



KELLOGG
RURAL LEADERSHIP
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“What is currently being done and what more can we do to reduce on-farm waste in the NZ Dairy Industry?”.

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Table of Contents

| | |
|--|-----------|
| Executive Summary | 3 |
| Acknowledgements | 5 |
| Limitations | 5 |
| 1.0 Introduction | 6 |
| 2.0 Aims and Objectives | 7 |
| 3.0 Methodology | 7 |
| 4.0 Defining On-Farm Waste | 8 |
| 5.0 Literature Review – How much waste is produced and what work has been done to address this problem | 9 |
| 5.1 PWC Report – Farm Plastics Priority Products Stewardship – Material Flow Analysis | 9 |
| 5.2 Rural Waste Survey Data Analysis – Waikato Regional Council | 10 |
| 5.3 Non-Natural Rural Waste – Site Survey – Environment Canterbury | 10 |
| 5.4 The New Zealand Rural Waste Minimisation Project – True North Consulting | 11 |
| 5.5 Waste Minimisation Act – Product Stewardship Scheme | 12 |
| 5.6 Green-Farm Product Stewardship Scheme – Agrecovery Foundation | 12 |
| 6.0 Literature Review Summary | 13 |
| 7.0 Critical Analysis - Current Agricultural Waste Recycling Providers and Destination of Recycling Materials | 14 |
| 7.1 Agrecovery | 14 |
| 7.2 Plasback | 17 |
| 7.3 Current Urban Recycling Providers | 18 |
| 7.4 Where is our recycling going? | 18 |
| 7.5 Future Post | 20 |
| 7.6 Saveboard | 20 |
| 8.0 Data Analysis – Survey Results | 21 |
| 8.1 Farmer Survey Completed by Trish Rankin | 21 |
| 8.2 Taranaki Farmer Survey 2022 | 22 |
| 8.3 Zero Waste Taranaki – 2022 Farmer Survey | 26 |
| 9.0 Summary of Survey Results | 27 |
| 10.0 Conclusions | 28 |
| 10.1 Government Intervention and Product Stewardship | 28 |
| 10.2 Current Recycling Provider Performance | 28 |
| 10.3 Additional Future Services | 29 |
| 10.4 Household Recycling | 29 |
| 10.5 On-Farm Recycling Stations | 29 |
| 10.6 Destination of recyclable materials and using recyclable materials locally | 30 |
| Recommendations | 31 |
| References | 32 |
| Appendices | 34 |

Executive

Summary:

The New Zealand dairy sector has come through a remarkable period of expansion over the past 20 years. We have seen cow numbers grow from 3.4 million in 2000 to 4.9 million in 2019 and the area being farmed for dairy has increased by 33% over this period. Underpinning this growth has been continued intensification which has created significant opportunities and prosperity for those in the industry, however like any fast-paced intensification it has created negative impacts on our environment.

As a result, the NZ dairy industry has been challenged to be more environmentally and socially sustainable to ensure we are both proud and responsible within our farming practices. We are beginning to see change in a number of areas across the dairy industry with significant emphasis being placed on Climate Change, Water Quality, Work Conditions and Animal Welfare. Despite some initial farmer objections, these developments are all beneficial to the NZ dairy industry, and will enhance our reputation as a world leader in quality produced dairy products.

An area that remains out of the spotlight is on-farm waste and what we are doing to be environmentally responsive. It was the objective of this report to discover current waste and recycling volumes within the NZ dairy sector as well as what is being done about improving waste disposal. The report also sought to determine what is being developed for greater future farmer engagement as well as what is currently being achieved with the recycling that we are collecting from dairy farms.

At the commencement of the project the assumption was made that farmers continue to burn and/or bury their waste and that there is a lack of work being completed to address the increasing issue of on-farm waste on dairy farms. This report has been able to determine that previous work has been undertaken around waste levels and current disposal across the rural sector in New Zealand, and that despite some improvements in disposal practices this is an ever increasing issue that requires immediate attention.

This report identifies several significant studies and the arrival of two key recycling providers into the industry, AgRecovery and Plasback, who have ensured the volumes of recycling collected from New Zealand dairy farmers has significantly increased. This has been further accelerated by Fonterra adding evidence of recycling as part of their “Co-operative Difference” payment scheme which has seen both AgRecovery and Plasback see significant surges in registrations.

Farm plastics were given additional focus in July 2020 when the Government named Farm Plastics as one of its six priority products. This has ensured that the rural sector now has a responsibility to be environmentally responsive with the plastic products generated within the sector. Following this announcement, the Ministry for the Environment (MFE) advised it would be working with the AgRecovery Foundation to produce the Green-Farm Product Stewardship Scheme. This document has been designed to create a “one stop shop” to ensure farmers are able to deliver four key plastics streams to local collection centres by 2024. The proposal recommends that these services will be free to customers with any cost incurred generated through levies paid by plastic producers.

The Green-Farm Product Stewardship Scheme, which is yet to be accredited by Government, is a positive step for the industry. However, following further critical analysis and using frequency distribution data gathered from surveys of farmers across Taranaki, it has been found that this service alone will not be fit-for-purpose to service the needs of all farmers. This analysis and data also suggested that both Plasback and AgRecovery have improvements to make in their service delivery to ensure they are meeting the needs of farmers. It is therefore recommended that these improvements alongside a collaborative approach from all providers will need to be delivered before any potential accreditation is approved.

Frequency distribution analysis of the survey data also indicated that farmers would like a choice in their provider, and a desire to feel that their contribution is valued. In order to achieve this the research demonstrated that offering additional profit based providers for greater convenience would see further engagement from farmers. In addition, having accuracy around the amount of recycling collected on farm would quantify the contribution an individual farm is making. The data also found that household waste is an area where very little emphasis is placed, with significant quantities of household recycling currently being burned/buried or placed in “skip bins” due to a lack of convenient services. This is another area that improvements could be made and a recommendation is made in the report to assess the feasibility of “on-farm recycling stations”.

Finally this report analyses where our current recycling is being processed, whether this is sustainable at its current levels, and if it can sustain an inevitable increase from greater farmer compliance. This report concludes that currently up to 80% of our farm plastics are sent overseas and whilst we are utilising some of this product in New Zealand, this is limited to a few manufacturing companies. In order to be more environmentally responsive in future we need to deal with recycling internally and therefore greater sector and government collaboration is required to assist businesses within New Zealand.

Following the information gained from this report the following recommendations are made;

Establish An Accredited Inclusive Product Stewardship Scheme

1. The current Green-Farm Product Stewardship Scheme proposed by the AgRecovery Foundation is a great initial concept, however it requires further development before any potential accreditation is granted from the Ministry for the Environment. The “One-Stop Shop” solution is a positive one for the rural industry, however, needs to be more inclusive of other providers including Plasback, for its ultimate success. The proposed scheme needs to better acknowledge the work that is already occurring within the waste sector and utilise these providers in any future scheme. Once these necessary amendments are made the proposal needs to be accredited and operational as projected, in 2024.

Utilise Local Service Providers

2. That local services are required to complement the Green-Farm Product Stewardship Scheme proposal which will both provide additional options for farmers, and service additional waste streams. These services could include on-farm collection as a user pay service that allows for greater convenience to farmers to ensure waste removal and improve recycling practices. Farmers need the ability to choose the most convenient practice to meet their business needs and one solution will not meet this requirement.

Collection of On-Farm Recycling Levels

3. That volumes of waste and recycling collected needs to be recorded and collated at a farm level. This would allow farmers to accurately record the increased efforts that they are making and to hold those to account who are not making the required effort. This would also allow farmers to provide more accurate statistics across the complete rural sector. Currently we are not recording this information as accurately as we could. Farmers need to know the difference they are making so showing key individual farm stats as to levels of recycling will be crucial to any future success.

Enhance Government Collaboration

4. That government needs to enhance the work it is doing alongside current businesses within New Zealand who are attempting to use recycling waste and to look to support and develop companies who are trying to operate in New Zealand. Currently up to 80% of our plastic recycling goes offshore to be processed and we therefore need to develop further businesses within New Zealand to service more of our own recycling. Many of the products that are created from plastic waste are not high value therefore government assistance will be required to ensure companies are able to process these plastics and remain financially sustainable.

Acknowledgements:

Firstly, I would like to thank Scott, Patrick, Lisa, Annie, and the rest of the Rural Leaders team for giving me the opportunity to be part of the course and for the support they have given me and all the other Cohort 46 members. The course and report have been hugely beneficial for me personally and provided me a fantastic platform from which to continue my Leadership journey.

I would also like to thank LIC for both funding my application and their support in allowing me to attend the course. From LIC I would especially like to thank Malcolm Ellis for his on-going guidance and providing me the opportunity to attend the course and the Taranaki LIC team for being so supportive.

I would also like to thank my wife Kim and two sons Ollie and Sam for being patient with me as I attended the course and worked my way through the project.

Thank you also to all the stakeholders who were so engaging throughout the entirety of my project and to the Ministry for the Environment who have provided me with a great deal of support and insight. Finally, I would like to thank all the local Taranaki dairy farmers who completed my survey and provided some key information to form the basis of this report.

Limitations:

Covid has been an on-going limiting factor throughout this research. It would have been ideal to visit recycling companies across both the country and Taranaki however most work places have remained off limits for visitors due to Covid risks. I am very grateful to “The Junction” and Waste Management in Taranaki for allowing me to visit their work places despite Covid restrictions. This gave me significant perspective on the current work being done with recycled materials and the logistics involved in processing these.

The report writer also acknowledges that there are some limitations to the data collected via the farmer survey. With 53 responses, this number could have been greater however some good information was able to be analysed from this sample size. The important limiting factor to note with the survey data used is those farmers who choose to have a focus around on-farm waste and recycling are always the most likely to complete a survey about the good work they are doing. It is therefore probable that greater levels of poor practice around waste disposal and recycling would be evident if the entire farming population was assessed. This point was acknowledged by representatives from the Ministry for the Environment who felt the level of recycling engagement may be an over-representation of the general farming population. This does however ensure that the recommendations developed from this report have greater relevance to address a significant industry issue.

