



Farm Plastics Priority Product Stewardship Scheme: Materials Flow Analysis

Agrecovery Foundation
September 2020

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Background

In August 2019 the Government released a public consultation document proposing regulated product stewardship to deal with environmentally harmful products before they become waste. The programme of work is part of the Government's longer-term goal of moving to a more efficient, low-emissions, sustainable and inclusive economy for New Zealand.

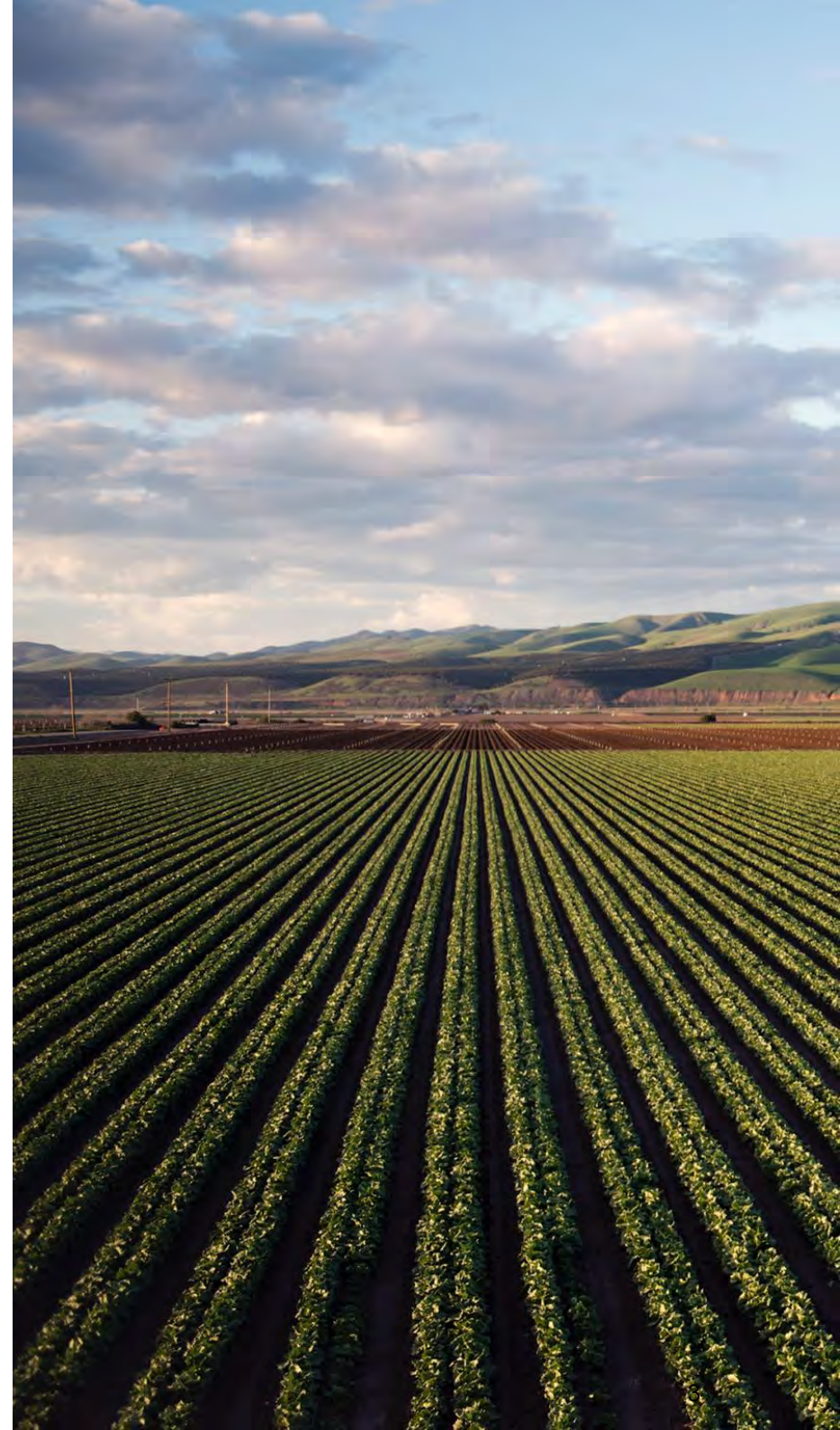
While there are 14 existing accredited schemes in New Zealand, all are currently voluntary. Regulated schemes help create a level playing field, ensure full participation in the scheme, and create better incentives to reduce waste and divert materials from landfills.

Among other products, a regulated product stewardship scheme for farm plastics has been proposed by the Government. The following products are in-scope, with the first two items being the initial priorities:

- Seed, feed and fertiliser bags (eg woven fertiliser polypropylene (PP) supersacks)
- Crop packaging films (eg silage wrap/covers and horticultural films/netting)
- Other plastic packaging and products used for agriculture and horticulture

The Agrecovery Foundation ('Agrecovery') has been appointed by the Ministry for the Environment to lead the design of the Farm Plastics Priority Product Stewardship Scheme ('the scheme'). A not-for-profit charitable trust, with Trustees who represent key areas of the primary sector, Agrecovery operates the voluntary agricultural chemical container product stewardship scheme.

Agrecovery has asked PwC to support the co-design of the farm plastics priority product stewardship scheme. This report relates to the current volume of farm plastics.



Scope

PwC was tasked with gathering information on the quantity of farm plastics used in New Zealand and what happens to them at the end of their useful life. The focus was on the volume of plastic packaging distributed to the end-user (ie farmer or grower), who does not have access to commercial waste solutions.

While this information provides a better understanding of total farm plastic that end up on-farm in New Zealand every year, it is expected that findings will continue to be refined as further information becomes available.



Methodology

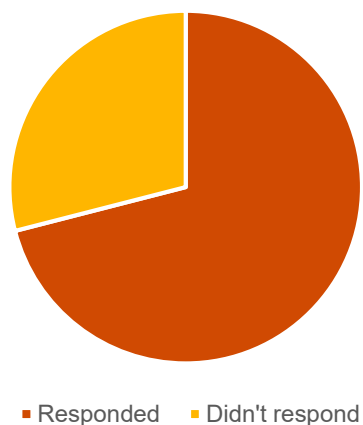
Farm plastics survey

PwC developed a survey to collect data on the volume of the following farm plastics:

- seed, feed and fertiliser bags
- crop packaging films (eg silage wrap/covers and horticultural films/netting).

