



## **Agricultural Waste Plastics Collection and Recovery Programme**

Extracts from the Interim Report:

- \*Executive Summary
- \*Farm Collection Schemes
- \*Agricultural Waste Plastic Reprocessors

For CIWM (EB)

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## Executive Summary

This summary reports on Phase One of the Programme. Conclusions and ideas are subject to review, change and development as the research progresses.

### Introduction

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#### The Programme

In April 2006 Valpak and ADAS submitted a successful proposal to the Agricultural Waste Stakeholder Forum, as part of a competitive tender, to carry out a study into the collection and recovery of agricultural waste plastics.

The aim of the study is to provide the AWSF and Defra with robust research into the economics and practicalities of collecting and recycling of farm plastics, to inform the development of Producer Responsibility Legislation. A small number of pilot projects will be run to trial expansion opportunities and efficiency improvements, that if successful, will help inform the development of a more comprehensive and sustainable collection coverage across the UK. This will allow the development of Good Practice guides into the cost effective collection and recovery of agricultural waste plastics.

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### Research & Analysis

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#### AWP Collection Schemes

In order to develop a web resource specifically focussed on AWP collection schemes, as well as establishing operational practices, geographical coverage and volume of AWP handled, a comprehensive survey of collection schemes was carried out. This included a telephone questionnaire, as well as in-depth interviews and visits. The key conclusions drawn from this work were:

- There are a considerable number of collectors spread across the UK, but only 19% have been operating over 1 year
- There appears to be no commonality of operation between the 12 established schemes
- Collection scheme coverage appears to be national, but not all farmers can receive a service
- Many collection schemes are expanding their area and intensity of collection
- The tonnage handled by the collection schemes is uncertain from the survey
- The majority of collection schemes collect from farms, almost half use farm hubs and less than a quarter use licensed sites
- Schemes collect the full range of plastics found on farms
- Schemes generally promote source separation; some allow for mixed collection
- Contamination is recognised as an issue that needs controlled; most schemes have a quality control process to minimise contamination
- The majority of collectors use balers to compact plastic for transport, baling is usually carried out at the scheme depot
- There are four main types of transportation used: trailed unit with tow vehicle, lorry, flatbed and bulk body

- There is no standard charge for collecting plastic from farms; schemes have developed individual ways of charging

### **AWP Reprocessors**

In order to develop a web resource specifically focussed on AWP reprocessors, to estimate the current and future UK reprocessing capacity for AWP and to establish whether any issues exist with the supply and reprocessing of AWP, a comprehensive survey of reprocessors was carried out. This included a telephone survey, as well as in-depth interviews and visits. The key conclusions drawn from this work were:

- There are ten AWP reprocessors spread across the UK
- Reprocessing capacity for farm plastics collected as a total is adequate to cope with materials collected
- Reprocessing Capacity is available for nearly all waste farm films currently produced in the UK
- Levels of soil contamination on film reach 80% + and can only be handled by a few reprocessors
- Reprocessors working in exclusive partnership with one collection scheme/network have the largest and most sustainable supply of material
- Reprocessors receive material both baled and loose
- It is not cost effective to separate out packaging from non-packaging plastics at the reprocessor stage
- Reprocessors sourced their AWP in a number of ways
- Material specifications by reprocessors were minimal, although level of contamination was a restriction for some
- 21 general plastics reprocessors expressed an interest in reprocessing AWP

### **Bio- degradable AWPs**

Biodegradable AWP are currently being trialled and developed, with the aim of them breaking down into carbon dioxide (CO<sup>2</sup>) and water. However some issues should be considered:

- Generally more expensive than conventional plastics
- When mixed with conventional polymers, biodegradable plastics are considered a contaminate by reprocessors (as such they need to be segregated and not sent for recycling)
- Polymers can be manufactured from Genetically Modified (GM) substances
- The achievement of total biodegradability has not been met by all manufacturers
- The reliability of biodegradation is also a potential issue, as if this occurs prematurely crops could be spoilt and therefore revenue lost.

### **EfW**

In order to assess if any UK EfW plants are capable of accepting AWP a telephone survey was undertaken and the following key conclusions drawn:

- It is believed that only three sites are capable of accepting AWP
- Plants would not accept AWP for the following reasons:

- Plastics have high calorific values slowing down throughput
  - Some plants did not have the correct permits to handle AWP waste
  - The material would need to be shredded and prepared before being fed into the machinery and as such operational restrictions apply
  - One plant was restricted to only accepting waste from the local vicinity
  - Pyrolysis is an additional potential end market for AWP
- 

### **AWP Programme Trials**

The methodology used in trial development was as follows:

- Set overall trial objectives
- Identify information required for Producer Responsibility recommendations
- Identify issues for further investigation from research (conclusions)
- Develop trial concepts and partners

A number of trials ranging from, for example, reduction of transport costs to cleaning of crop cover have been proposed to the PMB for commencement in autumn 2006.

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### **Producer Responsibility**

Two options for the operation of a Producer Responsibility scheme are outlined. These are:

- Agricultural Recovery Note (ARN) – This would be a system where the reprocessor would be accredited to issue tradable evidence of recycling and recovery of non-packaging agricultural plastic. Importers and Producers would be obligated and would be required to purchase the evidence to offset their obligation. An independent body would be set up to sell penalty ARNs if there was not sufficient supply from reprocessors
  - Target based Producer Levy – In this system a levy would be placed directly on Producers and Importers. The levy would be target based and would increase year on year as the target increased. The levy would be collected by an independent body and would be used directly to fund collection systems.
- 

### **Economic Model**

An economic model is being developed throughout the life of the project, as information is collated and analysed from both the research activities (surveys, visits, etc) and the trials. Three scenarios run through the economic model, based on a specific set of assumptions, are given in the Report. The key findings from the initial economic model are:

- Collection costs vary between £113 per tonne and £93.24 per tonne based on a gate fee being charged for delivered material.
- The maximum number of farms that can be serviced by a single vehicle per day is approximately 10. The volume of the material collected rather than the weight is the limiting factor for the vehicle capacity.
- To make a collection service economical, generally there has to be in excess of 1000 farms participating in the service. Smaller numbers than this are possible but the collection costs per tonne are significantly increased.
- Transport of the material to the end market is a significant cost and baling the material at a central location improves the economics because it allows for the use of a curtainsider vehicle. However in all the scenarios the baler

was only operating at a maximum capacity of 50%.

- If the material has high levels of contamination in excess of 20% then the costs per tonne will increase proportionately.
  - By compressing the film type plastic (LDPE, LLDPE) on farms it is possible to reduce the overall cost of collection in all scenarios tested by approximately £10 per tonne.
  - The cost of collection of rigids (HDPE) from farms is within the range of £150 to £200 per tonne. At present there is very little collection of this type as it is viewed to be uneconomic
- 

### **Marketing & Communication**

Communications activity to date has been significant – the groundwork has now been done that will enable stakeholder awareness of the Programme to be generated. The key publications released are:

- Programme Leaflet - 5000 Programme leaflets were printed and distributed at the end of June.
  - Programme website - The Programme website [www.agwasteplastics.org.uk](http://www.agwasteplastics.org.uk) was launched at the beginning of July and provides information about the Programme and background information about agricultural waste plastics, along with details of current collectors and reprocessors.
  - Programme press release - The first press release from the Programme was distributed in August to coincide with the compliance requirements for Farmers throughout the UK.
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## Section 3: Farm Collection Schemes

**Introduction** At the beginning of this Programme it was known that there were some AWP collection schemes in operation, however there was no definitive list of who these companies were, where they were operating and the tonnages of materials they handled.