There were also some limitations around the destination of recyclable products. This formed a section of my report. When engaging with various providers it was often difficult to be able to gain details as to where the recycling is going and for what use. Some examples were provided. However, information was often deemed “commercially sensitive”, which is representative of an area of our recycling eco-system that needs further transparency to determine volumes, destination, and end use.

1.0 Introduction:

It was recently stated that New Zealand needs to think of itself as a kitchen that provides food to the world. If any of our consumers decided to eat from our kitchen are there elements of our farming practices that we wouldn't be proud of? This was a concept that resonated with me as we know our consumers are becoming more conscious of where and how their food is produced and as an industry we need to be responsive to this.

The New Zealand dairy sector has come through a remarkable period of expansion over the past 20 years. The number of cows has grown from 3.4million in 2000 to 4.9million in 2019 with the area being farmed for dairy increasing by 33% over this period. Underpinning this growth has been continued increase in intensification and efficiency with significant growth in the numbers of cows per hectare and Milk Solids produced per cow (Brunsdon, 2021). These huge increases have created significant growth opportunities for those in the industry however, like any fast-paced intensification, it has created negative impacts on our environment.

As a result of this growth the NZ dairy industry has now been challenged to be more environmentally and socially sustainable. To meet these challenges the sector needs to provide immediate solutions to ensure we are both proud and responsible within our farming practices. We are beginning to see these changes in a number of areas across the dairy industry with milk companies such as Fonterra entering further inside the farm gate to assist farmers to improve on-farm practices. We have seen this with Fonterra's "Cooperative Difference" farmer incentives programme. Despite some farmer objections these developments are beneficial to the NZ dairy industry and will enhance our reputation as a world leader in quality produced dairy products.

Despite environmental and social initiatives beginning to identify and address Climate Change, Water Quality, Work Conditions and Animal Welfare, an area I believe that remains out of the spotlight is on-farm waste and what we are doing with this to be environmentally responsive.

We have seen initiatives introduced across the country with AgRecovery and Plasback, however this only covers a small number of recyclable products generated on farm and in general it appears there is no long term strategy in place around waste and recycling on farm. It is only a matter of time before this is identified as a further key area dairy farmers need to address to be commercially competitive in the trade market. Despite some improvements, we still have a number of farmers across the country who are not engaged with recycling processes and who are still practicing burn and bury policies. This must change as we look to be more environmentally and socially responsible.

This report will focus on identifying what on-farm waste is and the current volumes of waste that is being created across the NZ Dairy Industry. This report will then focus on what is currently being done across the sector to manage waste and what is being developed to better support farmers in the future.

The other key area this report will focus on is that if we are able to get farmers being more responsive with their waste and the dairy industry creates greater volumes of recycling, would current providers be able to process increased volumes? Do we have the systems and capacity in place or are we solving one problem but simply creating another?

From all of the findings this report will summarise as to whether the pathway we are on with the management of on-farm waste and recycling in the dairy industry, is both a sustainable one and fit-for-purpose. Do we have the right services in place and are any proposed future solutions the right one for dairy farmers or do we need to be complementing this with additional services to support the dairy industry reduce on-farm waste?

2.0 Aims and Objectives:

The aims of this project are to:

- Gain an understanding of the current waste produced and recycled on NZ dairy farms.
- Look at current services provided to assist farmers to recycle and gain an understanding of how well these services are being utilised.
- Gain an understanding of where recycling is currently going, whether this is being managed successfully and does capacity exist if farmer recycling volumes increase.
- Look where government see the future of on-farm waste and recycling.

The objectives of this project are to:

- Provide an overall landscape of the waste situation currently across the NZ dairy industry.
- Seek an overall farmer opinion of current services and how these can be developed and/or improved.
- Use my local region, Taranaki, to gain perspective on how local council is responding to on-farm waste and recycling.
- Looking at a possible local solution to assist farmers to be more responsive with their recycling.

3.0 Methodology:

A Literature Review has been completed to assist in determining what defines on-farm waste as well as the amount of waste being created from the rural industry and more specifically dairy farms. This will also explore the previous work that has been done on options to assist farmers with their on-farm waste as well as what is currently being developed to further assist farmers in the future.

Critical Analysis of what is currently being provided for farmers with an exploration of what these services are and the effectiveness of them has also been completed. This will also explore whether we have the recycling capability to manage both current recycling levels and any additional levels that will be created through greater engagement.

A frequency distribution analysis of survey responses has been completed by 53 farmers across the Taranaki region. In April 2022, with the assistance of Fonterra, a survey was sent out to all Fonterra suppliers in Taranaki with the objective of seeking an understanding of local farmers views on waste and recycling.

Frequency distribution results from a May 2022 survey from the Taranaki Solid Waste Management Committee has also been used to add further information to the report. Finally, an April 2019 survey of 100 farmers completed by Trish Rankin has also been utilised. This additional research has been utilised to compliment the Fonterra survey and gain an understanding of current farmer sentiments regarding on-farm waste.

An interview was also conducted with a representative of each of the following key stakeholders. These interviews were completed to gain a better understanding of the current waste environment and levels of recycling that are being collected across the rural sector. These interviews have been completed to provide greater understanding and add depth to both the literature review and critical analysis.

- Ministry for the Environment
- New Plymouth District Council
- Waste Management
- Envirowaste
- AgRecovery
- Plasback
- Fonterra

4.0 Defining On-Farm Waste:

To find solutions to the current problem of on-farm waste, it is essential to define on-farm waste, the different waste types this would encompass, and the current levels of on-farm waste recorded in New Zealand.

When looking at on-farm waste, the meaning and different materials considered to be waste can be complex. Therefore, it is important to form a key definition that will form the basis of this report.

To best define waste for a NZ dairy farming context, the most comprehensive and relevant meaning found was from WasteNet Southland which states, “Farm waste is any material that is unwanted and unvalued and discarded by its owner. Common waste materials found on farms include: plastic wrap, baling twine, plastic chemical containers, feed and fertiliser bags, paper and cardboard, machinery, motors, electrical parts, fencing, railing, corrugated iron, vehicle batteries, household rubbish (furniture, glass, cardboard, food waste), paints, glass, rubber, piping and fittings, timber, concrete, engine and hydraulic oil, dead livestock and animal medicines” (WasteNet, 2022) .

Further to this a 2014 Waikato Regional Council Technical Report into Rural Waste separated rural waste products into the categories in the below table. This will form the basis of what this report defines as on-farm waste materials.

Table 1: Core Rural Waste Products

| Waste type | Sub Group |
|--|---|
| Plastics | Containers |
| | Drums |
| | Silage wrap |
| | Netting |
| | Mulch film and crop cover |
| Hazardous substance containers e.g. agrichemicals, waste oil | Plastic |
| | Metal |
| | Lead acid batteries |
| Packaging | Fertiliser bags |
| | Seed bags |
| | Animal feed bags |
| | Animal health plastic packaging and plastic sheep dip |
| | Oil containers |
| | Miscellaneous |
| Wood | CCA treated timber |
| | Untreated timber offcuts |
| | Old fence posts |
| | Pallets |
| Scrap metal | Roofing materials |
| | Used vehicles/ machinery |
| Chemicals (hazardous & non-hazardous) | Drench/dip |
| | Agricultural sprays |
| | Fertiliser |
| Other | Twine |
| | Used tyres |
| | Vehicle batteries |
| | Building waste |
| Domestic refuse | Household wastes, Whiteware, TVs, fluoro bulbs etc |
| Organic Wastes | Animal remains, tree cuttings, and vegetative matter |

(WaikatoRegionalCouncil, 2014)

5.0 Literature Review – How much waste is produced and what work has been done to address the problem?

With a clear definition and understanding of the types of materials we define as on-farm waste, it is relevant to assess the extent of the waste being created in the NZ dairy industry.

Finding data regarding levels of waste across the industry has been difficult and therefore several key studies have been utilised to best estimate the levels of on-farm waste being created across the country on a yearly basis. Most of these studies have utilised data from across the whole rural industry rather than determining farming type, however this data still provides strong research into the volumes of waste being created from within the rural industry.

5.1 PWC Report – Farm Plastics Priority Product Stewardship Scheme: Materials Flow Analysis

In 2020 Agrecovery commissioned Price Waterhouse Cooper (PWC) to complete a Farm Plastics Priority Product Stewardship Scheme: Materials Flow Analysis. This determined the levels of on-farm plastic waste currently being deployed across the rural sector and the weight of all farm plastics that had been sent out to farms for the year ending 30 June 2019.

It is important to note with this data that several material volumes were estimates due to a lack of data from relevant organisations and only seed, feed and fertiliser bags, crop packaging films and other plastic packaging and products used for agriculture and horticulture were included in the scope of this analysis. It is also noted the analysis did not cover off the levels of plastics that were then removed from farm and recycled and that because the analysis only looked at certain product types, the actual levels of on-farm plastics would potentially be far greater than these estimates.