Agrecovery circulated this survey to 42 retailers and producers of these priority products, who together represented the largest participants in the sector. There was a strong response to the survey with 71% of all recipients responding, including all major participants.

Figure 1: Survey response rate



Materials flow modelling

Data from the survey was analysed and aggregated into the number of units and weight of packaging by product type and plastic type.

Results are presented on a June year-end basis.

During this process, issues with some survey entries were identified. Agrecovery conducted further consultation with relevant stakeholders (where applicable) to help ensure the data was robust.

Where necessary, survey data was also cleansed to improve reliability. Data cleansing techniques involved:

- identifying and removing duplicate data
- identifying data gaps and, where applicable, smoothing respondents' returns.

Limitations

1) Limited information on the weight of plastic packaging for seed and feed

Organisations provided limited or no information on the weight of the plastic packaging for seed and feed bags. We created average weights for different sized bags using the information we received and applied this to the relevant data.

Table 1 shows the average weights used for seed and feed bags.

Actual weights will differ from those provided in Table 1 due to:

- different plastic types
- required plastic varying for a given bag weight, depending on the contents of the bag itself.

Table 1: Average seed and feed bag weights

Size of bag (kg)	Weight of bag (grams)
1-5kg	35
5kg	70
10kg	55
20kg	100
25kg	100
30kg	120
500kg	2,200
1000kg	2,600

2) Some information on 'units sold' missing

In places, organisations did not provide information on units sold for all financial years. Where this had a material impact on the results we estimated market share for years omitted based on market share in other years. We then used this as a proxy to estimate material flow for applicable organisations.

3) Some stakeholders chose not to respond to the survey

42 organisations were approached to complete the survey. 12 organisations did not respond.

No attempt has been made to ascertain volumes attributable to those participants who have not completed the survey.

While their responses would have been helpful, the response to the survey was strong at 71%, and includes all major sector participants.

4) Risk of double counting

Given that survey participants include both retailers and producers, there is the possibility that volume has been counted multiple times.

To mitigate this risk, the survey explicitly asked that organisations only provide data on the volume of plastic packaging that they distributed to the end-user directly (ie the farmer or grower).

Findings – Seed and Feed

Figure 2: Number of seed bags sold for the year ending 30 June

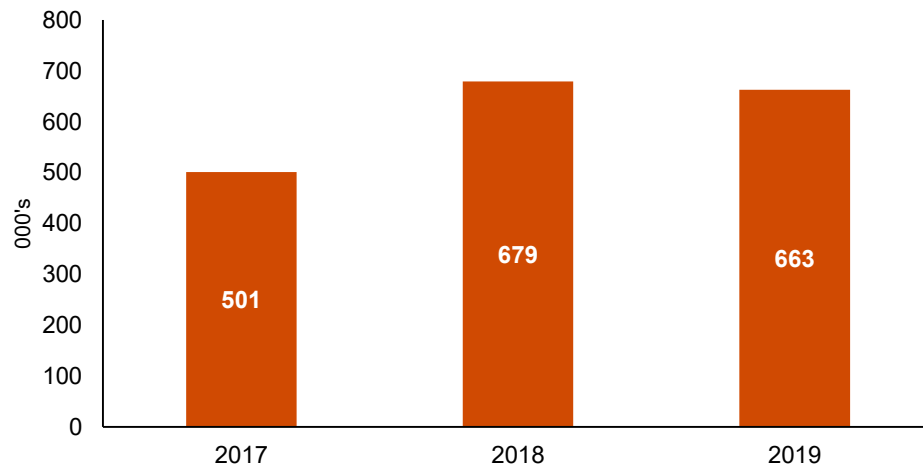


Figure 4: Number of feed bags sold for the year ending 30 June

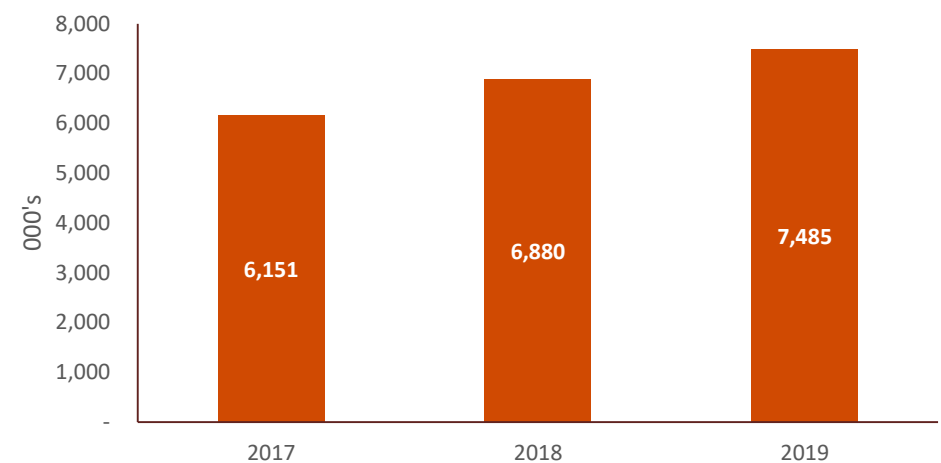


Figure 3: Weight of plastic packaging of seed bags by plastic type for the year ending 30 June