In order to develop a web resource specifically focussed on AWP collection schemes, as well as establishing operational practices, geographical coverage and volume of AWP handled, a comprehensive survey of collection schemes was carried out by ADAS.

The results of the survey were also used to identify issues that exist with the collection of AWP that could be addressed through appropriate trials in the subsequent phase of the AWP Programme. Details of the issues identified and the process adopted to develop trials can be found in Section 7 of this Report.

This section details the survey process, analysis, results and conclusions and outlines the AWP collector's information now available on the Programme website.

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### 3.1 Collection Scheme Survey

#### 3.1.1 The Survey & Surveying Process

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**Objectives** The main objective of the survey was to develop a comprehensive database of collectors and their activities. The type of information collated includes:

- Geographical location, area covered and the number of participating farms
- Scheme organisation
- Operational practices, including separation, storage, bulking, collection methods (including bring schemes), and collection frequency
- The method of transport used
- Materials collected (e.g. polymer types, packaging/non-packaging plastics, other farm wastes)
- Volumes collected
- Overall costs, costs to farmers, and funding arrangements (e.g. grant support, levy-based or fully commercial)
- End Markets

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**Timescales** The project was conducted over the following time period:

**Figure 2: Timescales used for the AWP collector's survey**

| Activity                                   | Time Scale (2006)                                |
|--|--|
| 1. Develop Questionnaire                   | 1 <sup>st</sup> May - 31 <sup>st</sup> May       |
| 2. Telephone Interviews                    | 1 <sup>st</sup> June – 30 <sup>th</sup> June     |
| 3. Topline Initial Analysis                | 1 <sup>st</sup> July – 15 <sup>th</sup> July     |
| 4. Telephone interviews of failed contacts | 15 <sup>th</sup> July – 31 <sup>st</sup> July    |
| 5. Detailed Analysis and final report      | 1 <sup>st</sup> August – 18 <sup>th</sup> August |

**Activities**

The collection scheme surveying process involved the following key activities:

- Identification of AWP collection schemes
- Development of questionnaire
- Telephone survey
- Depth interviews
- AWP collection scheme visits
- Analysis of survey results
- Reporting results and conclusions

Each of these activities is detailed below.

**Identification of Collection Schemes**

ADAS consulted various sources of information within the farming and plastics recycling industry to develop a database of organisations operating AWP collection schemes. The organisations approached included Environmental Regulators, Industry associations and various consultants from within the industry. Company websites and trade press were also used.

**Development of Questionnaire**

A structured survey was developed, consisting mainly of closed questions with multiple choice answers. Some open questions were included in order to record opinions. The questionnaire was structured as follows:

- Background information on company coverage and capacity
- The type of plastic that is collected, any source separation requirements, and the form it is collected in.
- Information on the methods tried and used, and effectiveness.
- Asses the market preferences for example cleanliness etc
- Additional comments

A copy of the questionnaire is available in Appendix I of the main report.

**Telephone Surveying**

85 telephone interviews were carried out from a database of 99 contacts; a success rate of 86%. The telephone interviews lasted approximately 10 minutes and were carried out by our partners Hill Taylor Ltd. Hill Taylor Ltd are a specialist telephone interview company that use a Computer Aided Telephone Interview (CATI) system to conduct interviews. The CATI system enhances the efficiency and speed of the interview process and also allows for instant secure storage of respondent's answers within a database.

**Depth Interviews**

Following the receipt of information from the telephone questionnaires, each company received an email to invite further discussion on potential trials. Those companies of particular interest or perceived as suitable trial partners were contacted again to collect further information. These included:

- Agri.cycle Ltd, Lincolnshire
- Agriplass Ltd
- Sastak Farm Machinery Ring, Shropshire
- Somerset FWAG
- Solway Recycling Ltd
- Southern Agri Recycling

**Collection Scheme Visits**

A number of collection schemes of particular interest were visited and interviewed in order to gain a thorough understanding of the activities being undertaken. These are listed below and tended to be the larger, more established schemes or those with the potential for being involved in a trial.

- Birch Farm Plastic Collections
- Agri.cycle Ltd
- FarmPlas
- Somerset Farm Plastic Scheme
- Sastak (Shropshire Machinery Ring)
- Solway Recycling Ltd

**Analysis of Survey Results**

The CATI system also contributed to the analysis process. It is based on a market research statistical analysis software program called QPSMR. It facilitated the analysis of trends and the production of topline data tables of survey questions. Cross analysis of key issues and questions was subsequently carried out and the conclusions from the survey responses and analysis drawn.

**Reporting Results & Conclusions**

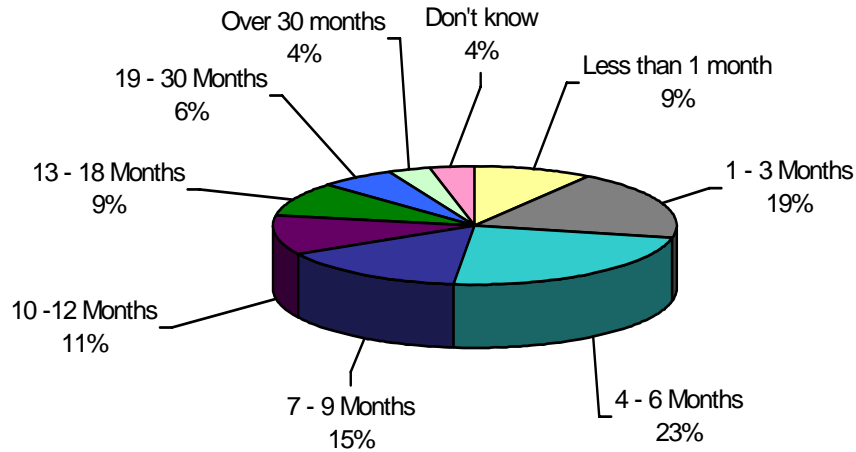
A Final Report on survey activities was written by ADAS for inclusion in this Interim Report. This was structured into key sections of issues that were identified during the analysis stage. A number of conclusions were drawn from the survey results, which have been used as the basis for designing the trials detailed later in Section 7 of the main Report.

**3.1.2 Profile of respondents****Age of Schemes**

Figure 3 below demonstrates that 67% (57 out of 85 respondents) of the sample had set-up a plastic collection scheme within the last 9 months. This highlights that two-thirds of the companies surveyed were relatively new to AWP collection. 19% (16) of the sample had been operating for over 12 months and are well established within the market place.

Further analysis was made on those companies operating 12 months or more. There was no clear correlation between length of time of trading or tonnages collected (discussed later), and no specific company type. The companies included specialists focusing on AWP collection, and companies already trading either in waste or some other agricultural service, and expanding into AWP collection.

**Figure 3: Length of Time Collection Schemes have been Operational**



**Franchises & Agents**

53% (45) of the sample were agents of a parent organisation and trade under the name of the parent organisation. There are currently five known parent organisations (others developing):

- Agricycle UK Ltd (23 Agents)
- Solway Recycling (22 Agents)
- FarmPlas (10 Agents)
- Agriplass Ltd (3 Agents)
- Birch Farm Plastic Collection (to be confirmed)

Of the organisations surveyed that have been operating for 12 months, 38% (6 out of 16) are agents of a parent organisation. Of those that have been operating for over 19 months, 25% (2 out of 8) were agents for parent organisations.