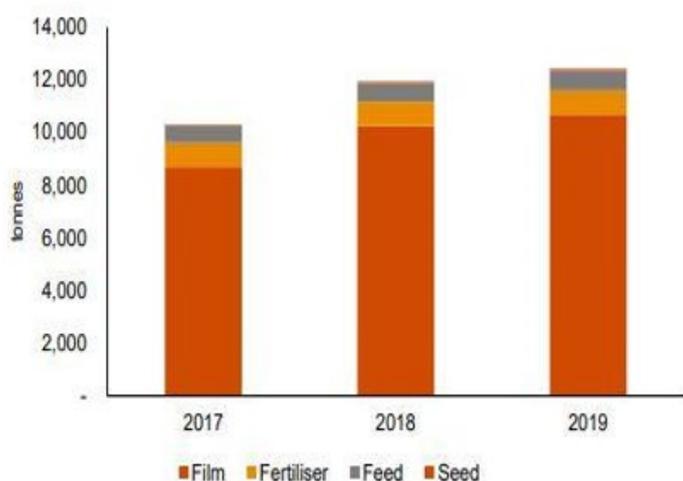


Figure 1: Weight of plastic packaging of all farm plastics by for the year ending 30 June

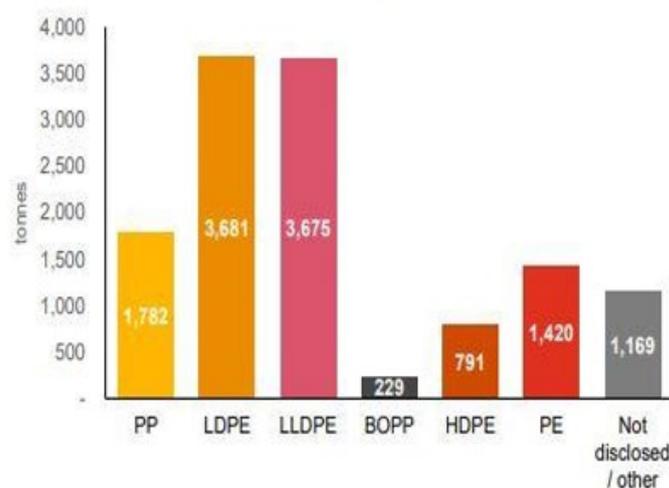


Figure 2: Weight of plastic packaging of all farm plastics plastic type for year ending 30 June

(PWC, 2020)

5.2 Rural Waste Survey Data Analysis – Waikato Regional Council

In 2014 the Waikato Regional Council released their Rural Waste Survey's Data Analysis – Waikato and Bay of Plenty, which provides greater clarity as to the amounts of waste on farm collected for recycling. The survey was conducted on 69 rural properties and recorded 2564 tonnes of rural waste. This is an average of 37 tonnes of waste disposed of on each property. If this was to be extended across all 14,685 farm holdings in both regions at the time, an estimated 544,622 tonnes of rural wastes are disposed of annually. This study also determined at the time that 100% of all rural properties surveyed in the Waikato and Bay of Plenty regions buried, burned or bulk stored waste on site.

If we then use 37 tonnes of rural waste per property and project it across all the 58,071 rural properties as represented in Figure 3 below, we can estimate that in NZ there is 2,148,627 tonnes of rural waste produced annually. The application of an average tonnage per rural property across New Zealand is a simple projection and does not consider the variations in activity (dairy, dry stock, horticulture), property size, and activity intensity, however the data shows rural waste represents a national scale issue (WaikatoRegionalCouncil, 2014).

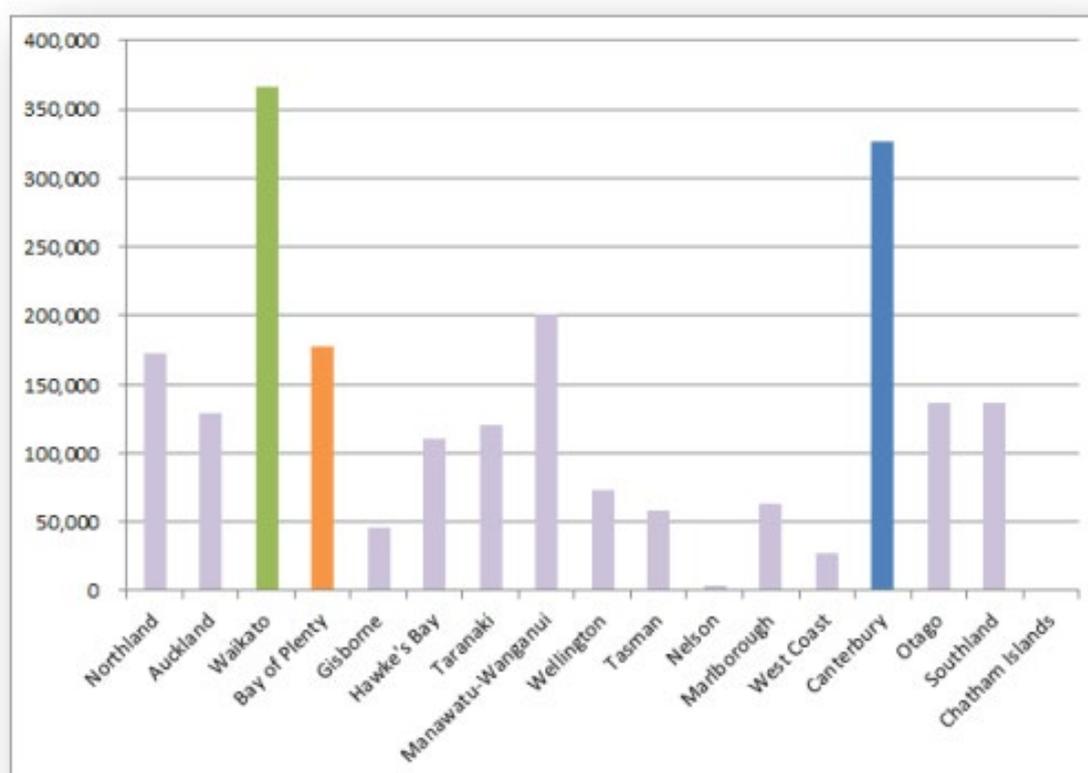


Figure 3: National Rural Waste Projections

(WaikatoRegionalCouncil, 2014)

5.3 Non-Natural Rural Wastes – Site Survey – Environment Canterbury

A further study looking at the levels of on-farm waste was the Non-natural Rural Wastes – Site Survey Data Analysis Report completed by Isla Hepburn and Chris Keeling in 2013 for Environment Canterbury. This study was conducted to give an indication of the type and amount of waste produced on farm in Canterbury, and how this waste is managed. In this study surveys were carried out on 53 farms across eight of the 10 Districts in Canterbury over a cross-section of farming types. The report estimated that a total of 490 tonnes of non-natural rural waste, 740 tonnes of organic waste

and 26 tonnes of domestic waste were generated annually by the farms surveyed resulting in an average of 24 tonnes per farm per year (Hepburn & Keeling, 2013).

Based on these averages the report concluded that 209,000 tonnes of waste is produced in total each year across rural properties in Canterbury, which equated to the amount of waste sent to landfill by Christchurch City in the 2012/13 financial year. Of the farmers surveyed 92% of farmers advised that they used burning, burying, or stockpiling as their primary form of waste disposal meaning approximately 192,000 tonnes of waste is disposed in these ways in Canterbury each year (Hepburn & Keeling, 2013).

From these surveys it became clear that NZ farming was producing large amounts of waste and at the time very little of it was being recycled. As a result of the work done by these studies across 2013 and 2014, a report was commissioned jointly by Environment Canterbury alongside the Ministry for the Environment to look at how on-farm waste could be better managed and how farmers could be better supported to recycle some of their waste products. The report has formed the basis of several the improvements we have seen in the sector and on-going recommendations as to how to improve the management of on-farm waste in New Zealand.

5.4 The New Zealand Rural Waste Minimisation Project – True North Consulting

The New Zealand Rural Waste Minimisation Project was completed by True North Consulting for Environment Canterbury in 2018. The project was undertaken due to previous surveys undertaken in Canterbury, Waikato, and the Bay of Plenty and in response to on-going concerns around the disposal of rural waste. The project was designed to better understand the nature of waste on farms and to identify sustainable alternatives to burning, burial and bulk storage of waste.

Following consultation with key organisations such as Agrecovery and Plasback as well as running two pilot programmes in Geraldine and Matamata, the report concluded that a “one stop shop” as per the table below would be the best future solution for the rural sector to improve the disposal of on-farm waste.

Table 2: Rural Waste Solution Model



The project also concluded the following key learnings that would need to be included in any future projects or deployments of programmes in relation to the reduction of on-farm waste.

- Farmers are already motivated to protect the land.
- Service uptake depends on flexibility in cost and convenience.
- Waste should be collected all at once.
- Solutions need to be designed around farmers.
- Waste end-market sustainability is the key threat to service viability.
- Legislation is unlikely to be the primary solution to current farmer waste management issues.
- Service participation is best ensured by partnering with industry organisations.
- Effective service provision and farmer engagement is being modelled by community organisations.

The Rural Waste Minimisation Project became the key piece of work highlighting the current waste issue in the rural industry and alerted industry partners and the Government that some significant improvements were required in the sector. The result of this was milk processors bringing recycling practices into their on-farm requirements and an increased uptake to rural waste providers such as the AgRecovery and Plasback programmes. The report also highlighted that further intervention into on-farm waste was required and in 2020 the Ministry for the Environment (MFE) announced farm plastics as one of their six priority products.

5.5 Waste Minimisation Act – Regulated Product Stewardship

The reduction of on-farm waste further came into focus in July 2020 when the Ministry for the Environment (MFE) named Farm Plastics as one of its six priority products. To be a priority product the Ministry must be satisfied that either;

- the product will or may cause significant environmental harm when it becomes waste
 - or there are significant benefits from reduction, recycling, recovery, or treatment of the product
- and;
- the product can be effectively managed under a product stewardship scheme.

Declaration of “priority product” under the Waste Minimisation Act creates both an obligation and opportunity within the industry (MinistryForTheEnvironment, Regulated Product Stewardship, 2021).

Following this announcement MFE announced it would be working with stakeholders across the six priority products to co-design product stewardship schemes. In regard to Farm Plastics, The AgRecovery Foundation have been supported by MFE to produce the Green-Farm Product Stewardship Scheme for potential future accreditation under the Waste Management Act 2008.

5.6 Green-Farm Product Stewardship Scheme – AgRecovery Foundation

With the support of MFE, The AgRecovery Foundation has recently completed a project which seeks to develop a Product Stewardship Scheme for the collection and treatment of farm plastics. Through this project, The Agrecovery Foundation has engaged with stakeholders to design and implement processes, undertaking a robust assessment of scheme options and has made a recommendation to MFE on the preferred scheme option.

The outcome of the farm plastics project co-design workstream is a proposal for AgRecovery to implement an effective and sustainable regulated Green-farms Product Stewardship Scheme (GPSS) for accreditation in 2024. The GPSS is expected to collect and treat farm plastics across four farm plastics waste streams by 2026 and then add-on other farm plastics waste streams over the following years. The goal is to effectively collect and treat most farm plastics by 2030.

The scheme has initially been designed for four farm plastics product waste streams as shown in the table below, based on several design and implementation principles. The scheme is projected to recover most plastics used on New Zealand farms today with an operational infrastructure in place to cover the collection of the forecast volumes, and readily scalable in the future to cover other farm plastics and/or other agricultural waste (AgrecoveryFoundation, 2021).