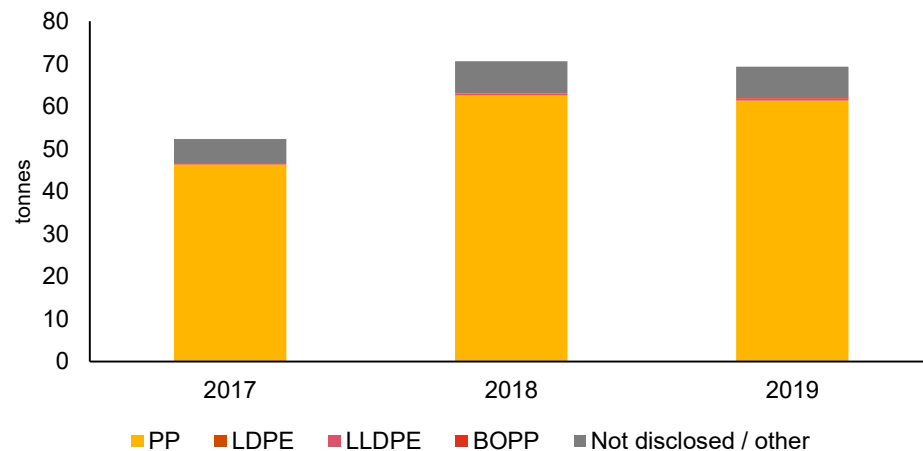
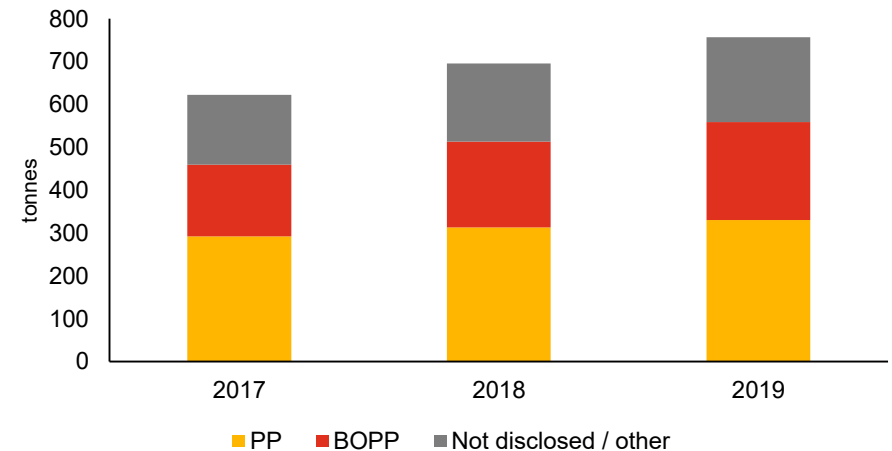


Figure 5: Weight of plastic packaging of feed bags by plastic type for the year ending 30 June



Findings – Fertiliser

Figure 6: Number of fertiliser bags sold for the year ending 30 June

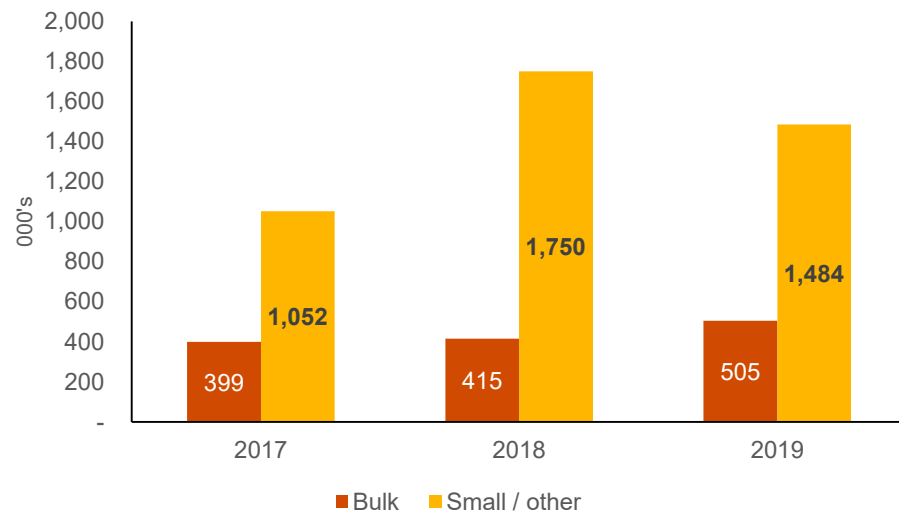


Figure 7: Weight of plastic packaging of fertiliser bags for the year ending 30 June

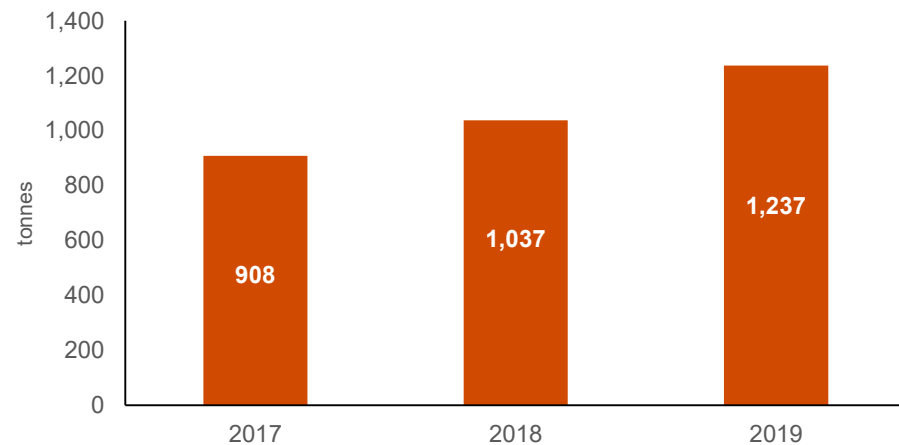
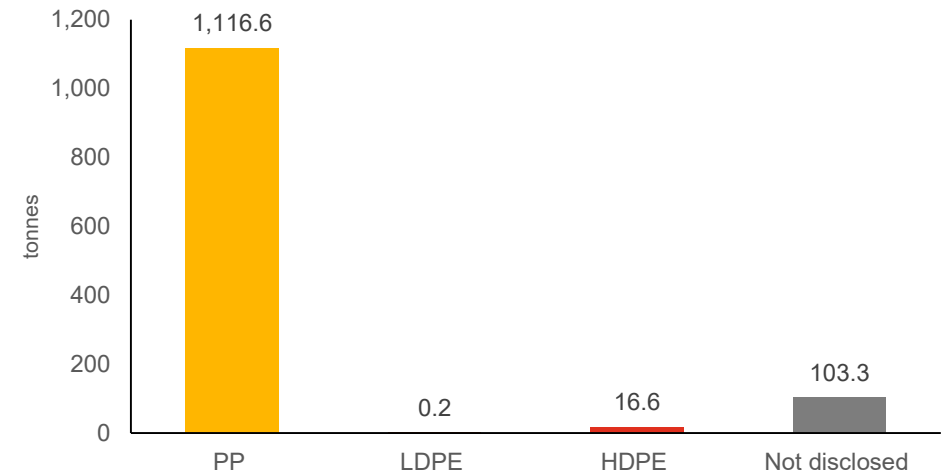