**3.1.3 Coverage and capacity of collectors**

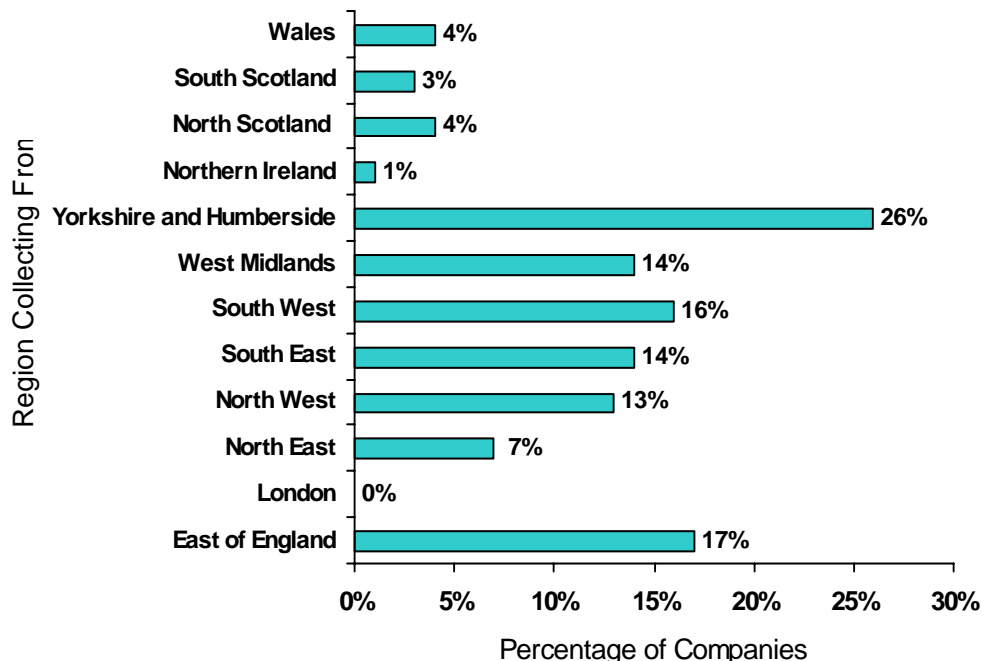
**Regional Coverage**

The results from the survey show that 19% (16) of companies sampled stated they collect on a national basis, 41% (35) on a regional basis and 40% (34) across individual counties.

Figure 4 displays the percentage of independent collectors operating within the various regions of the UK. These figures do not include the organisations that have indicated that they collect on a national basis as it has been assumed that these organisations will give some coverage in all areas.

The results show that there are very few collectors operating in the predominantly rural regions of North East England, Northern Ireland, Scotland and Wales.

**Figure 4: The dispersion of Collectors throughout the UK**



**County Coverage**

This evidence is supported further by the breakdown of county collections. Figure 5 below displays the counties that currently have no independent operators offering collections (i.e. only covered by national collectors) according to our sample.

**Figure 5: Counties not covered by independent collectors<sup>1</sup>**

| Wales               |                   |
|---------------------|-------------------|
| Anglesey            | Glamorgan         |
| Flintshire          | Monmouthshire     |
| Scotland            |                   |
| East Ayrshire       | North Lanarkshire |
| South Ayrshire      | South Lanarkshire |
| North Ayrshire      | Moray             |
| Clackmannanshire    | Orkney            |
| East Dunbartonshire | Renfrewshire      |
| West Dunbartonshire | Scottish Borders  |
| Falkirk             | Shetland          |
| Fife                | Stirling          |
| Inverclyde          | Western Isles     |
| Northern Ireland    |                   |
| Antrim              |                   |

<sup>1</sup> Sources of county lists used during the survey:  
 (<http://homepage.ntlworld.com/geogdata/ngw/counties.htm>) Wales  
 (<http://www.abcounties.co.uk/counties/map.htm>) England (<http://www.geo.ed.ac.uk/scotgaz/scotland.html>)  
 Scotland (<http://www.proni.gov.uk/geogindx/counties.htm>) Northern Ireland

Possible reasons for this lack of coverage are:

- Some counties may contain urban areas
- Some counties are not farming counties,
- Collectors may find it difficult to engage farmers in some areas
- Farmers may not wish to be involved in plastic recycling
- Areas with low farm density may make collections uneconomic

It should also be noted that collectors which have indicated that they offer a national service, or those that declined interview, may collect in some of the areas highlighted above.

**Radius of Collection**

55% (42 out of 76) of non-national collectors travel further than 150km from their operating premises to collect plastics, which suggests that even though the companies sampled do not target the above counties, they may be prepared to collect from them.

Interestingly, of the 19% of companies that have been established for over 12 months, 75% (12 out of 16) are prepared to travel over 150km from their operating premises for collections. This demonstrates that companies that have been established for a while, may be looking to develop their business by travelling further for collections.

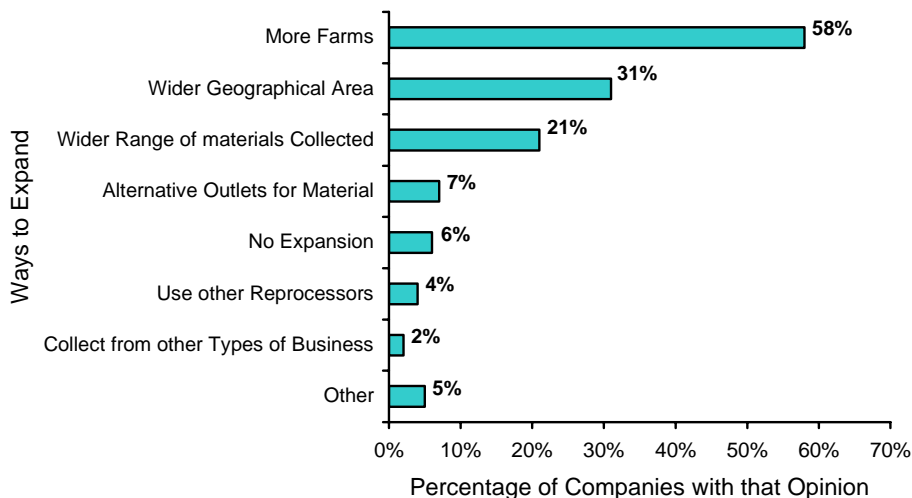
**Areas of expansion opportunity**

Companies were asked if they would be expanding over the next 12 months and 32% (27) said yes. The parent trading organisations were contacted and a number of these companies indicated that they are planning to expand their coverage into the areas that were highlighted in Figure 5, as they felt these areas were underrepresented for collections.

**Nature of expansion**

Respondents were asked in what way they could expand their current service; Figure 6 displays the most common responses.

**Figure 6: Expansion Opportunities for Collectors**



From the evidence gathered it is clear that over half the sample believed that in order to expand their business they need to increase the number of farms they collect from within their area. Expanding into a wider geographical area and increasing the range of materials collected were also noted as important.

