-farm sequestration to reduce emissions footprint. However, there are some agricultural land uses for which $85/tCO$_2$e is unlikely to be a strong driver for afforestation. For example, prime horticultural land is at very low risk of being planted out in forestry blocks.

The HWEN proposal

The agricultural emissions pricing proposal made by HWEN charges a relatively small annual levy for all agricultural emissions (in terms of $/tCO$_2$e), but uses the revenue from this levy to fund more expensive emission reduction technologies.



This chart shows the HWEN proposal in combination with the status quo impact of the NZ ETS afforestation incentive. While the prices for the HWEN proposal have not been formally set, they have proposed that the price ceiling for the levy should be set initially at 5% of the NZ ETS price. 5% of the $85 NZU price assumed in 2025 results in a ceiling on the levy fee at $4.25/tCO$_2$e and this is what we have included within the chart.

HWEN envisages that the revenue from the levy is used to directly fund two things:

1. The administrative costs of running the scheme
2. Research and development into emission reduction technologies and extension of technical advice, including a dedicated fund for Māori landowners

In addition to this direct funding, the HWEN proposal is that farmers should be able to claim a reduction in their levy fee (i.e. a rebate) through two separate mechanisms:

- Approved actions (practices and technologies) that reduce emissions
- The value of on-farm sequestration activities.

This financial approach wouldn't see money paid to the farmers from HWEN, but is a form of indirect funding for the farmers that will reduce the revenue collected by the HWEN proposal. By structuring their proposal in this manner, HWEN can collect levies at a relatively low cost (on a $/tCO$_2$e basis), but fund technologies that cost much more than this (again on a $/tCO$_2$e basis).

[3] The agricultural processors do face NZ ETS costs for the emissions associated with their production facilities (such as coal, gas and electricity consumption) as these are not classified as agricultural emissions within the NZ ETS. There are also on-farm costs such as diesel and electricity consumption which attract NZ ETS costs.

[4] New Zealand Ministry for the Environment, *Marginal abatement cost curves analysis for New Zealand: Potential greenhouse gas mitigation options and their costs* (2020)

[5] Breeding stock have a higher methane-emitting profile given the need to maintenance feed versus a finishing animal that grows over a shorter period before being sold.

A central question explored in the economic modelling behind the HWEN proposal is therefore how all these revenue flows and rebates add up. Because HWEN forecasts that they will be providing rebates for a much smaller volume of emission reductions than the emissions volume they are collecting the levy from, that the net overall revenue can remain positive.

This means the HWEN pricing scheme can be self-sufficient, despite the difference in $/tCO$_2$e between the levy and the emissions reduction rebates.

It is unclear what the range of costs will be for the emissions intensity reductions that are funded, but we can see in the modelling behind HWEN that a range of *multipliers* have been considered that range from 2.5 to 10 times the levy fee. In addition, the HWEN proposal has suggested that on-farm sequestration could receive a rebate of between 75%-90% of the NZU price. If/as we see the costs of these low-emissions technologies drop over time then the rebates will need to be recalculated so that the overall HWEN revenue outcomes remain balanced.

When we put the HWEN proposal together with the status quo NZ ETS afforestation driver, we get:

- The emissions price signal to lower the emissions intensity of agricultural production could be anywhere between $11 and $77/tCO$_2$e[6] in 2025. This reflects the range of rebates that could be available for farmers that pursue emission reduction activities and/or get their on-farm sequestration recognised. The HWEN proposal is open about the fact that these costs are currently uncertain and would need to be decided as part of any final agreement.
- The emissions price signal that impacts production volumes from HWEN directly is only $4.25/tCO$_2$e in 2025. This cost will need to be borne by farmers or passed onto their customers. However, HWEN will do nothing to remove the afforestation signal of $85/tCO$_2$e that will continue to be applied by the NZ ETS, which means the overall emissions price driver impacting production volumes now rises to $89.25/tCO$_2$e.