Figure 8: Weight of plastic packaging of fertiliser bags by plastic type for the year ending 30 June 2019



Findings – Film

Figure 9: Weight of plastic packaging of film by plastic type for the year ending 30 June

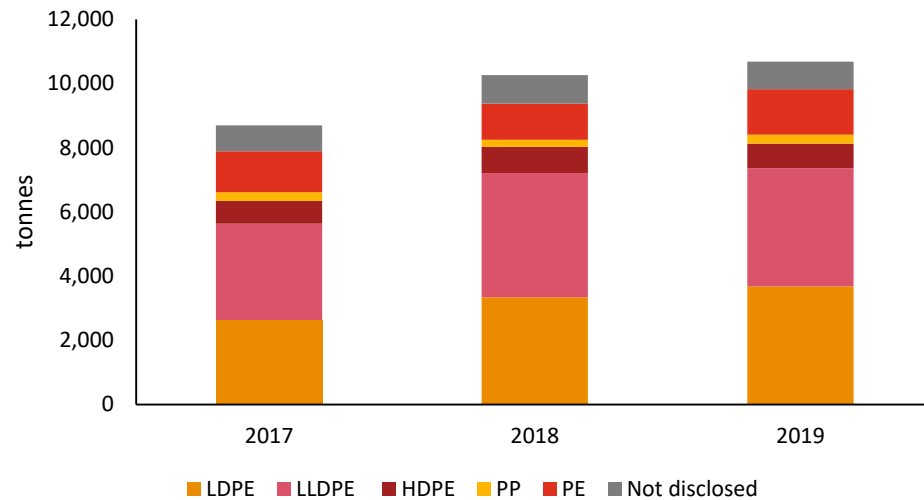
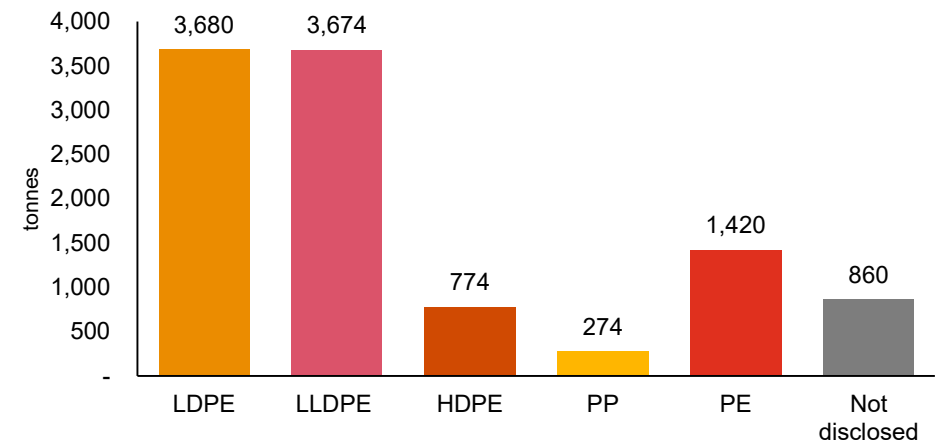


Figure 10: Weight of plastic packaging of film by plastic type for the year ending 30 June 2019



Findings – Summary

Figure 11: Weight of plastic packaging of all farm plastics for the year ending 30 June

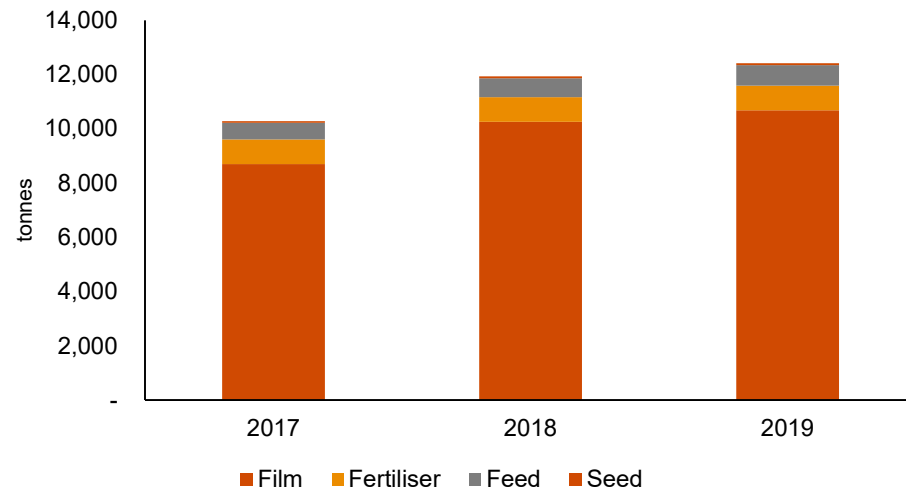
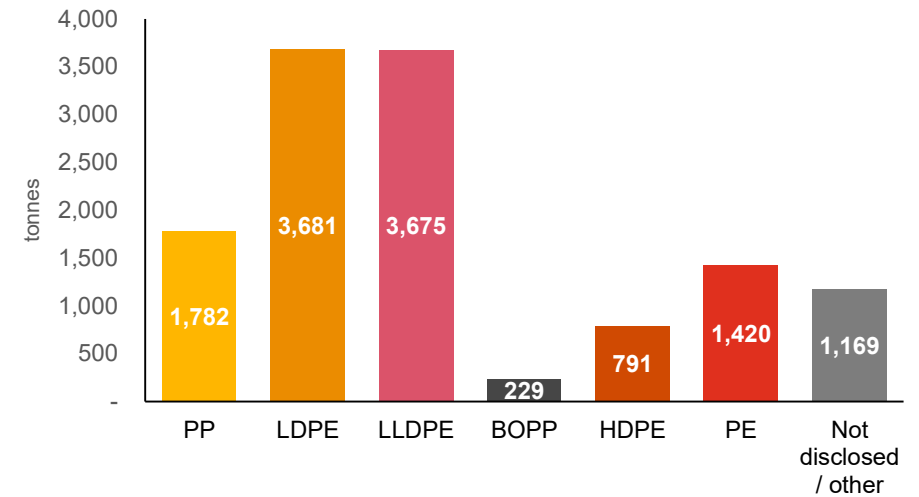