27 companies said that more advertising and publicity was needed in order to sign up more farmers to their schemes. A further 20 companies identified increased awareness among farmers of the legislation and processes of plastic collection and recycling as of importance.

### 3.1.4 Collection Points

#### Collection Points

The survey results showed that the majority of scheme operators offer three main collection methods:

- The most popular is collections from farm premises, 92% (78) of respondents collect via this method
- 46% (39) collect from farmer groups where the plastics are stored at a central hub, usually located on a farm with farmers transporting the waste to the hub themselves
- 19% (16) of companies collect from licensed waste sites
- Only one company surveyed does not offer a collection to farmers and requires the farmers to bring the plastics to them

#### Collections from Farms

Figure 7 highlights the average number of farm collection schemes operating in each region and the average number of farms they each collect from.

**Figure 7: Average number of farms operators collect from within each region**

| Region  | Number of operators | Average number of farms collected from <sup>2</sup> |
|---|---------------------|---|
| East Midlands                                 | 8                   | 92.9  |
| East of England                               | 8                   | 150.1   |
| London  | 1                   | 50  |
| North East                                    | 4                   | 87.5  |
| North West                                    | 8                   | 92.9  |
| South East                                    | 8                   | 131.3   |
| South West                                    | 9                   | 164.4   |
| West Midlands                                 | 8                   | 114.3   |
| Yorkshire and Humberside                      | 15                  | 80  |
| <b>Overall England</b>                        |                     | <b>107</b>  |
| <b>Northern Ireland</b>                       | <b>1</b>            | <b>3250</b>   |
| North Scotland                                | 3                   | 100   |
| South Scotland                                | 2                   | 125   |
| <b>Overall Scotland</b>                       |                     | <b>112.5</b>  |
| <b>Wales</b>                                  | <b>3</b>            | <b>150</b>  |
| <b>Those that collect on a national level</b> | <b>16</b>           | <b>1667</b>   |

<sup>2</sup> The data contained within this table is an estimate of farm gates collected from within each region by the collectors. Given that some contractors did not provide an estimate and a number provided a total estimate for several regions, this data should be used only as a guide to the number of farms from which collections are made.

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The data demonstrates that the average number of collections for operators across regions within England is 107 farms. These figures are relatively similar in Scotland (113) and Wales (150).

The figure for regional farm collections given for Northern Ireland, 3,250, is high. As this is the only company surveyed in Northern Ireland that collects from farms, it is possible to assume that this company collects over all of Northern Ireland and is not restricted to one specific area.

The vast majority of scheme operators that collect from regions collect from between 1 and 400 farms. Only a small number (5) of companies that aren't national collectors, collect from over 400 farms. Of all the companies that state that they collect nationally, the average number of individual farms collected from is 1,667.

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**Collections from Hubs**

30 respondents specified the number of hubs they collected material from: 27 collect from between 1 and 40 hubs, of which eight collect from one to three hubs. The remaining 3 collectors claimed to collect from over 100 hubs.

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**Collections from Licensed Waste sites**

Although 16 operators collect from licensed waste sites, only ten of these knew the number of sites they collect from. Eight of the ten operators collect from less than ten Licensed Waste sites.

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### 3.1.5 Plastic Types Collected

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**Polymers**

Of the 85 companies within the sample the majority collect a range of plastic types.

- LDPE (99%)
- PP (96%)
- HDPE (91%)
- PVC (80%)
- Polystyrene (65%)

Therefore, nearly all operators will collect LDPE, PP and HDPE.

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**Restrictions**

Further analysis shows that 31% (26) of the sample specify restrictions on the types of plastic they collect. This appeared to be a result of processing capabilities. Other companies placed restrictions on:

- hazardous waste,
  - contaminated plastics,
  - silage bags
  - hard plastics and string,
  - wet plastics
- 

**Source**

The data shows that 85% (72) of the sample separate plastic types at the

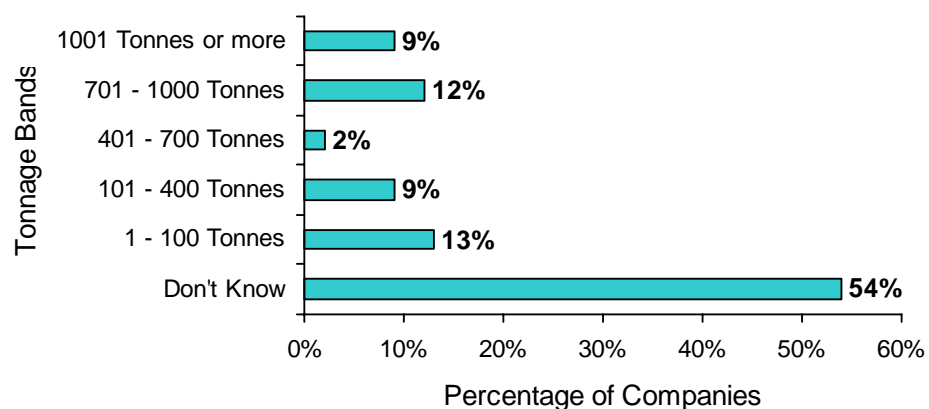
**Separation** collection point. Only 12% (10) of companies do not separate and 4% (3) sometimes separate.

**Packaging and non packaging wastes** Respondents were asked if packaging and non-packaging wastes were collected together, 80% (68 out of 85) of the sample said that they were, 13% (11 out of 85) claimed that they did not collect them together and 7% (6 out of 85) said they sometimes collected them together.

**Tonnage weight collected** Collectors were reluctant to disclose tonnage information, the main reason being that most schemes are still in their infancy and genuinely did not know what yearly tonnages are or would be. This evidence is supported by the data discussed in section 3.1.2 where it is suggested that 67% of the sample have only been operating collection schemes for the last 9 months.

39 operators provided estimates of approximate tonnage of plastics collected. Of the 39, 31 claimed that they collected 1000 tonnes or less per year, and 8 reported collecting 1001 tonnes or more per year.

**Figure 8: Breakdown of Yearly Tonnage's Collected**



As can be seen in Figure 8 above, 19 companies (22%) collected up to 400 tonnes per year, and a further 12 (14%) collected between 401 and 1000 tonnes per year. Taking this data in to consideration, there appears to be three categories of collectors in terms of tonnage collected. They are:

- smaller operators that collect between 1 – 400 tonnes per year
- medium sized operators that collect 401 – 1000 tonnes per year
- large operators that collect over 1000 tonnes per year

**Company Age & Tonnage Relationship** A cross analysis of the data in relation to company age was carried out. For this, it was decided that combining data from the tonnage bands of companies collecting 701 to 1000 tonnes, and 1001 tonnes or more in figure 8 was needed. The data reveals that 17 companies collect 1000 tonnes or more per year.:

- 7 of the 17 collectors have been established for over 10 months

- 10 of the 17 collectors have been established less than 10 months
- 7 of the 17 collectors expressed an interest in expansion (wider geographical area and more farmers locally)

Whilst it could be concluded that those companies who are less than 10 months old are collecting high tonnage, it should be borne in mind that collectors may have signed up for collection, but may not collect until year end (May 2007). Therefore, tonnage estimates for these companies may not be accurate.

**Containers & Container Charges**

Operators were asked if they provide bulked up containers for customers to use; 69% (59) said that they did. Of those, 75% (44 out of 59) charge by volume, and 25% (15 out of 59) charge by weight. Charges are discussed in more detail section 3.1.9 of this report.