Table 3: Proposed Plastic Waste Streams

| | |
|---|--|
| 1 | Agri-chemicals and their containers stream, including any complementary farm plastics - existing voluntary and accredited scheme |
| 2 | Bale wrap and silage sheet stream, including any complementary farm plastics e.g., baling twine - mostly plastic film packaging |
| 3 | Small bags stream, including any complementary farm plastics - 10 to 25kg seed, feed, and fertilizer plastic packaging |
| 4 | Large sacks stream, including any complementary farm plastics – typically half and one tonne grain and fertilizer packaging |

The four farm plastics areas have been designed to significantly reduce the largest and most concerning volume of farm plastics and to avoid the plastics from being burnt, buried, or stockpiled on the farms or disposed of, off farm, such as in refuse tips. The proposed collection method of the farm plastics across the four streams will be;

Table 4: Proposed Rural Collection Methods

| |
|---|
| <p>First - through farmers and growers and farm contractors dropping their farm plastics off at well communicated and sign-posted collection (drop-off) sites. Where possible no more than 25km from the farm gate. This is consistent with the successful operational model used for the existing agri-chemicals and containers voluntary and accredited scheme; and</p> <p>Second - where the volume of the plastics exceeds set weight limits the farmer or grower will be offered an on-farm pickup. An on-farm pickup will also be offered where a farm is distant from any established collection site, irrespective of the weight of the plastics.</p> |
|---|

The premise of the proposal is that all services will be free for farmers and finances required to run the scheme will be produced through levies charged to on-farm plastic manufacturers. The final proposal has recently been completed and returned to MFE for scheme accreditation. Government consultation on proposed regulations to support effective scheme operation can now begin with any future accredited scheme due to commence from July 1, 2024.

6.0 Literature Review Summary:

From the Literature Review it is clear a lot more is occurring to address on-farm waste than first thought when undertaking this project. Several studies have been completed across the country that have determined the potential volume of waste being created across the rural industry and the current methods in which it is being disposed.

What these projects have determined is what was already suspected. That significant volumes of waste are being created across rural properties in New Zealand with currently a lack of transparency as to where and how these products are disposed of. We can see from the research that traditionally the only form of removal of this waste was via burn and bury policies however in recent times, with the introduction of several recycling entities and heightened environmental awareness, we have seen an increase in recycling practices.

With farm plastics being announced as a priority product in the Waste Minimisation Act – Regulated Product Stewardship Scheme and the subsequent Green-Farm Product Stewardship Scheme Report produced by the AgRecovery

Foundation, the industry has now been provided with a potential blueprint for its future waste disposal.

This represents a positive step for future environmental outputs and the reputation of the industry. It is now imperative however to look at what current on-farm waste recycling organisations are doing and where this recycling is going. This will then provide further information as to whether the Agrecovery Foundations proposal is achievable or whether further solutions need to be developed and providers endorsed for the greatest possible farmer engagement.

7.0 Critical Analysis – Current Agricultural Recycling Providers and Destination of Recycling Materials:

The Green-Farm Product Stewardship Scheme Report provides a potential future strategy for a number of waste product streams currently generated on-farm. However, it is important to analyse what current on-farm recycling options exist and whether these need to remain available should the future solution provided by the Green Farm Product Stewardship Scheme come into effect in 2024. It is also important to analyse where current waste streams are going and whether we can increase current production levels.

There are currently two main organisations providing rural waste collection in New Zealand. These are AgRecovery and Plasback. Outside of these two organisations, farmers are currently required to dispose of their own waste and recycling. To gain a better understanding of current services provided by these organisations this report has provided an overview of what each company does and the current success of their schemes.

7.1 AgRecovery:



Agrecovery is a not-for-profit charitable trust that provides free agrichemical container recycling and chemical recovery for farmers across the country. It provides this service by ensuring brand owners that distribute agrichemical, animal health and dairy hygiene products into the New Zealand market take responsibility for the disposal of their products and their packaging at the end of their useful life. They do this by paying the Agrecovery Foundation fees and levies to cover programme costs. This enables free access to Agrecovery users (Agrecovery, About Us, 2022).

AgRecovery currently recover these materials by setting up regional collection events. Since its inception in 2007 they have collected and recycled 3,468,721Kg of plastic containers and have recovered 116,803Kg of chemicals. Due to this success and their continued desire to reduce rural waste, the AgRecovery Foundation have produced the Green-Farm Product Stewardship document which seeks to expand their scope of collection and have the scheme accredited and operational by July 2024.

It is noted from both the survey data collated as well as interviews completed that AgRecovery has been a welcome programme to assist farmers with their on-farm recycling. It is also noted that farmers have successfully chosen to take up a registration with Agrecovery with significant increases in registrations over the past few years as can be seen in the table below.

Table 5: Agrecovery New Registrations

| Agrecovery New Registrations | | | |
|------------------------------|------|------|------|
| Property Type | 2020 | 2021 | % |
| Arable | 78 | 91 | 17% |
| Dairying | 159 | 988 | 521% |
| Livestock | 180 | 240 | 33% |
| Orchard | 121 | 184 | 52% |

Have increased registrations led to increased participation and greater volumes of recycled material? AgRecovery were contacted for comment and advised they have seen significant increases in registrations which now total 19,413 nationwide. Due to the current nature of the programme and recording of the materials received they can provide accurate nationwide data however recording at farm level is currently not as accurate. This is something that is currently being worked on with systems currently being put in place to improve this.

What is seen as the key reason for a huge increase in the registrations for Agrecovery is its inclusion in Fonterra’s Co-Operative Difference document. From 1 June 2021 Fonterra commenced its Co-operative Difference programme which pays an extra 10c dividend to its farmers who meet certain targets across the following five key area; People and Community, Environment, Animals, Co-op & Prosperity and Milk. For a supplier to be able to access this 10c payment they are required to meet criteria across all these key areas.

Contained within the Environment Section, Fonterra has included a section that stipulates all on farm plastics and unused agrichemicals are managed through an approved product stewardship scheme such as AgRecovery or Plasback (Fonterra, 2020).



Environment

- The farms purchased nitrogen surplus is at or lower than the target. The preliminary target for the 2021/2022 season is 137 kgN/ha. This will be updated to the final target figure early in the new season.
- All on-farm plastics and unused agrichemicals are managed through an approved product stewardship scheme such as AgRecovery or Plasback.
- There is no discharge of dairy shed effluent to water.
- 80% farm-grown feed across the season.
- Assess the winter grazing risk associated with your farm and demonstrate how this risk is managed before 1 May.

Figure 4: Fonterra Cooperative Difference – Environment Section

Following the release of this document, as can be seen in Figure 5 below, there has been a significant increase in the uptake of Agrecovery new registrations.

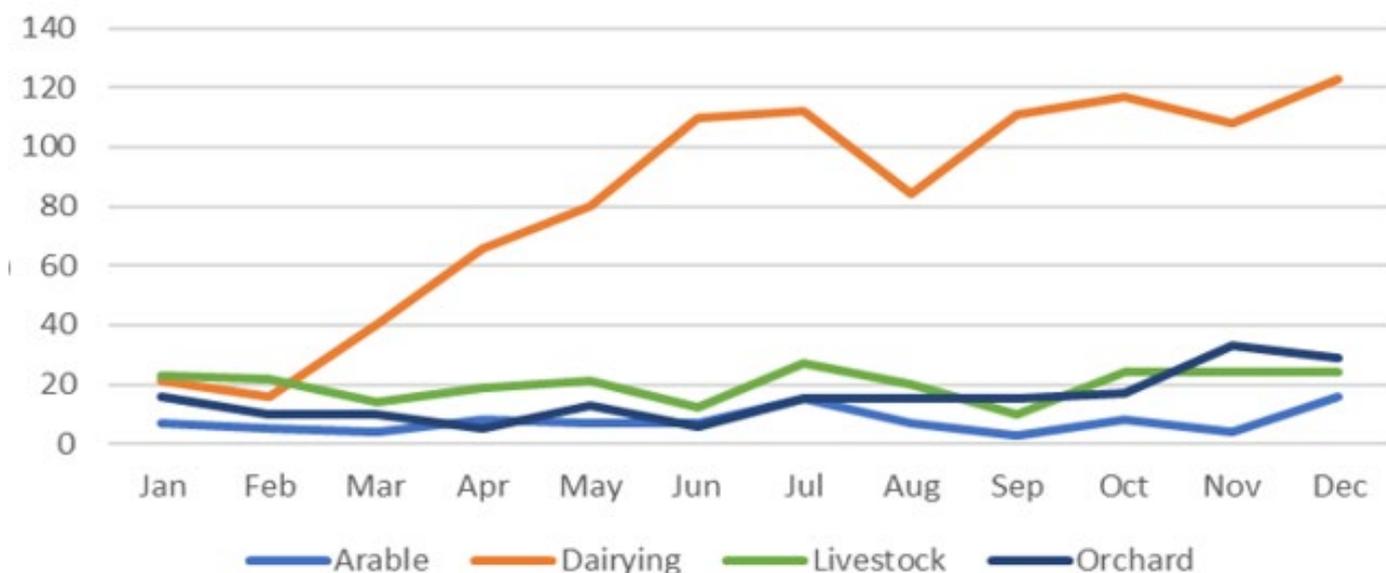


Figure 5: Agrecovery New Registrations 2021

To gain a better understanding of the requirements of this section in the Co-operative Difference document I interviewed a local Fonterra Area Manager. They advised the current criteria for achieving this standard is for farmers to have registered with either AgRecovery or Plasback. No requirement is currently in place to assess the farmers uptake of any of these schemes. They are looking to extend this requirement in future to include evidence of recycling provided to recyclers however at this stage this is not required.

This information suggests that although AgRecovery has seen a significant increase in registrations to their programme, due to current lack of measuring and collection we are unable to determine whether this has seen an increase in the amount of material being recycled.

To make this more specific I have used a Taranaki example, utilising data from the Taranaki Solid Waste Management Committee. Taranaki currently has 765 farmers registered with AgRecovery however in the last two years has hosted only one event in each of Taranaki’s three Districts with a total of 75 farmers in attendance. During these events over three tonnes of plastic waste and around four tonnes of chemical waste and oil were collected. This is a great result, however only represents a small quantity of what remains on farm.