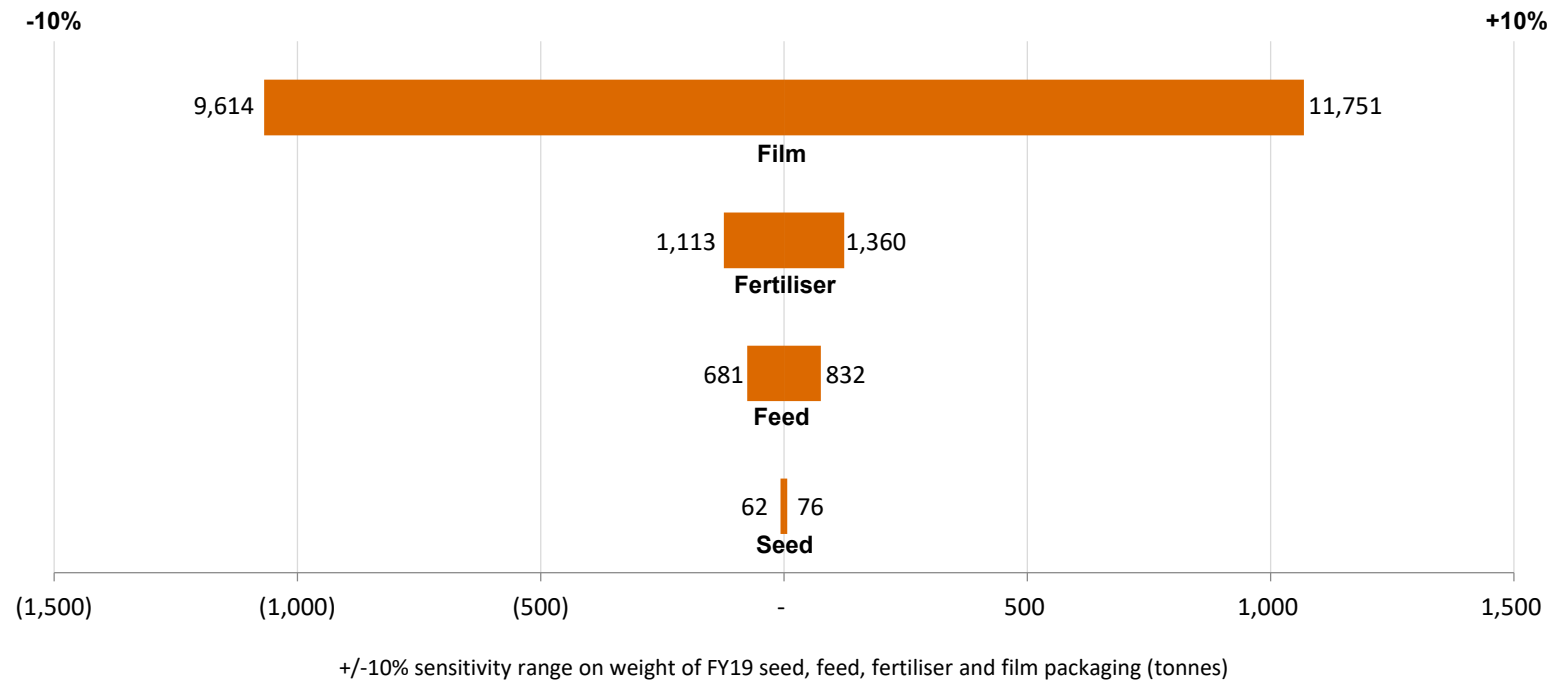
Figure 12: Weight of plastic packaging of all farm plastics by plastic type for the year ending 30 June 2019



Findings – Sensitivity

Figure 13: Sensitivity analysis for FY19 seed, feed, film and fertiliser plastics weight

The below chart illustrates the magnitude of change if there was a +/- 10% variation in volume across packaging types.



Findings – Qualitative results

Figure 14: Survey results showing proportion of organisations with systems in place to recycle/recover packaging

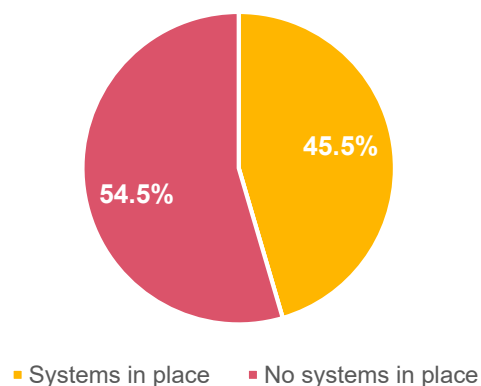
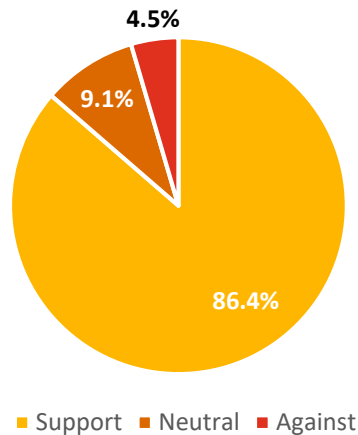


Table 2: Survey results rating how important the issue of plastic waste is for respondent companies and their customers

<i>Importance rating</i>	<i>Proportion of respondents</i>
Very important	66.7%
Important	33.3%
Neutral	-
Unimportant	-

Findings – Qualitative results

Figure 15: Survey results showing proportion of organisations supporting farm plastics being declared a priority under the Waste Minimisation Act

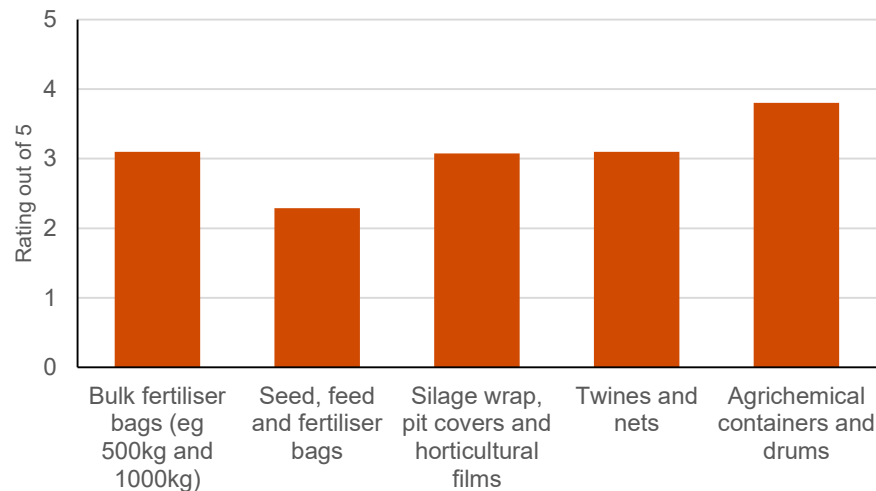


Themes from commentary:

- Many respondents who provided additional commentary referenced the importance of systems to recycle/recover packaging
- Other points made include:
 - Importance of efficiency in any solution.
 - Importance of the process being easy for farmers and growers, in order to drive positive outcomes.
 - Whether the scheme could include other sectors.
 - Goal should be to have onshore recycling.
 - Compulsory recording of packaging should be considered, and would help ensure all equally contribute to the scheme.
 - Would like to see industry take a more proactive approach and work closely with the Government to arrive at a sustainable solution.
 - Opposition to levies on current supplier members of stewardship schemes.

Findings – Qualitative results

Figure 16: Survey results rating existing services provided to farmers and growers to manage disposal of farm plastics (1 being poor, 5 being outstanding)



Themes from commentary:

- Cost and ease of use can be a barrier to uptake of existing services.
- Competitor ownership may also be restricting uptake.
- Preference for services to be not for profit.
- Regulation and legislation spanning collection services and broader settings (eg dumping) would be helpful.

Findings – Qualitative results

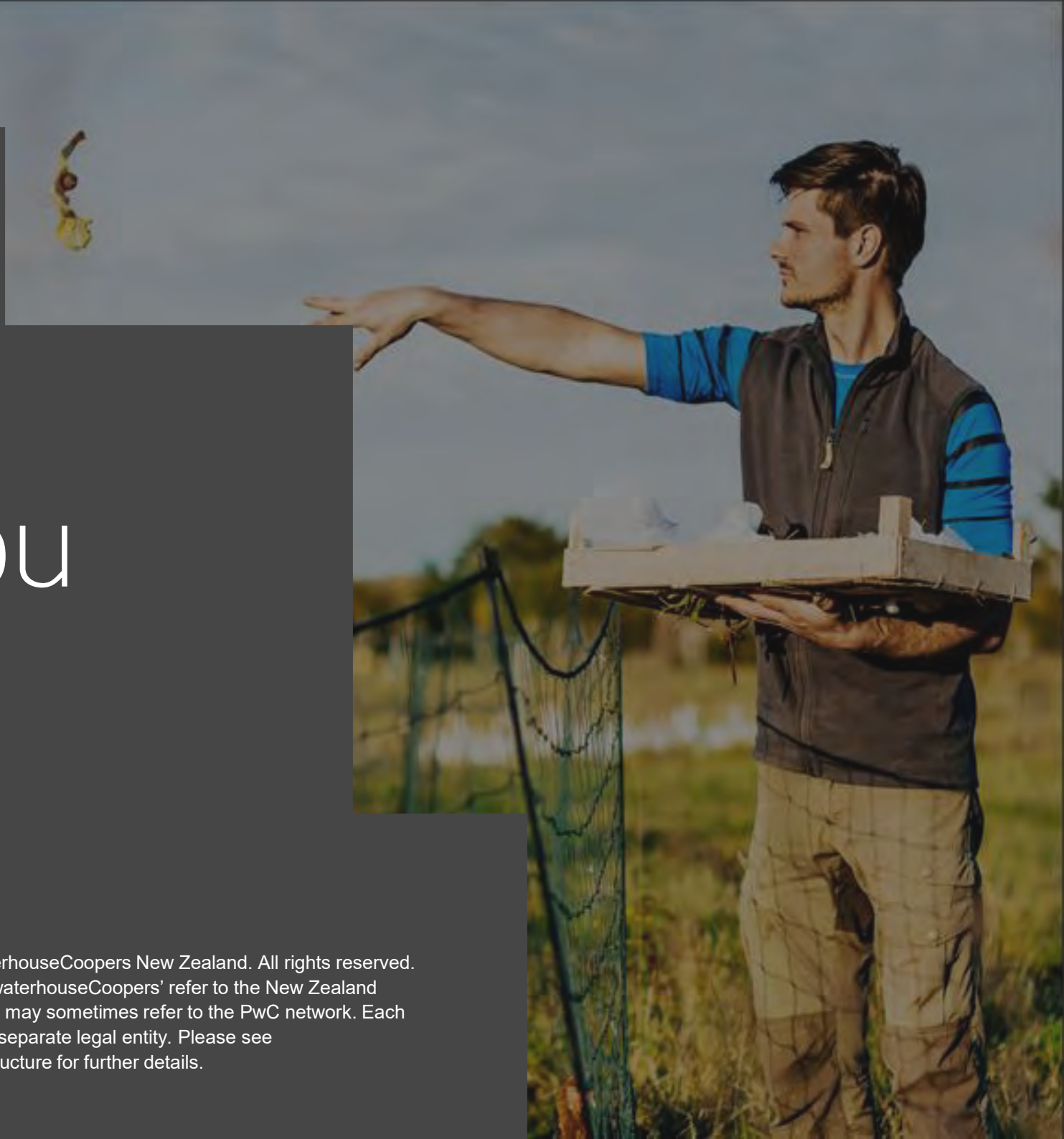
Other themes from commentary:

- The scheme must be designed with farmers and growers in mind:
 - make it easy for farmers and growers
 - give farmers and growers options
 - be cognisant that the agriculture and horticulture sectors have experienced significant legislative change and increasing compliance costs in recent years – the new scheme should minimise the compliance burden and cost where possible.
- Plastic is low value and expensive to recycle.
- Contamination of plastic will be a challenge.
- Consideration should be given to alternatives (eg reusable covers and plastics and/or compositable bags).
- All importers/manufacturers should contribute to the scheme.
- Consider localised/regional processing plants given New Zealand's geographical nature.