**Other waste collected**

For the purpose of this study, other wastes are classed as batteries, oils, scrap metals, cardboard, wood, etc; anything that is non-plastic. When asked if other wastes were collected, 49% (42 out of 85) of the sample said that they also collected other non-plastic wastes at the same time as plastic waste collections. It is perceived that by collecting other types of wastes at the same time, the costs of running collection services are reduced.

**Figure 9: Types of Non-Plastics Collected**

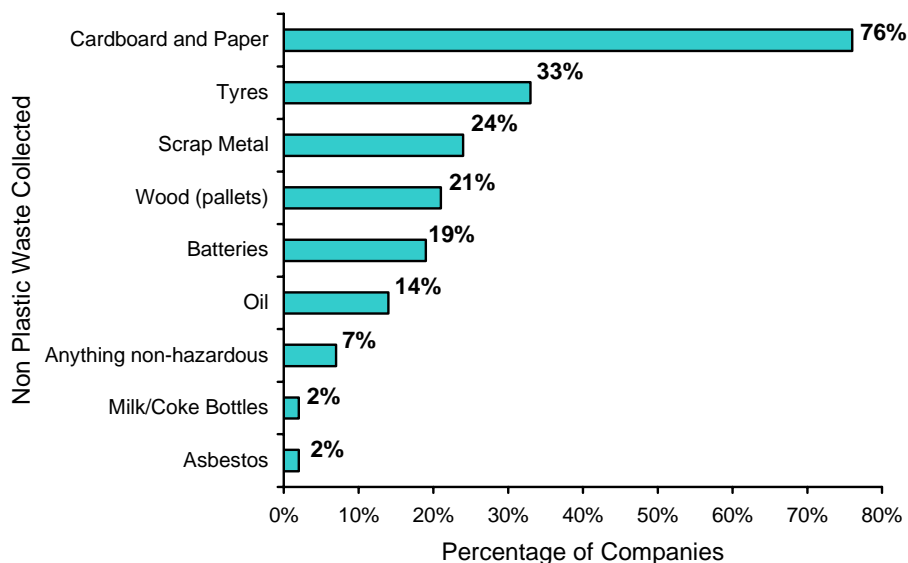


Figure 9 indicates that cardboard and paper are the most commonly collected forms of other waste. This may be because cardboard can be flat packed and baled in the same machines as plastic waste.

There is certainly room for expansion within this area for collection schemes as highlighted in section 3.1.3 of this report, where it is identified that 21% of the sample feel that they can expand their current range of services by offering collections on other waste types.

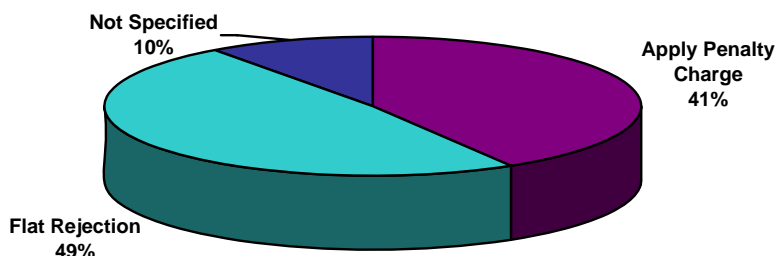
### 3.1.6 Quality Control Schemes

#### Quality Procedures

Operators were asked if they work to a scheme quality procedure; 94% (80) reported that they do. Furthermore, 82% (70) operate a rejection or penalty procedure, as illustrated below in Figure 10. The remaining 18% (15) of the sample taking all plastics away regardless.

On further analysis, it was discovered that 89% (62 out of 70) of companies reject or penalise on the basis of excessive contamination.

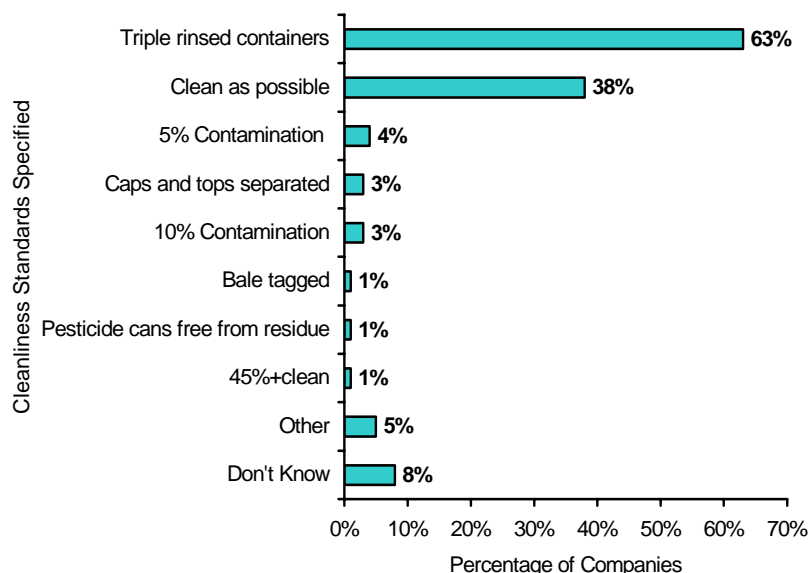
**Figure 10: Rejection Quality Procedure**



#### Cleanliness Specifications

84% (71 out of 85) of operators reported that they specify cleanliness standards within their contracts; these are displayed in Figure 11.

**Figure 11: Cleanliness Standards Specified**



#### Contaminated Pesticide Containers

For pesticide containers, a triple rinse standard that is adopted by the Environment Agency is the minimum requirement of cleanliness that is requested by the collectors when collecting from farms.

**Contaminated Film Plastic** For film plastic the level of acceptable contamination varies, for example 27 respondents said “as clean as possible”, 2 said “10% contamination” and 3 said “5% contamination.” The data highlights that there is no consistent or clear standard of contamination accepted within the industry.

Contamination levels of silage wrap, in particular crop cover film, can be very high. Collectors have reported that contamination levels vary by crop type.

**Reducing Contamination Reduces Costs**

For farmers reducing contamination levels on their waste plastics there is often a cost saving, especially if they are charged per tonne of material collected.

This in turn leads to reduced transport costs for collectors, as carrying fewer tonnes of soil and other contaminants increases the tonnage/volume of plastics that can be transported in a load. Furthermore it may enable a wider range of reprocessors to accept their plastics, therefore increasing choice and perhaps the distance travelled to reprocess.

For reprocessors, cleaner plastics can improve efficiency and life of their recycling equipment.

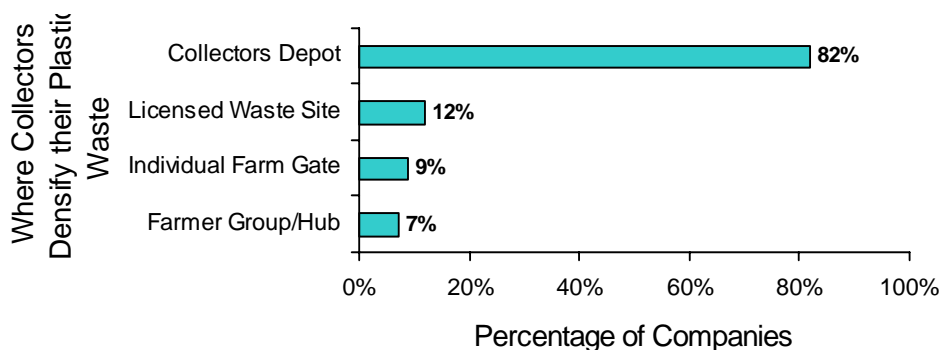
An alternative solution to farmers reducing contamination levels is for collectors to offer a plastic cleaning service. In general plastic cleaning is carried by reprocessors, with just 16% (14) of collectors offering a plastic cleaning service.