AgRecovery has now also set up Plastic Container recycling “cages” at Farm Source stores across the country which is again another move in the right direction. At this stage a farmer is required to log in to their AgRecovery Account to advise of the products they are dropping off. They need to ensure these are from an affiliated provider or to purchase “stickers” that are required when recycling a non-affiliated provider. When received at Farm Source these are then receipted from the Farm Source staff either via a paper receipt or electronically.

This highlights that what AgRecovery is trying to achieve is commendable and what the industry requires. The current model however lacks a complete solution and is unable to collect the direct data needed to accurately measure its success.

7.2 Plasback:



Plasback is a farm plastics recycling company specialising in the recycling of Baleage Wrap. The company was founded in 2006 by Agpac, an importer of baleage wrap to New Zealand, and to date have recycled over 19,000 tonnes of farm plastics.

Plasback currently recovers its materials by providing drop-off points for farmers or by picking up from farm by providing bins and liners in which to collect plastic bale wrap in preparation for transportation. The company operates nine purpose-built balers designed to improve the onward transport logistics from collection points to the recycling plants, and have introduced new products made from recycled plastics, Tuffboard, Tuffdeck, and Plaswood. Plasback utilise contractors who run the collections across New Zealand (Plasback, 2022).

The difference between the models offered from AgRecovery and Plasback is that Plasback is a commercial entity with the cost of bins and liners charged as well as any on-farm collection service.

Plasback was originally accredited Product Stewardship status by the Ministry for the Environment under the Waste Minimisation Act 2008 on 4th May 2010 however the current model no longer fits the criteria for future product stewardship in that it's a profit-based model. The company remains with this status until 2024 at which time a new product stewardship agreement will be accredited. It remains unknown what entity will have product accreditation however it is noted that AgRecovery have proposed that this would sit under their Green-Farm Product Stewardship Scheme.

In response to the current Green-Farm Product Stewardship document which has been prepared by AgRecovery and proposes AgRecovery would be the accredited entity to provide removal of Baleage Wrap, Plasback has opposed certain elements of the current report. They have asked that some form of competition remain in the industry and that the choice should be left to farmers, with service and performance determining which provider they would utilise. They further point out that the current report creates a model that is not financially sustainable and has a "slant" to Agrecovery. If the report was to be finalised and implemented in 2024, there would be no place in the market for Plasback. They reiterated their message that farmer choice is vital and can only create greater opportunity to address the issue of on-farm waste and that both Agrecovery and Plasback could complement each other to provide the best outcomes for farmers.

In survey results and farmer interviews, much like Agrecovery, there has been a significant increase in registrations to Plasback since its inclusion in the Co-operative Difference document. This information was confirmed by Plasback who advise their memberships has increased by around 20% since the Co-operative Difference document was released in 2019 as well as approx. a 33% increase in the volume of plastic bail wrap collected over this time. Plasback also advised they have currently accessed around 50% of the market with plenty of opportunity for further engagement across the rural sector.

7.3 – Current Urban Recycling Providers

Outside of AgRecovery and Plasback there are no other significant on-farm waste organisations operating across the country. From the work that AgRecovery is doing with its Green-Farm Product Stewardship proposal it is clear, AgRecovery or another similar “One-Stop Shop” entity wishes to be the leader in this space and to provide further solutions for a wider number of products.

As it is currently, there are a significant number of waste products across the dairy industry that are not under a product stewardship scheme and therefore must be removed by other means. This is either by way of the traditional burn and bury method or as we see on most farms now, via a “skip bin” from either of the two main waste providers across the country, Waste Management and Envirowaste.

Both companies were spoken to regarding this report and were able to supply information on what they provide to the rural sector. Information around numbers of bins currently on farms around New Zealand and volumes collected was deemed “commercially sensitive”, however the two companies confirmed they provide recycling and waste solutions for councils and businesses across the country. Both companies provide waste solutions for dairy farmers, with “skip bins” being the current primary form of waste removal from farms. This system works on a monthly charge for the hireage of the bin, plus a pick up and removal fee. The waste collected from these bins can be any material and is transported directly to the nearest refuse station where it is then taken to a landfill to be buried.

In discussions with Waste Management in my local region of Taranaki, they were very helpful with what solutions could be further provided to assist rural customers with their recycling. They advised however that they would need to have significant quantities of customers for this to be commercially viable. For example, Waste Management currently hires recycling bins and runs recycling collection services that travel throughout Taranaki however due to cost, these trucks only travel “main routes”. Customers who are located outside of these routes can transport their bins onto these “main routes” on the day of collection. Although this is not an ideal situation and doesn’t provide an “on-farm” solution it does provide a further alternative to taking recycling to a local refuse station.

7.4 Where is our current recycling going

When looking at potentially increasing significant amounts of recycling material into the supply chain it’s important to note whether the supply chain could support such an increase.

The Green-farm product Stewardship document suggests that New Zealand has been increasing plastics recycling capacity, albeit slowly, with much further investment required. A number of local plastic manufacturers use recycled plastics in their manufacturing process, however there is not enough plastics recycling capacity in New Zealand to process current plastics collections, let alone farm plastics on their own.

Agrecovery and Plasback advised the majority of the product they are collecting is currently going to overseas markets, with only approx. 20% of recycled product remaining onshore and being repurposed in New Zealand. The future for plastics recycling in New Zealand and in the rural industry is therefore unclear and there appears to be limited investment in new processing plants on the horizon.

The only alternative to a lack of domestic recycling capacity is to export the farm plastics overseas. Large volumes have been sent to Asia for a number of years however given current world and market implications the sustainability of processing much of our plastic waste by shipping it to Asia is also in question. This all points to longer term solutions needing to be found onshore. Agrecovery advised it currently has overseas markets and processes in place to export farm plastics when required and this is likely to continue for the other GPSS farm plastics streams from 2024 onwards (AgrecoveryFoundation, 2021) .

To assess what we are currently doing with other recycling streams, I engaged with both Waste Management and Envirowaste within my region, as these two companies cover all urban recycling collected across New Zealand. Both companies were limited in their responses, advising that some of this information is commercially sensitive. They were able to provide me some examples based in New Zealand however, that represent a positive future for some of our plastic recycling.

To get greater local perspective both Envirowaste and Waste Management suggested having a tour of The Junction – Zero Waste Hub located in New Plymouth.

This facility has been built as a Hub for both education around producing less waste as well as a drop off Centre for all types of plastics, cardboards and glass. These can be dropped off at no charge and then delivered to recycling providers. The Junction is a community run facility devoted to a Zero Waste future by changing attitudes around waste minimisation and reuse. They do this through fun, hands-on education programmes that encourage reduction of waste through reuse and recycling as well as encouraging the donation of preloved goods for resale (NPDC, 2022).

Image 1: The Junction – Zero Waste Hub



Located within The Junction is The Material Recovery Facility (Murf) which is where domestic recyclables from across Taranaki arrive to be sorted and compacted before being sold around New Zealand and overseas. The machine which has been in operation since 2015 is like many that are now operational across the country and has ensured that Taranaki has been able to divert up to 6000 tonnes of recycling from landfill every year (Stuff, Take a look inside Murf - New 39 million Recycling Plant, 2015).

The recycling created from the Material Recovery Facility is sorted and diverted to a number of recycling organisations across both the country and the world. Both glass and cardboard are diverted to companies inside New Zealand with both Envirowaste and Waste Management advising there is no issue with current volumes or any potential increased volumes across these two products. Where the greater difficulty lies is with both hard and soft plastics. In my visit to “The Junction” it was advised that with any plastic material the market is limited within New Zealand with these products traditionally sent to overseas markets. Due to increased volumes and COVID implications these markets have ceased, and significant stockpiling is occurring at this time. It is hoped we will either return to using overseas markets or there will be development of further recycling alternatives for hard and soft plastics. During the interview both Future Post and Saveboard were listed as innovate companies who are examples of NZ based plastic recycling.

7.5 Future Post



Future Post is a NZ based company that creates 100% recycled plastic fence posts. The company takes recycled household plastics such as milk containers and household plastic bags and turns them into plastic fence posts. Machinery designed and made in New Zealand is used to turn the soft plastic packaging into small chips, which are then put through an extruder and moulded into fence posts. About 1500 bags go into each standard fence post and the Future Post factory can make about 800 posts a day. The Waiuku based company has also recently upgraded its factory enabling it to now process up to 5000 tonne of plastic waste per year (FuturePost, 2022).

The company has also connected with NZ Post to create an ability for everyone to work together to assist with recycling. From April 2022 a trial has been running allowing consumers to buy and fill special pre-paid courier bags with soft plastics, including bread bags, courier bags, bubble wrap and dry pet food bags. These can then be dropped off to a courier where they are mailed directly to Future Post. The \$7 pre-paid bags are available from selected NZ Post, New World, The Warehouse and Warehouse Stationery stores from April 22 (Stuff, Postal Recycling Scheme to Turn Plastics Into Fence Posts, 2022).

Image 2: NZ Post Soft Plastic Recycle Bag



Future Post represents a clear example of what needs to be achieved with an ever-increasing level of recyclable plastics. With a recent capacity to process 5000 tonnes of plastic per year, this is a great start. However, we will need more companies like this if we are to address plastic recycling within New Zealand, and if greater number of recyclables are generated from the rural industry.

7.6 Saveboard



Saveboard is a New Zealand based innovation solution company that upcycles packaging waste into construction board. The company has recently received significant funding enabling it to build a plant in Te Rapa which has been fully operational since the end of 2021. The plant can now convert up to 4000 tonnes of waste a year into approx. 200,000

sheets of construction board. The company converts (previously unrecyclable in New Zealand) material such as coffee cups, carton board and soft plastic waste into world-class products (Saveboard, 2022).

To fulfil current production would require Saveboard to capture 1% of the construction market which shows the potential scope of future waste recycling an operation like this could utilise if it became a significant product within the construction industry.