Thank you



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Appendix A: Restrictions

This report has been prepared for the Agrecovery Foundation to assist with the design of the Farm Plastics Priority Product Stewardship Scheme. This report has been prepared solely for this purpose and should not be relied upon for any other purpose. We accept no liability to any party should it be used for any purpose other than that for which it was prepared.

This report has been prepared solely for use by the Agrecovery Foundation and may not be copied or distributed to third parties without our prior written consent.

You have advised us that you may make the report available to other parties. We note that we do not accept any responsibility or liability (whether in contract, tort (including negligence) or otherwise) to any person other than yourself for the consequences of any reliance on this report.

To the fullest extent permitted by law, PwC accepts no duty of care to any third party in connection with the provision of the Report and/or any related information or explanation (together, the "Information"). Accordingly, regardless of the form of action, whether in contract, tort (including without limitation, negligence) or otherwise, and to the extent permitted by applicable law, PwC accepts no liability of any kind to any third party and disclaims all responsibility for the consequences of any third party acting or refraining to act in reliance on the Information. We have not independently verified the accuracy of information provided to us and have not conducted any form of audit in respect of the Agrecovery Foundation. Accordingly, we express no opinion on the reliability, accuracy, or completeness of the information provided to us and upon which we have relied.

We reserve the right, but will be under no obligation, to review our analysis and if we consider it necessary, to revise this report, if any additional information, which was in existence on the date of this report, was not brought to our attention, or subsequently comes to light.

The Agrecovery Foundation is ultimately responsible for the inputs and assumptions populated in this report. In any case, we are unable to guarantee that this report is 100% free of errors and accordingly we give no such guarantee.

It is not possible to assess with any certainty the implications of COVID-19 on the Agrecovery Foundation or the economy as a whole, both generally in terms of how long the current crisis may last and more specifically in terms of its impact on a specific business or the wider economy. We note our advice is subject to significant caveats and caution at this time due to uncertainty that exists for businesses including (amongst other matters) the demand for products or services, access to capital, supply chain disruption, and the extent and duration of the measures implemented by various governments and authorities to contain and / or prevent spread of COVID-19.

This report is issued pursuant to the terms and conditions of our engagement letter dated 14 May 2020.

Appendix B: Glossary

BOPP	Biaxially oriented polypropylene
HDPE	High density polyethylene
LDPE	Low density polyethylene
LLDPE	Linear low density polyethylene
MfE	Ministry for the Environment
PE	Polyethylene
PP	Polypropylene

Appendix C: Materials Flow Data

LDPE	-	-	-
LLDPE	0.43	0.45	0.42
BOPP	-	0.10	0.20
Not disclosed / other	5.60	7.47	7.36
Total	52.29	70.57	69.32

Table 3: Number of seed bags sold for the year ending 30 June
Seed bags estimated units

Plastic type	Units sold FY-17 (#)	Units sold FY-18 (#)	Units sold FY-19 (#)
1-5kg	27,296	34,877	32,354
5kg	13,136	19,003	19,068
10kg	3,412	7,287	9,079
15kg	8,682	11,451	11,974
25kg	417,309	564,563	547,649
40kg	28,169	37,376	38,193
500kg	1,591	2,043	2,112
1000kg	10	30	50
Not disclosed	1,500	1,800	2,100
Total	501,106	678,430	662,579

Table 4: Weight of plastic packaging of seed bags by plastic type for the year ending 30 June
Seed bags estimated weight

Plastic type	Estimated weight FY17 (tonnes)	Estimated weight FY18 (tonnes)	Estimated weight FY19 (tonnes)
PP	46.27	62.55	61.34
LDPE	-	-	-
LLDPE	0.43	0.45	0.42
BOPP	-	0.10	0.20
Not disclosed / other	5.60	7.47	7.36
Total	52.29	70.57	69.32

Seed bags estimated units

Plastic type	Units sold FY-17 (#)	Units sold FY-18 (#)	Units sold FY-19 (#)
1-5kg	27,296	34,877	32,354
5kg	13,136	19,003	19,068
10kg	3,412	7,287	9,079

Appendix C: Materials Flow Data (cont.)

Table 5: Number of feed bags sold for the year ending 30 June

<i>Plastic type</i>	<i>Units sold FY17 (#)</i>	<i>Units sold FY18 (#)</i>	<i>Units sold FY19 (#)</i>
10kg	109,395	112,885	114,063
20kg	3,670,472	4,539,509	4,905,616
22.7kg	15,889	17,773	19,336
25kg	2,961,321	2,888,412	3,184,122
30kg	3,836	4,291	4,668
40kg	365	408	444
500kg	4,943	5,042	5,636
Not disclosed	6	11	-

Table 6: Weight of plastic packaging of feed bags by plastic type for the year ending 30 June

<i>Bag size</i>	<i>Estimated weight FY17 (tonnes)</i>	<i>Estimated weight FY18 (tonnes)</i>	<i>Estimated weight FY19 (tonnes)</i>
PP	321.52	344.42	363.46
BOPP	183.70	220.14	251.19
Not disclosed / other	178.61	199.60	217.29
Total	683.83	764.16	831.94

Appendix C: Materials Flow Data (cont.)

Table 7: Number of fertiliser bags sold for the year ending 30 June

<i>Bag type</i>	<i>Number of units (FY17)</i>	<i>Number of units (FY18)</i>	<i>Number of units (FY19)</i>
Bulk	358,702	373,326	454,109
Small / other	946,549	1,574,924	1,335,853

Table 8: Weight of plastic packaging of fertiliser bags by plastic type for the year ending 30 June

<i>Bag size</i>	<i>Estimated weight FY17 (tonnes)</i>	<i>Estimated weight FY18 (tonnes)</i>	<i>Estimated weight FY19 (tonnes)</i>
PP	769.23	856.41	1,004.91
LDPE	-	0.14	0.19
HDPE	13.45	13.87	14.92
Not disclosed	35.29	63.31	93.01
Total	817.97	933.72	1,113.03

Appendix C: Materials Flow Data (cont.)

Table 9: Weight of plastic packaging of film by plastic type for the year ending 30 June

<i>Plastic type</i>	<i>Plastic weight (tonnes) FY17</i>	<i>Plastic weight (tonnes) FY18</i>	<i>Plastic weight (tonnes) FY19</i>
LDPE	2,371	3,003	3,312
LLDPE	2,699	3,483	3,307
HDPE	639	738	697
PP	239	198	247
PE	1,152	1,013	1,278
Not disclosed	724	796	774
Total	7,824	9,231	9,614

Appendix D: Survey summary

The survey question and answer format is summarised below.