**3.1.7 Densifying Wastes**

**Point of Densification**

Respondents were asked if they make their waste package more compact prior to delivering to reprocessors; 80% (68) of collectors reported doing this. The vast majority of collectors do this at their own depot as shown in Figure 12 below, however densification is also carried out on farms, at hubs and at licensed waste sites.

**Figure 12: Where Plastic Waste is Densified**



**Method of**

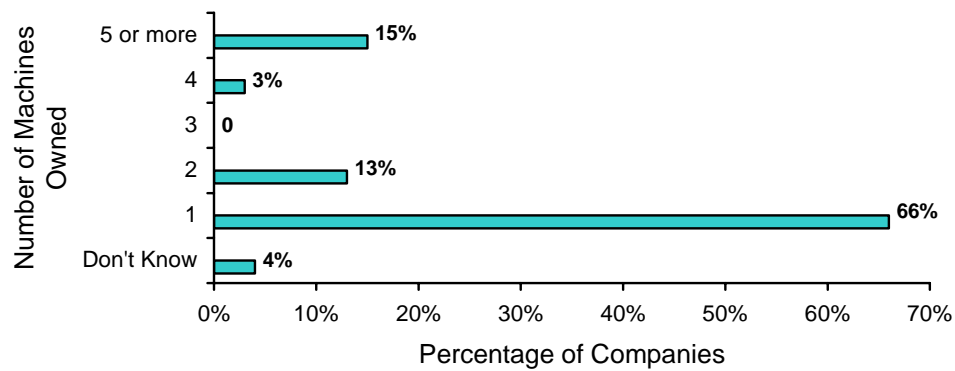
Whether on site, at a hub, or at the collector's depot, there appears to be

**Densification** consistency in the method of densification. 83% of those that densify waste use balers, 16% use both baling and shredding methods and only 1% of collector's use shredding only.

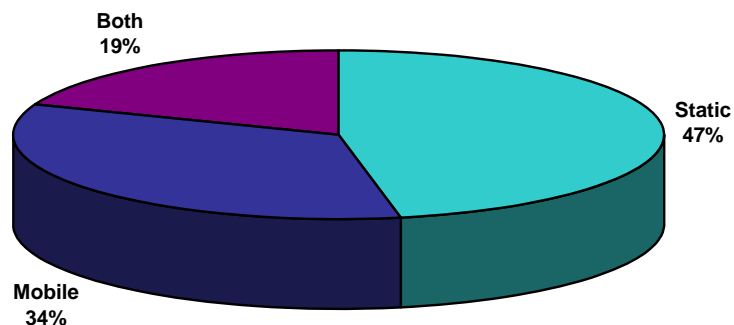
Baling plastic can reduce transport costs by saving lorry space and by enabling the use of less expensive, larger, flatbed lorries instead of bulkers. Through the labelling of baled packages, traceability and quality control can also be improved.

**Number of Balers used** Figure 13 highlights the number of machines collectors have; 66% (45 out of 68) have just one baler, 31% (21 out of 68) have more than one machine, and 15 have over five machines. The majority of companies that are operating more than one baler are identified as agents of parent organisations, who may have been answering the question in relation to the parent company. One company stating a high number of balers is a distributor of balers.

**Figure 13: Number of Baling Machines per Operator**



**Static & Mobile Balers** The most common type of baler used is the static machine, which 66% (45 out of 68) of operators have. The majority of collectors that have static machines compact waste at their depot. 53% (36 out of 68) of collectors have mobile balers and will bale at farmer premises, hubs and their own depot.



**Bale sizes**

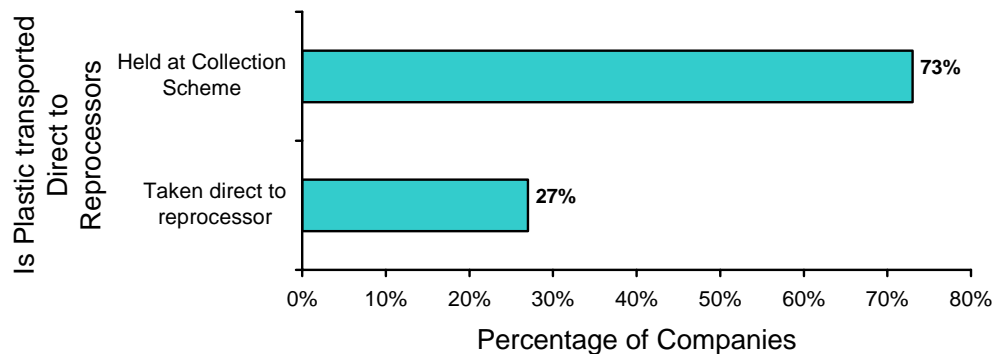
Each company produces bales dependent on their own specific needs. Although this was not investigated further, it is assumed that the range of bale sizes is dependant on the type and make of baler used. It is also influenced by lorry bed size to optimise the lorry loading, ease of use in terms of mobility and its adaptability to compact other materials. Some reprocessors also specify minimum and maximum bale sizes and weights.

### 3.1.8 The Transportation of Plastics

**Direct to Reprocessor**

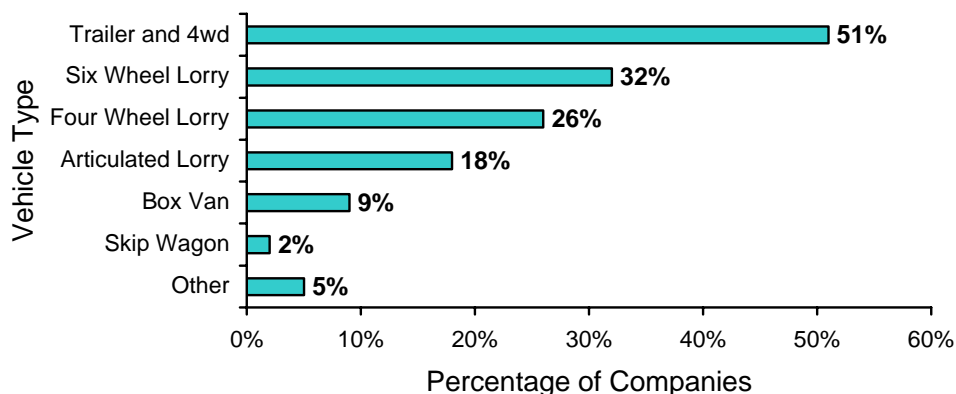
Figure 15 reveals that 23 collectors (27%) densify at the site of collection and transport direct to reprocessors. The majority of the sample (73%) collect the waste plastic and store it at their depot before transporting to the reprocessors. Although not investigated further within this study, it is believed that the main reason for storing plastics at the depot is to make deliveries more economical and cost effective by delivering full loads every time.