Image 3: Saveboard Construction Board



Much like FuturePost, companies such as Saveboard will need to be supported and enhanced to assist New Zealand to be able to convert the ever-increasing levels of recyclables to useable products. The reality becomes, as we begin to fix the problem of rural recyclable materials ending up in landfill or being burned and/or buried we need to ensure we have the companies and infrastructure to support this change. These businesses showcase future possibilities.

8.0 Data Analysis – Survey Results:

As part of my report, it was essential that frequency distribution data was collected from farmers to assess current trends on whether they feel on-farm waste is an issue. I also wanted to determine the level of current service use and whether farmers feel these services are satisfactory or whether they need to be further enhanced. It was also relevant to assess whether farmers feel additional services could be added to current offerings to make their ability to reduce waste more convenient.

I have utilised three sets of data to quantify these findings. Firstly, I have used a study completed by Trish Rankin, a previous Kellogg graduate and former Dairy Women of the Year, who surveyed 100 farmers from across the country in April 2019. I have also utilised May 2022 survey results provided to me by the Taranaki Solid Waste Management Committee who are currently using survey data to form their updated Waste Management and Minimisation Strategy for Taranaki (due for release in 2024). Finally, I have completed my own survey with the support of Fonterra which has been undertaken by 53 dairy farmers across Taranaki.

8.1 Farmer Survey completed by Trish Rankin

In April 2019 Trish Rankin completed a survey of 100 dairy farmers across the country to assess current attitudes towards waste and recycling and what could further assist them to recycle their waste. Some of the key conclusions from the survey found;

- 90% of farmers surveyed believed that the NZ Dairy Industry needs to improve (reduce) the amount of rubbish produced on farm, with 7% being undecided and only 3% believing we didn't need to improve our waste disposal behaviours.

- 51% of all farmers surveyed advised they sent all their waste to landfill, with a further 22% burning or burying their waste on farm. Only 27% of respondents advised they were currently using a recycling provider such as Plasback or AgRecovery.
- The number one option to help farmers improve how they deal with waste was for “the council to make rubbish and recycling options easier for farmers”.

8.2 Taranaki Farmer Survey 2022

In April 2022, with the assistance of Fonterra, a survey was sent out to all Fonterra suppliers in Taranaki. The objective of the survey was to provide a frequency distribution of local farmers views on waste and recycling.

Of the 53 farmers surveyed 81.13% were located within the South Taranaki District, with 9.43% located in the Stratford District and a further 9.43% from the New Plymouth District. To give an indication of the size of the dairy farms, the average cow numbers per recipient was 435 cows and the average number of dwellings per farm was three.

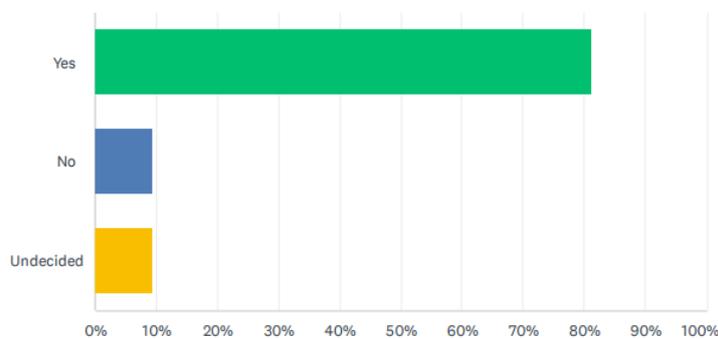
The survey provided the following key results;

Survey Result Graph 1:

- 81.13% of those surveyed felt the NZ Dairy Industry needed to improve the current options available to dairy farmers to manage waste and improve recycling practices. Only 9.43% of responses advised they felt the industry doesn’t need to improve with the remaining 9.43% undecided. This shows a definitive need for farmers identifying a need for greater assistance with their waste and recycling processes.

Q4 Do you think the NZ Dairy Industry needs to improve the options currently available to its farmers to manage waste and improve recycling practices?

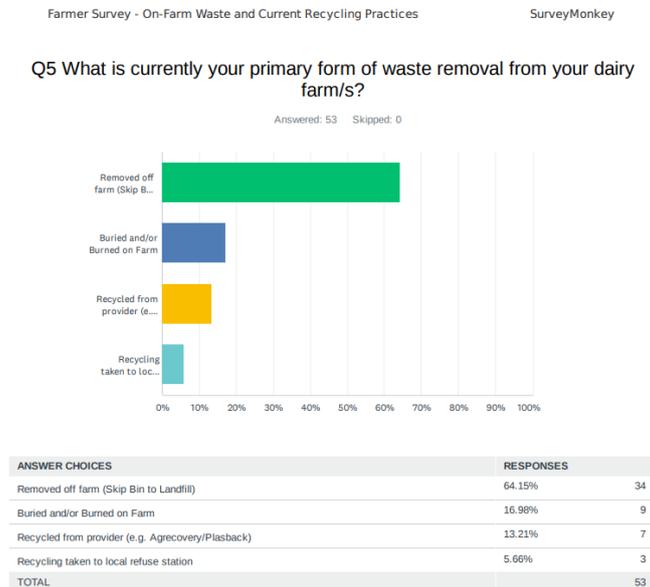
Answered: 53 Skipped: 0



| ANSWER CHOICES | RESPONSES | |
|----------------|-----------|----|
| Yes | 81.13% | 43 |
| No | 9.43% | 5 |
| Undecided | 9.43% | 5 |
| TOTAL | | 53 |

Survey Result Graph 2:

- 64.15% of respondents advised that their primary form of waste removal is via skip bin to landfill. A further 16.98% advised their primary form of disposal is burning or burying, meaning a total of 81.13% of respondents are still sending their waste to landfill.



Survey Result Graph 3:

- 78.43% of respondents advised that they currently use Plasback to recycle their used Silage wrap. 74.51% of respondents advised they currently utilise AgRecovery for recycling of their used plastic containers and drums. 47.06% of respondents advise they take glass/cardboard to a local refuse station for recycling. These results represent an encouraging increase in recycling from farmers from previous studies suggesting dairy farmers are beginning to become more responsive with their recycling.



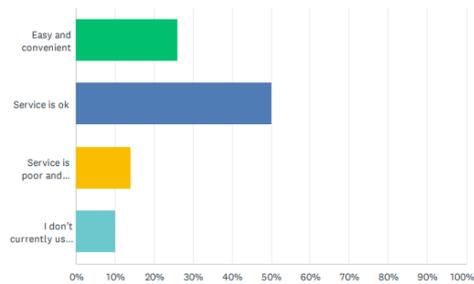
Survey Result Graph 4:

- Of those 90% of respondents who currently use a recycling provider for either their silage wrap or plastic drums and containers 50% advised that the current service is ok with a further 14% suggesting service is currently poor and inconvenient. This left a total of 26% of respondents believing the current level of service provided by current recycling providers to be easy and convenient.

Farmer Survey - On-Farm Waste and Current Recycling Practices SurveyMonkey

Q7 If you do use a current recycling provider, how would you rate this experience?

Answered: 50 Skipped: 3



| ANSWER CHOICES | RESPONSES |
|--|-----------|
| Easy and convenient | 26.00% 13 |
| Service is ok | 50.00% 25 |
| Service is poor and inconvenient | 14.00% 7 |
| I don't currently use a recycling provider | 10.00% 5 |
| TOTAL | 50 |

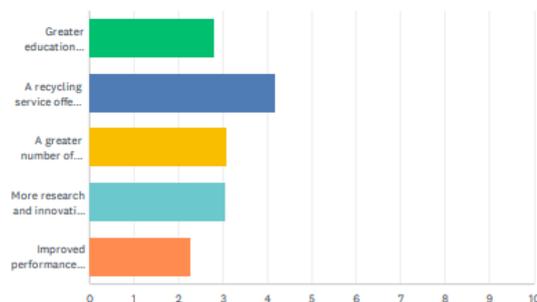
Survey Result Graph 5:

- 29 of the 53 farmers surveyed felt that a recycling service with collection from the farm would be the greatest way to improve their on-farm recycling practices.

Farmer Survey - On-Farm Waste and Current Recycling Practices SurveyMonkey

Q8 What would assist you to improve your on-farm recycling processes?
Rank in order from most important to least important (1 being most important with 5 being the least important).

Answered: 53 Skipped: 0



| | 1 | 2 | 3 | 4 | 5 | TOTAL | SCORE |
|--|--------------|--------------|--------------|--------------|--------------|-------|-------|
| Greater education around recycling, what can be recycled and where to take these products to be recycled. | 10.20% 5 | 26.53% 13 | 22.45% 11 | 14.29% 7 | 26.53% 13 | 49 | 2.80 |
| A recycling service offered with collection at the farm gate. | 58.00% 29 | 18.00% 9 | 14.00% 7 | 4.00% 2 | 6.00% 3 | 50 | 4.18 |
| A greater number of recycling collection points. | 12.50% 6 | 29.17% 14 | 20.83% 10 | 29.17% 14 | 8.33% 4 | 48 | 3.08 |
| More research and innovation in the industry to create new products that remove significant waste e.g. a product to replace silage wrap. | 16.00% 8 | 22.00% 11 | 24.00% 12 | 26.00% 13 | 12.00% 6 | 50 | 3.04 |
| Improved performance from current recycling providers. | 9.43% 5 | 5.66% 3 | 24.53% 13 | 24.53% 13 | 35.85% 19 | 53 | 2.28 |

Survey Result Graph 6:

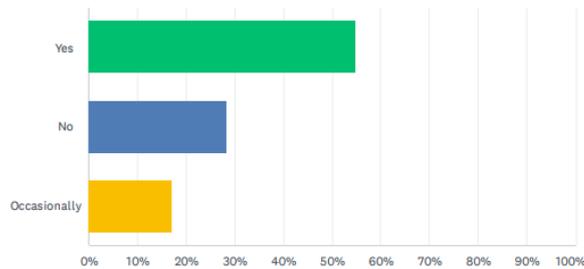
- Only 54.72% of respondents advised they currently recycle household waste items such as cans, bottles and cardboard. 19.98% advised they do this occasionally with 28.30% of farmers advising they recycle no household waste at all.

Farmer Survey - On-Farm Waste and Current Recycling Practices

SurveyMonkey

Q9 Do you recycle any of your household waste items (e.g. cans, bottles, cardboard) ?