A. Organisation information

Thank you for taking the time to participate in our survey. We appreciate your feedback. Responses will remain confidential and only aggregated data will be made available.

Q1. Please provide the name of your organisation below:

Q2. What is your name:

Q3. What is your email address:

Q4. What date is your organisation's financial year end?

Q5. Which of the below best describes your organisation (select all that apply)?

- Rural supplies merchant
- Fertiliser supplier
- Agricultural and horticultural plastics (eg silage wrap and horticultural films) supplier
- Seed and/or feed supplier
- Other (please specify)

Depending on the type of organisation selected in Q5, the following tables are presented for the respondent to complete:

- **Rural supplies merchants** are requested to complete tables for bags of seed, feed and fertiliser
- **Fertiliser suppliers** are requested to complete tables for bags of fertiliser
- **Agricultural and horticultural plastics suppliers** are requested to complete tables for crop packaging films eg silage wrap, pit covers, protective nets, ground covers, irrigation pipe, netting and twine
- **Seed and/or feed suppliers** are requested to complete tables for bags of seed and/or feed
- Respondents who answer "**Other**" to Q5 are requested to complete tables for bags of seed, bags of feed, bags of fertiliser and crop packaging films.

Appendix D: Survey summary (cont.)

B. If you supply bags of seed or feed please fill in the tables below:

Please remember that all responses will remain confidential.

When answering these questions, please only include the packaging that is used to distribute goods directly to the farmer or grower.

In the plastic packaging description field, examples might include: 1 tonne bags, 500kg bags, 40kg bags, 25kg bags, 20kg bags etc.

Q6. Bags of seed:

For bags of seed, please describe the plastic packaging type and complete the table.							
		Plastic packaging type (eg PET, HDPE, PVC, LDPE, LLDPE, PP, PS, EPS, other)	Net weight of plastic packaging if known (g)	Units sold FY-17 (No.)	Units sold FY-18 (No.)	Units sold FY-19 (No.)	Any other comments
Plastic packaging description 1	Free text	Free text	Numerical	Numerical	Numerical	Numerical	Free text
...		Free text	Numerical	Numerical	Numerical	Numerical	Free text
Plastic packaging description 10		Free text	Numerical	Numerical	Numerical	Numerical	Free text

Q7. Bags of feed:

For bags of feed, please describe the plastic packaging type and complete the table.							
		Plastic packaging type (eg PET, HDPE, PVC, LDPE, LLDPE, PP, PS, EPS, other)	Net weight of plastic packaging if known (g)	Units sold FY-17 (No.)	Units sold FY-18 (No.)	Units sold FY-19 (No.)	Any other comments
Plastic packaging description 1	Free text	Free text	Numerical	Numerical	Numerical	Numerical	Free text
...		Free text	Numerical	Numerical	Numerical	Numerical	Free text
Plastic packaging description 10		Free text	Numerical	Numerical	Numerical	Numerical	Free text

Appendix D: Survey summary (cont.)

C. If you supply bags of fertiliser please fill in the table below:

Please remember that all responses will remain confidential.

When answering these questions, please only include the packaging that is used to distribute goods directly to the farmer or grower.

In the plastic packaging description field, examples might include: 1 tonne bags, 500kg bags, 40kg bags, 25kg bags, 20kg bags etc.

Q8. Bags of fertiliser:

For bags of fertiliser, please describe the plastic packaging type and complete the table.

		Plastic packaging type (eg PET, HDPE, PVC, LDPE, LLDPE, PP, PS, EPS, other)	Net weight of plastic packaging if known (g)	Units sold FY-17 (No.)	Units sold FY-18 (No.)	Units sold FY-19 (No.)	Any other comments
Plastic packaging description 1	Free text	Free text	Numerical	Numerical	Numerical	Numerical	Free text
...		Free text	Numerical	Numerical	Numerical	Numerical	Free text
Plastic packaging description 10		Free text	Numerical	Numerical	Numerical	Numerical	Free text

Appendix D: Survey summary (cont.)

D. If you supply crop packaging films for agricultural or horticultural purposes please fill in the table below:

Please remember that all responses will remain confidential.

When answering these questions, please only include the plastic products that are used for agricultural and horticultural purposes. These include: silage wrap, pit covers, protective nets, ground covers, irrigation pipe, netting and twine.

Q9. Crop packaging films:

For crop packaging films, please describe the plastic type and complete the table.

		Plastic type if know n (eg LDPE, MDPE, other)	Total w eight of plastic sold FY-17 (tonnes)	Total w eight of plastic sold FY-18 (tonnes)	Total w eight of plastic sold FY-19 (tonnes)	Any other comments
Silage/baleage w rap						
Bale netting						
Baling tw ine						
Pit covers						
Mulch film						
Other 1	Free text	Free text	Numerical	Numerical	Numerical	Free text
...		Free text	Numerical	Numerical	Numerical	Free text
Other 10		Free text	Numerical	Numerical	Numerical	Free text

Appendix D: Survey summary (cont.)

E. Concluding questions

Q10. Does your company have any systems in place to recover and repurpose/recycle product and/or product packaging? If so, please describe these processes and the quantity of packaging/product you recover?

Q11. How important is the issue of plastic waste for your company and your customers?

- Very important
- Important
- Neutral
- Unimportant

Q12. Does your company support farm plastics being declared a priority product under the Waste Minimisation Act as proposed by the Minister for the Environment?

- Support
- Oppose
- Neutral

Do you have any comments you would like to add on this?

Appendix D: Survey summary (cont.)

E. Concluding questions (cont.)

Q13. How would you rate (1 being poor, 3 being average and 5 being outstanding) existing services provided to farmers and growers to manage disposal of:

- Bulk fertiliser bags (eg 500kg and 1000kg)
- Seed, feed and fertiliser bags
- Silage wrap, pit covers and horticultural films
- Twines and nets
- Agrichemical containers and drums

Do you have any comments on the existing services you have rated above?

Q14. Do you have any other thoughts/information/arguments you would like to share that would help us to better understand the farm plastic waste problem we are trying to solve?

Q15. If you have any files you would like to attach, please use the button below.