**Figure 15: Transportation of AWP to Reprocessors**

**From source collection to the scheme depot**

Respondents were asked what type of vehicle they use to transport plastics from the farm/hub/licensed waste site to their own scheme depot; the two most popular forms of transport for plastic waste are lorries, and a trailer with 4 wheel drive. This is illustrated in Figure 16 below.

**Figure 16: Transportation of AWP from Collection Site to Collectors Depot**



From cross analysis of the data it is evident that companies using trailers and 4 wheel drives are mostly companies that have been formed for less than 10 months. Most are used for collecting small amounts of waste mainly from individual farm gates.

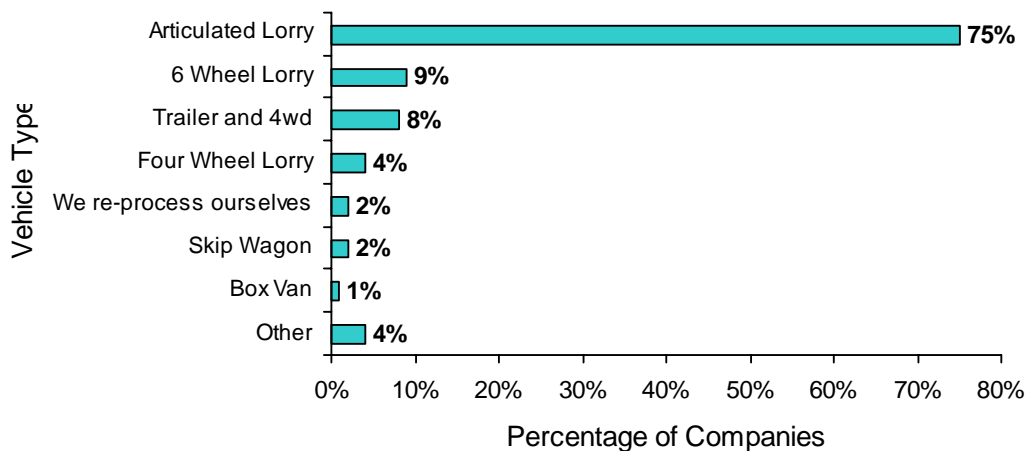
64% of companies that use trailers and four wheel drives have only one vehicle. However, 8% of collectors have over 10 trailers and four wheel drives which suggests that these companies are much larger operators.

41% of companies that use lorries have been running the collection scheme for over 10 months and do multiple collections from farm gates, farmer hubs and licensed waste sites. 44% of companies that use lorries use only one for transport. However, 24% of companies that use lorries own over 10. Those schemes that own over 10 lorries collect large amounts of plastic each year.

**From Scheme Depot to Reprocessor**

Figure 17 shows that once the material has been compacted the majority of collectors (75%) transfer the bales to reprocessors using articulated lorries. All companies that deliver using lorries have annual collections of over 100 tonnes.

**Figure 17: Transportation of AWP from Collectors Depot to Reprocessor**



**3.1.9 Collection Schemes/Scheme Membership**

**Collection frequency**

69% (59) of the sample offer both a planned collection service and collection by request. 21% (18) offer collections by individual request only and 9% (8) offer regular planned collections only. Of the collectors that provide planned collections 55% (37 out of 67) offer biannual collections and 15% (10 out of 67) offer monthly collections. On the whole it appears that collectors are heavily reliant on farmers contacting them for plastic collections.

**Reprocessors**

Collectors were asked the number of reprocessors they use for the recycling of plastics. 75% (64) of the sample said that they used just one reprocessor and 25% (21) used two or more reprocessors. The names of reprocessors provided by collectors are given in Figure 18.

**Figure 18: Reprocessors named by Collection Schemes**

| Name of Reprocessors used by Collectors |   |
|---|---|
| BPI, Dumfries, Scotland                 | Ian Hodges <sup>3</sup> Recycling, Cramling |
| Centriforce, Liverpool                  | Plumbs <sup>3</sup> , Doncaster             |
| Econoplas, Scarborough                  | Reflex polymers, Middlesborough             |
| F.D Todd <sup>4</sup> , Thirsk          |   |

**Registration/ Membership Fees**

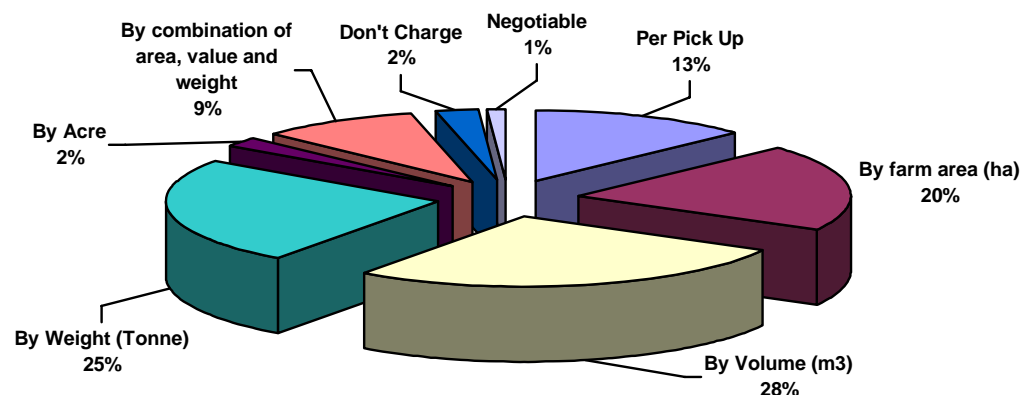
28% (24) of respondents reported charging a registration fee to join their scheme. Of those, 58% (14 out of 24) require the fee to be paid every year, whilst the remainder just charge a one off joining fee.

For both one off joining fees and yearly subscriptions there appears to be no consistency in fees charged. For both types of schemes, registration / membership fees range from £20 to £250.

**Scheme Charges**

Collection companies were asked how they charge for the actual collection of plastics each time. Figure 19 displays the different ways operators charge for collections.

**Figure 19: Operators Charges per Collection of Plastic Waste**



<sup>3</sup> Interviewed as part of the Reprocessors survey; stated they did not reprocess AWP

<sup>4</sup> Interviewed as part of the Reprocessors survey; stated they did not reprocess AWP, but traded it on

Figure 19 shows that the most popular methods of charging for the collection of plastics are by volume, weight and farm area.

However, it is also evident from the survey that there is tremendous variation in the charges to farmers. The collectors that charged per load/pick up charged between £10 and £50 per load. One collector said that he charged £27 per hour for travel time and time spent on site or £70 per bale collected.

The charges by farm area ranged from £0.75 per acre to £4.60 per acre. Charges by volume ranged between £10 and £40 per metre cubed. Finally, weight charges ranged from £12 per tonne to £130 per tonne.

### 3.1.10 Financial Support

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**Funding** Of the 85 companies surveyed 11% (9) are receiving financial support; of which 8 received it in the form of a grant. One company receives the financial aid in the form of a subsidy.

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### 3.1.11 Key Conclusions

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**Introduction** From the analysis carried out and presented above, several key conclusions can be drawn; these are outlined below.