Answered: 53 Skipped: 0



| ANSWER CHOICES | RESPONSES |
|----------------|-----------|
| Yes | 54.72% 29 |
| No | 28.30% 15 |
| Occasionally | 16.98% 9 |
| TOTAL | 53 |

Survey Result Graph 7:

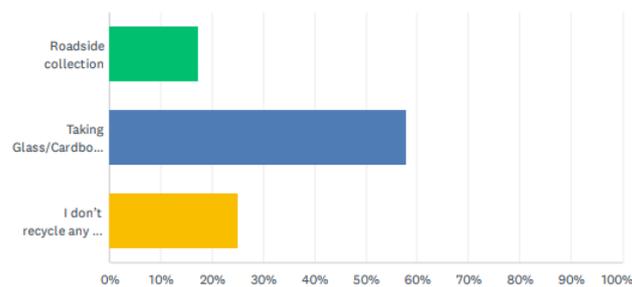
- 57.69% of respondents advised they recycle their household waste by taking this to the local refuse station. 17.31% of farmers are able to utilise some form of roadside collection with 25% advising they do not recycle any of their household waste.

Farmer Survey - On-Farm Waste and Current Recycling Practices

SurveyMonkey

Q10 If you do recycle some of your household waste, how is this recycled?

Answered: 52 Skipped: 1



| ANSWER CHOICES | RESPONSES |
|--|-----------|
| Roadside collection | 17.31% 9 |
| Taking Glass/Cardboard to the local refuse station | 57.69% 30 |
| I don't recycle any of my household waste | 25.00% 13 |
| TOTAL | 52 |

Survey Result Graph 8:

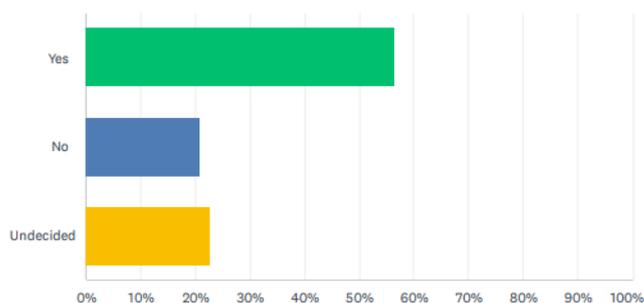
- 56.60% of surveyed farmers advised they would be willing to pay for some form of on farm collection of their recycling with a further 22.64% undecided. 20.75% of respondents advised they would not be willing to pay for the collection of their recycling.

Farmer Survey - On-Farm Waste and Current Recycling Practices

SurveyMonkey

Q11 If a recycling collection could be provided (rather than you having to deliver recycling off farm) would you be prepared to pay for this service?

Answered: 53 Skipped: 0



| ANSWER CHOICES | RESPONSES |
|----------------|-----------|
| Yes | 56.60% 30 |
| No | 20.75% 11 |
| Undecided | 22.64% 12 |
| TOTAL | 53 |

8.3 Zero Waste Taranaki - 2022 Farmer Survey

To get a further understanding of dairy farmer attitudes around waste and recycling, this report has also utilised data collected from the Taranaki Solid Waste Management Committee. This data was completed in May 2022 and has been collected for an upcoming review of their Waste Management and Minimisation Strategy which is due to be completed in 2024. Farmers from across Taranaki were surveyed on their attitudes to and ability to recycle their waste easily and effectively. The following key findings have been identified;

- 40% of farmers advised there isn't enough access to recycling stations and convenient options to recycle.
- 59% of respondents use landfill or a "skip" bin as their primary form of waste management.
- 40% of respondents advised they were using Plasback and/or AgRecovery.
- 63% of those surveyed advised they were taking some recyclable materials to a refuse station.

The following key responses from the survey are also noted;

"We're trying to recycle as much as we can but it's extremely time-consuming checking the triangles to see if they're "the right number" then sorting them all into multiple bags to then put all on a trailer to take 20mins into town. It can take over an hour, but time is money when you're running a farming business, a home and a life. Make something like what townies get for farmers (recycling bins ON FARM) And they'll recycle much more."

“It would be good to see initiatives for recycling companies and businesses to develop ways to utilise/recycle more things. The easier things are to do the more people will adopt the practice into their lives.”

“As farmers we are always encouraged to reduce waste, more so than our city living ratepayers. Having a basic recycling system available to our door step in rural areas would help us out more. The cost of taking our recycling in to town to a transfer station is a major hindrance for the rural communities. I find it more frustrating that even though I have contacted the council in helping our community in this area they are not interested in the least. And they also have said it's now our problem to figure out because we are too remote. This is ridiculous.”

9.0 Summary of Survey Results:

From the three data sets there have been some key trends that have been identified.

Most significantly is that across all data sets there is a key message from farmers that they believe there is a need to reduce the amount of waste currently created on New Zealand dairy farms. This is very encouraging and re-enforces the idea that farmers need better support and direction with future waste reduction and recycling.

A further significant trend has been the increase in farmers who are now utilising recycling providers. When Trish Rankin completed her survey in 2019 only 27% of farmers advised they were using a recycling provider with the remaining 73% sending all waste to landfill or burning and burying. In the survey completed for this report this has now increased to 76% of those surveyed now engaged with a recycling provider. The predominant form of waste removal remains landfill or burn and/or bury with 81% of those surveyed advising this is their primary form of waste removal. Of note for recycling providers is that only 26% of respondents advised the current service is easy and convenient with the remaining farmers surveyed rating the service ok, poor or they were not currently engaged with any providers.

All surveys also continued to show the same trend, that the key change farmers would like to improve their ability to recycle, is greater convenience. This could be provided by either a pick-up service or a greater number of refuse stations in close proximity to their location.

The final interesting piece of information that this report gathered was around current household recycling practices. Of the 53 farmers surveyed there was an average of three dwellings per farm. From these dwellings only 54% of respondents advised they recycle their household waste with the remaining farmers doing this occasionally or not at all. This represents a significant amount of recycling that is not currently considered, with further thought required to prevent this material from ending up in landfill or burned and/or buried.

In conclusion, all three data sets have provided detailed evidence as to the current state of on-farm recycling across the rural sector. The results have shown that over recent years the sector has made significant improvements in its practices, and we have seen exponential growth in farmer engagement with key recycling providers such as AgRecovery and Plasback. What is evident however is that farmers see the current standard of this service and the ease at which they can utilise these services as average, and therefore a barrier to greater engagement. To gain improved waste removal practices further services are required to compliment what is already in place and provide greater convenience and levels of service.

10.0 Conclusions:

At the beginning of this project an assumption was made that very little is happening with on-farm waste in the New Zealand dairy industry. What has been discovered is that key research has been completed which identified a significant issue for the industry. Previous research has seen the New Zealand Government's focus on plastics increase over recent years which will now see a targeted and combined focus on reducing the use of plastics, their reuse where possible, and driving plastic recycling efforts. There is also now an increasing public concern which has brought on-farm waste into the spotlight and is now seen as a pressing environmental problem that needs urgent attention.

10.1 Further Government intervention necessary to enhance proposed Product Stewardship model

The previous research has now culminated in the Government listing farm plastics as one of its six priority products. In response to this The Agrecovery Foundation, alongside the Ministry for the Environment, has developed the Green-Farm Product Stewardship Scheme document. This has been presented to the government and sets out a blueprint for the future management of on-farm waste. On reviewing this document, these changes would represent a necessary and positive change for the industry to both support farmers with their on-farm waste, and to ensure companies who continue to produce plastic products are both environmentally and financially responsible for these plastics.

The scheme which proposes a "one-stop shop" model for farm plastics appears very good in theory, however it's essential to challenge whether this model would be successful and whether it covers all required products to significantly reduce on-farm waste.

10.2 Improvement required in current recycling provider performance

From both the research completed, and the quantitative analysis completed it is evident that there have been significant increases in the use of the two current recycling providers, AgRecovery and Plasback. These increases have been the result of farmers becoming more environmentally responsive and the inclusion of recycling practices being introduced into milk price via Fonterra's Co-operative Difference. The concern for these increases however is that the success of these programmes is currently being measured via registration rather than any actual recycling collected on-farm.

As these programmes morph into greater significance there must be improvements in the recording of an individual customer's level of recycling. In the research paper "Social Principals for Agricultural Extension to Assist in the Promotion of Natural Resource Management" published in the Australian Journal of Experimental Agriculture in 2004, the paper listed several key social principles relevant to the promotion of natural resource management. One of these key principles stated, "Farmers need to feel valued". The principle suggested that farmers are prepared to make their contribution however they need to know their contribution is appreciated and valued by the broader community (Vanclay, 2004).

This principle clearly suggests that for farmers to feel like they are contributing, and that this is appreciated and valued, we need to be able to quantify this at an on-farm level. With their current recycling volumes, we need to be able to give farmers the ability to showcase the good work they are doing and the positive impact this is having on the environment. The industry needs to improve this and both AgRecovery and Plasback advised they are making changes to their practices to ensure this can occur. Fonterra advised that when completing their Co-operative Difference assessments in future, far greater emphasis will be placed on participation rather than registration.

It is also important that for increased participation, the service provided by the key recycling providers is improved. From the quantitative data gathered, only 26% of respondents felt that the service was both easy and convenient. Given the Green-Farm Product Stewardship Scheme model proposes an extension of the current AgRecovery model, with the

inclusion on further collection points, service will need to be significantly improved or mandated to achieve greater levels of engagement.

10.3 Additional future services

To improve service and farmer participation, additional services that complement the “one-stop shop” model are required. This would ensure that farmers have choice and are able to reduce on-farm waste and recycle in the manner that best suits their farm operation. In the Green-Farm Product Stewardship Scheme report there is a suggestion that Plasback would no longer be required as this waste stream (Plastic Wrap) would be covered at no cost to farmers. Farmers would need to continue to accumulate their plastic wrap as they do currently and then take it to their closest collection point at no cost.