The HWEN proposal has been structured in this way to ensure that the emissions price driver which could act to reduce production volumes is only large enough to fund the emissions reductions measures required to deliver the legislated methane reduction target. But what is easy to overlook within the proposal is the continuing materiality, for some farmers, of the NZ ETS emissions afforestation price signal. This NZ ETS afforestation signal is not muted by the HWEN pricing regime, but even slightly increased. The opportunity cost of $85/tCO$_2$e that exists at the moment would have an additional $4.25/tCO$_2$e levy of direct costs added to it. A farmer choosing to switch some of their land from agricultural production into forestry would then face a net emissions price benefit of $89.25/tCO$_2$e.

Simplifications and caveats

We have tried to write an explanation of agricultural emissions pricing that is as straightforward as possible to understand. This section of our article lists some of the areas where these simplifications have been made. This article has:

- Not sought to make judgements about emissions leakage. Emissions leakage describes an outcome where production (and therefore emissions) are lowered domestically but this same production is replaced by higher production overseas with higher emissions intensity. Agricultural products, as well as those industries receiving free allocation within the NZ ETS, are all at risk of emissions leakage and this is therefore an important consideration within the design of emissions pricing systems.
- Used a single emissions price for both methane and nitrogen whereas HWEN envisages a separate price for each. Our choice to combine the costs for these gases has been done to try to ensure our messages are as easy to understand as possible. A more detailed explanation would split these gases apart from each other, but likely lead to very similar high-level conclusions.
- Not explored the social, regional economic or environmental outcomes from agricultural emissions pricing, even though these topics are of critical importance to decisions about climate policy. Agricultural emissions pricing has the potential to deliver disruptive impacts for rural communities and provincial centres that are reliant on the food and fibre industry for employment. This would include not only those working on the land, but also those involved in transporting and processing food and fibre products and providing services to rural communities.
- Not explained the vital role that other climate policies need to play alongside emissions pricing. Emissions pricing is an important part of the climate change policy toolkit, but it will work most effectively when it is supported by other policies.
- Just considered costs in terms of $/tCO$_2$e rather than looking into detail at the breakdown of capital, operating and financial costs. These costs will be different for each farm, emissions reduction technology and/or practice considered.

[6] These numbers are the range of abatement costs that could be funded and this ranges from 2.5 times the levy ($11) up to 90% of the reference NZ ETS price ($77)

Conclusions

Designing an effective and practical method for implementing agricultural emissions pricing is complex and difficult. It is also a topic that can quickly get personal because of the much tighter relationship that rural communities often have with their workplaces than workers do in many other parts of the economy. A farm can be simultaneously a workplace, a business, a home, a community, a tāonga we are charged with preserving for future generations and a multi-generational family asset. These factors can make decisions about any large-scale change more difficult.

However, the challenges and risks facing the agricultural sector from climate change are real and material. The agricultural sector faces a wide range of physical and transitional climate change risks. Changing weather patterns driven by a warming climate could make farming more difficult, less predictable and more expensive. Changing consumer preferences towards lower-emissions food products, such as synthetic proteins, could create risks to consumer demand. Voters and the governments that they elect will continue to demand progress, and enact policies, to move towards national and international emission reduction targets.

The opportunities for low-emission agriculture in New Zealand are also substantial. Consumers and food producers around the world will have an increasing appetite for climate-friendly agricultural products, processes and technologies. If the agricultural sector in New Zealand can capture even a small fraction of this global demand, then a strong growth story can be built from it.

So with these broader drivers in mind, we can summarise by considering how effectively the HWEN proposal provides these two emissions pricing signals:

- Lowering the emissions intensity of production
- Reducing emissions by lowering the volume of production

1. Lowering the emissions intensity of production

The HWEN proposal will provide financial incentives to farmers to reduce the emissions intensity of their production, and from this perspective it represents an improvement on the status quo. However, it goes about this in a complex manner that will need careful management, and likely frequent recalibration, over time. This is because each of the emission reduction technologies or practices that are funded need to have their costs agreed between a central HWEN governing body and farmers. This is one of the complexities that the CCC pointed to when it advised that implementing this system by 2025 would be challenging for the sector.

Contrast this with the situation that steel or lime manufacturers face within the NZ ETS, where these facilities don't need to negotiate any price for emissions reductions technologies with a central body. Facilities receiving free allocation within the NZ ETS get to make all their own decisions about whether the emission reduction technologies they are considering make economic sense. Free allocation recipients within the NZ ETS are therefore incentivised to try to implement any emissions reductions technologies at the lowest possible cost, so they maximise their financial returns. The portfolio of rebates set up through HWEN could encourage a focus on the negotiation of higher prices for the emission reduction technologies or practices, rather than efforts to bring down the cost of the emissions intensity improvements. If an allocation methodology could be developed through HWEN that acted in a similar way to the NZ ETS free allocation methodology then this might streamline the emission reductions incentives.

A lot could also be written about the approach that HWEN proposes taking towards the sequestration of on farm vegetation. Its proposal sets out the opportunity for a wide range of vegetation to be counted by the agricultural sector, some of which may already exist (and therefore lack additionality), and which is not available to other sectors. For example, councils own a wide range of vegetation types that don't qualify as forests within the NZ ETS but they (and their ratepayers) can't use this sequestration to offset their NZ ETS costs. This was another area where the CCC advised that changes might be needed to HWEN – their suggestion was to remove the funding of sequestration from the pricing scheme design.

2. Reducing emissions by lowering the volume of production

The HWEN proposal will provide only a modest emissions pricing incentive to lower emissions through lowering production volumes. This is because its levy is only as high as is forecast to be needed to meet the legislated methane emission reduction targets. The HWEN proposal[7] states this objective directly *"Levy rates need to be as low as possible while still achieving the objectives of reducing emissions, increasing integrated sequestration, and minimising impacts on primary sector production and profitability"*. If the economic modelling used to design the levy settings proves correct and HWEN (as proposed) does allow the sector's emission reduction targets to be met, then it is easy to argue that a low levy is all that is needed. However, while a low levy might be good at minimising the impacts of emissions pricing within today's agricultural markets, it could fail to adequately prepare New Zealand's agricultural sector for the outcomes needed to be profitable within the agricultural markets of the future.

[7] HWEN, *He Waka Eke Noa: Recommendations Report* (2022)

Today's status quo is a global market where agricultural emissions aren't charged for by governments, but this is a situation that could change in the future. Earlier this year the European Commission published a tender[8] for an economic study to assess a potential role for agricultural emissions pricing. The UK government included questions about how to measure agricultural emissions within a UK ETS consultation[9] launched in March 2022. The risk for the New Zealand agricultural sector would be if overseas agricultural emissions pricing proposals were combined with carbon border tax adjustments, such as those being considered by the EU[10], the UK[11], Canada[12] and the US[13]. This combination could see the New Zealand agricultural sector attempting to save money at home by setting a low domestic levy but then needing to pay money into the tax departments of overseas governments to meet their carbon border tax adjustment. The money given to other governments couldn't be used for R&D here at home, or to help fund the sector to scale its emission reduction efforts.

HWEN will need to be judged by not only how its impact can be minimised, but also its ability to be a force for positive change within the sector. This change will need to come from both technologies and practices that can lower the emissions intensity of agricultural production as well as shifting patterns of demand. While HWEN offers only a modest additional demand signal, there are other drivers of change that could be much more material in the future. Changing consumer preferences and new food products could create large shifts in our export markets and we can't ignore these risks and opportunities.

HWEN might be quite a delicate dance partner for the agricultural sector at the moment, but it is a crowded dance floor and the music is only getting louder.

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[10] EC, *Carbon Border Adjustment Mechanism: Questions and Answers* (2021)
[11] UK Government, House of Commons Environmental Audit Committee, *Greening imports: a UK carbon border approach* (2022)
[12] Government of Canada, *Exploring Border Carbon Adjustments for Canada* (2021)
[13] United States of America, Congress, *S.4355 - Clean Competition Act* (2022)