There is still a place for a profit-based company such as Plasback if farmers choose to pay for greater convenience. Plasback could continue to offer their chargeable bag and collection service and continue to recycle Silage Wrap via their current practices if the customer decided they were willing to pay for greater convenience. This theory is further supported via the farmer survey which suggests that up to 79.24% of the Taranaki farmers surveyed would be willing to pay for a collection service if it provided greater convenience. The goal must be that materials are recycled rather than placed in landfill or burned and/or buried. Whether this comes at no cost or at a fee should be up to the customer.

10.4 Household Recycling needs greater attention

From both the research and quantitative data gathered there is a waste stream that is being overlooked across the industry. Namely the household waste generated from farms and where this is currently going. From the survey data collected of Taranaki dairy farmers there is currently an average of three dwellings per property with an average of 298 cows per farm. This is below the 440-cow national average suggesting the numbers of dwellings per farm is greater in parts of the country such as Southland where the average cow count is 602 and Canterbury where the average cow counts is 804 (DairyNZ, NZ Dairy Statistics 2019-20, 2021).

From the research completed by Environment Canterbury in 2013, of the 53 farmers surveyed, 26 tonnes of domestic waste was generated annually from these farms with 92% of farmers using burning, burying, or stockpiling to manage this waste (Hepburn & Keeling, 2013). From the survey results of Taranaki farmers these practices have improved, however only 54% of respondents advised they recycled their household recyclables regularly suggesting significant amounts of recyclable materials from farm dwellings continue to be burned and/or buried or ends up in landfill. This is a key area of improvement that can be addressed and represents an opportunity for greater environmental stewardship without significant investment.

There is an opportunity for Regional and District council to have greater engagement with their rural rate payers and review services that they are providing them. Given current cost levels versus any profit made from recyclables unfortunately councils will not be able to service all their rate payers at the farm gate. There is however potential opportunity for commercial entities to look to service farmers to ensure that recycling is collected and recycled rather than burned and or buried or dumped in landfill. From the survey, 79.24% of farmers advised they would not be against cost if this made their waste management easier and more achievable therefore this could represent a future model.

10.5 On-Farm recycling stations can enhance engagement

Local Fonterra and Waste Management representatives as well as Plast-Ax, a local plastic bin manufacturing company based in Whanganui, have been approached to assess their thoughts on an on-farm recycling solution. All parties have suggested they would be interested in being involved in a pilot scheme to see whether an on-farm recycling station would create greater ease for farmers and whether this would lead to an increase in recycling from farmers. The station would consist of a series of bins for each of the current residential recycling waste streams.

Image 4: Plast-Ax Recycle Bins



The pilot scheme would have all household recycling material collected at a central point on-farm which would include plastic, cardboard, and glass as well as any other farm recycling materials that are not currently being collected from either Plasback or AgRecovery. These materials would then be collected monthly and deposited to the local recycling providers as per the process for residential rate payers.

The pilot scheme would actively record the levels of recycling that are being collected from each farm to report on the total levels of recycling that have been collected. In time this would work alongside the current AgRecovery and Plasback collection services and could also be used as a mechanism for collection of AgRecovery and Plasback products for transport to central points. A farmer can currently do this without cost, by dropping recycling to a local collection point, however if it creates greater convenience, a higher volume of recycling is recycled and a farmer is willing to pay a fee, this service is something that would be beneficial for the industry.

The ambition is to run the pilot scheme across five Taranaki dairy farms and track levels of recycling collected then interview participants to assess whether the scheme created increased levels of recycling, greater ease and whether the improved convenience was worth the cost. These findings will determine whether this pilot would have any future value across the sector.

10.6 Destination of recyclable materials and using recycled material locally

Where recycling is currently going and what we are going to do with increased volumes also remains a significant concern. From this report is apparent that the number of businesses using recycled products in New Zealand is limited with the majority of recycling material being sent overseas. We have good success with recycling glass and cardboard products however we are still seeing up to 80% of farm plastics sent to overseas markets to be processed.

A key consideration therefore is that future focus needs to be placed on creating infrastructure within New Zealand to process and reuse the plastics that we are consuming within New Zealand. When talking to key providers about this, including Waste Management, Plasback and AgRecovery, it is currently not feasible to build recycling plants for plastics such as bail wrap when the marketable product that is produced from this has little value. Significant Government subsidies would be required for these plants to be operated feasibly with an aim to have new product streams supporting future development. This remains a focus for government with some key businesses being well supported, however this needs to continue to significantly increase as recycling volumes increase.

Recommendations:

As a result of the conclusions generated from this report the following recommendations have been made;

Establish An Accredited Inclusive Product Stewardship Scheme

1. The current Green-Farm Product Stewardship Scheme proposed by the AgRecovery Foundation is a great initial concept, however it requires further development before any potential accreditation is granted from the Ministry for the Environment. The “One-Stop Shop” solution is a positive one for the rural industry, however, needs to be more inclusive of other providers including Plasback, for its ultimate success. The proposed scheme needs to better acknowledge the work that is already occurring within the waste sector and utilise these providers in any future scheme. Once these necessary amendments are made the proposal needs to be accredited and operational as projected, in 2024.

Utilise Local Service Providers

2. That local services are required to complement the Green-Farm Product Stewardship Scheme proposal which will both provide additional options for farmers, and service additional waste streams. These services could include on-farm collection as a user pay service that allows for greater convenience to farmers to ensure waste removal and improve recycling practices. Farmers need the ability to choose the most convenient practice to meet their business needs and one solution will not meet this requirement.

Collection of On-Farm Recycling Levels

3. That volumes of waste and recycling collected needs to be recorded and collated at a farm level. This would allow farmers to accurately record the increased efforts that they are making and to hold those to account who are not making the required effort. This would also allow farmers to provide more accurate statistics across the complete rural sector. Currently we are not recording this information as accurately as we could. Farmers need to know the difference they are making so showing key individual farm stats as to levels of recycling will be crucial to any future success.

Enhancing Government Collaboration

4. That government needs to enhance the work it is doing alongside current businesses within New Zealand who are attempting to use recycling waste and to look to support and develop companies who are trying to operate in New Zealand. Currently up to 80% of our plastic recycling goes offshore to be processed and we therefore need to develop further businesses within New Zealand to service more of our own recycling. Many of the products that are created from plastic waste are not high value, therefore government assistance will be required to ensure companies are able to process these plastics and remain financially sustainable.

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Appendices:

Appendix One: Trish Rankin – Waste Survey 2019

QUESTIONS:

1. What Regional Council are do you live in?
2. Do you think the NZ Dairy Industry needs to improve the amount of 'rubbish' produced on farm, how we deal with it and options for recycling/reusing/composting etc?
3. Your on-farm rubbish (non-biological/non-organic) is MAINLY (select ONE - what you would MAINLY do with rubbish)
Note: rubbish from farm can be thought of as everything from silage wrap to rubberware to spray paint, latex gloves to meal bags - all the things we would consider rubbish.
4. Your on-farm rubbish (non-biological/non-organic) is also SOMETIMES... (select as many as you use)
5. What would help you improve how you deal with rubbish on farm? Rank these 1-7 - where 1 is the option that would help you best and 7 being the option that would help you least...

Appendix Two: Fonterra Farmer Survey 2022

Farmer Survey - On-Farm Waste and Current Recycling Practices

What is currently being done and what more can we do to reduce on-farm waste in the dairy industry?

Hi, I'm Daniel Butler from LIC and as part of my Kellogg's Rural Leaders Programme I am doing a project entitled, "What is currently being done and what more can we do to reduce on-farm waste in the NZ dairy industry?"

As part of this project, I need to gather information as to the current recycling processes on farm and would be very appreciative if you could complete this short survey. The survey will take less than 5 minutes to complete and will contribute to a better understanding of current on-farm recycling practices and can help assess what could be done to better support dairy farmers with recycling and waste disposal.

Please note all results will remain anonymous and no personal details will be requested.

Thanks for taking the time to support my project.

QUESTIONS:

1. What District do you live in?
2. How many cows approx. do you currently have on farm? If you have multiple farms, please enter multiple approx. cow totals.
3. How many dwellings do you currently have on farm? If you have multiple farms please enter multiple property totals.
4. Do you think the NZ Dairy Industry needs to improve the options currently available to its farmers to manage waste and improve recycling practices?
5. What is currently your primary form of waste removal from your dairy farm/s?

6. If you do recycle, please tick what recycling you are doing (please tick each option that applies)?
7. If you do use a current recycling provider, how would you rate this experience?
8. What would assist you to improve your on-farm recycling processes? Rank in order from most important to least important (1 being most important with 5 being the least important).
9. Do you recycle any of your household waste items (e.g. cans, bottles, cardboard) ?
10. If you do recycle some of your household waste, how is this recycled?
11. If a recycling collection could be provided (rather than you having to deliver recycling off farm) would you be prepared to pay for this service?
12. If your roadside collection was available today, how often would you require this?
13. Do you have any further comments you would like to make regarding on-farm waste and recycling in the NZ Dairy Industry?

Appendix Three: Zero Waste Taranaki – Farmer Survey 2022

1. Who are you answering this survey as?
2. How concerned are you about the impacts of farm waste on the environment?
3. How committed are you to **recycling** the waste your farm produces? (Note: recycling here means using schemes like AgRecovery and Plasback or bringing cardboard and chemicals to your local Transfer Station).
4. How committed are you to doing **more than recycling** in order to reduce the amount of waste your farm produces? (Note: doing more than recycling means rethinking what you buy, composting, buying in bulk, re-using barrels/containers, etc.).
5. Tick all the ways that you get information about reducing farm waste in your district.
6. How do you dispose of most of your farm waste?
7. Last year (May 2021), Zero Waste Taranaki partnered with AgRecovery and held a 3-day event to recycle your farm waste and dispose of unwanted chemicals. Did you attend this event? (Y/N)
8. If no, why?
9. If Zero Waste Taranaki and AgRecovery were to run another AgRecovery Event, how likely would you be to attend? (1-5 scale).
10. In the past 12 months, how regularly have you used a Transfer Station to dispose of your waste and recycling?
11. What stops you from reducing waste on your farm?
12. What would help you improve how you deal with waste on your farm?
13. If you were able to learn more minimising farm waste, how would you prefer to learn?

14: Is there anything else that would help your farm make waste improvements?

15. Any other comments?

16. Would you be interested in receiving support to help your farm reduce waste?