---

#### **There are a considerable number of collectors spread across the UK, but only 19% have been operating over 1 year**

**Current AWP Collectors**

- 99 collectors were identified in the UK at the time of the Survey
- The majority of collectors operate as agents for parent organisations (53%)
- Nearly two-thirds of the sample had only established plastic collection schemes within the 9 months leading up the survey
- The plastic collection scheme market is made up of small, medium and large sized collectors that are relatively evenly spread

---

#### **There appears to be no commonality between the 12 established schemes**

**Differences in Established Schemes**

- Different methods of collection
- Different operational plans
- Variety of transportation methods
- Majority bale, but some material still transported to reprocessor loose
- Variety of geographical locations
- Variety of materials collected
- Variety of charging and registration mechanisms

However, at least half of the established schemes are linked exclusively to one reprocessor

---

### **Collection scheme coverage appears to be national, but not all farmers can receive a service**

#### **Coverage**

- The results of the survey indicate that there is complete national coverage for plastics arising on farms
  - Some counties have no independent collectors operating within them and are only covered by operators which have indicated they operate nationally
  - Companies operating on a local or regional level confirmed not all farms within their area receive a collection service; therefore whilst coverage is reported to be national, not all farmers receive a service
  - There are a number of collection schemes collecting on a near national basis who are working in exclusive partnership with a reprocessor
- 

### **Many collection schemes are expanding their area and intensity of collection**

#### **Expansion of Schemes**

Key areas for expansion over the next 12 months (in order of importance):

- Collecting from more farms
- Widening geographical spread
- Collecting a larger range of waste materials

The main ways to achieve this is through educating farmers on recycling legislation and processes, and by increasing marketing activity

---

### **The tonnage handled by the collection schemes is uncertain from the survey**

#### **Tonnages**

- Collectors were very reluctant to disclose tonnage collected
  - Due to the majority of schemes being established within the last 9 months, it was difficult to estimate yearly collection tonnages
- 

### **The majority of collection schemes collect from farms, almost half use farm hubs and less than a quarter use licensed sites**

#### **Point of collection**

- 92% collect from farms
- 46% collect from hubs
- 19% collect from Licensed sites.

#### **Number of farms**

- The vast majority of scheme operators collect from between 1 and 400 farms
- Only 5 non-national scheme operators collect from over 400 farms
- Companies reporting national coverage, on average number collect from 1,667 farms

---

## **Schemes collect the full range of plastics found on farms**

### **Materials Collected**

- Nearly all operators collect LDPE, HDPE and PP
  - LDPE film plastic is the predominant plastic collected
  - Some schemes collect other wastes and some are considering collecting other wastes to expand their service
  - Card and paper is the most commonly collected other waste
- 

## **Schemes generally promote source separation; some allow for mixed collection**

### **Source separation**

- There is a preference for collectors to request source separation (85%)
  - Source separation is by polymer type, not packaging and non-packaging
  - One re-processor does not require source separation
- 

## **Contamination is recognised as an issue that needs controlled; most schemes have a quality control process to minimise contamination**

### **Contaminated Plastic**

- 94% of collection schemes have a quality control process in place to minimise contamination
  - The majority (82%) of collectors operate a rejection or penalty procedure for excessive contamination
  - Contamination levels vary for silage wrap; there is no consistent or clear standard of contamination accepted within the industry
  - The triple rinse procedure appears to be standard for pesticide containers
- 

## **The majority of collectors use balers to densify plastic for transport; baling is usually carried out at the scheme depot**

### **Densifying Wastes**

- 80% of collectors use balers to densify packages of plastic for transport
  - Baling is usually carried out at the scheme depot
  - Despite the use of farm hubs only a very small proportion (<7%) of collectors bale plastic at hubs
  - 65% of Collectors who bale have the use of only one machine
  - 66% use static balers, 53% use mobile balers, 19% use both
  - A considerable variation in bale size exists
- 

## **There are four main types of transportation used: trailed unit with tow vehicle, lorry, flatbed and bulk body**

### **Transportation**

- Equal numbers of schemes use a trailed unit with tow vehicle as use a lorry
- Flatbed and bulk body are also used in similar proportions

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## There is no standard charge for collecting plastic from farms; schemes have developed individual ways of charging

### Collection Charges

- Collection schemes have developed their own individual ways of costing the collection service, which may include other services
  - Some schemes have annual charges or one off joining fees
  - There is no consistency within the industry for the level of charges
  - Where collectors charge for individual collections, this is mostly by volume, weight or farm size
  - It can be difficult for farmers to compare prices of collection schemes
- 

## 3.2 Collection Scheme Database

### Purpose of Database

Providing information on companies currently collecting AWP on a public website will aid both farmers and reprocessors in the organisation and logistics of collecting and recovering AWP. It will also go some way to helping collectors promote and market their services to farmers as recommended above.

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### Description & Content

Details of the 85 collection schemes interviewed for the Programme are provided on the website, including information such as contact details, collection area and materials accepted. An example of a company profile is shown below.

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Figure 20: Sample Collector Profile as Available on the Website

The screenshot shows a website interface for the Agricultural Waste Plastics Collection and Recovery Programme. On the left is a green navigation menu with links: The Programme, Ag Waste Plastics, Press, Feedback, Request Updates, Collectors, and Reprocessors. Below the menu is a search bar with 'Collectors' and 'Reprocessors' entered. The main content area is titled 'Collectors' and features a 'Collector Details' section for 'Agriplass Franchise'. The details include:

- Collection Company:** Agriplass Franchise
- Company Name:** Rough Hill Farm
- Contact Name:** Jonathan Court
- Website Address:** www.Aagriplass.co.uk
- Company Address:** Rough Hill Farm, Sherington, Banbury, Oxfordshire, OX156HQ, England
- National:** yes
- Telephone Number:** 07866 530344
- Source Separated:** yes

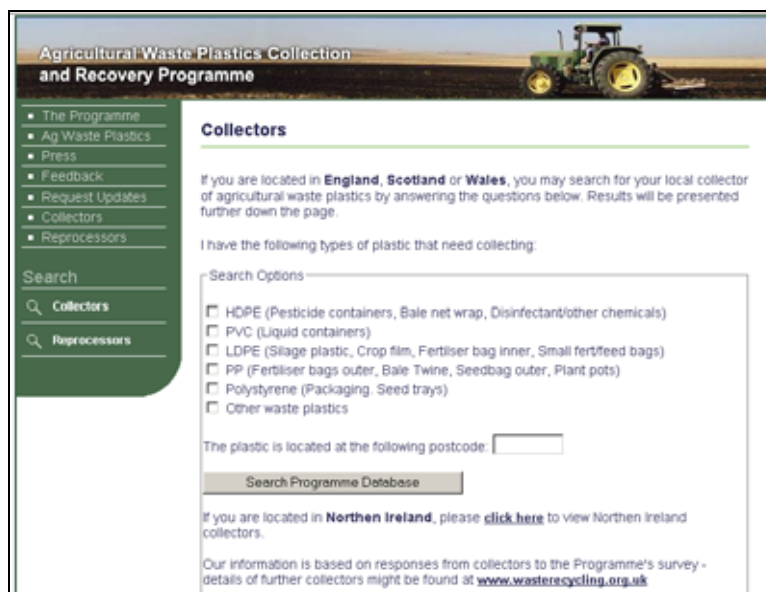
To the right of these details is a box titled 'Plastics Collected' which lists:

- Plastics:** HDPE, PVC, LDPE, PP, PS

## Search Capacity

The website search facility enables a user to search a database of all respondents to the questionnaire by postcode or name. This facility is shown in the figure below.

Figure 21: Website Collector's Search Facility



The screenshot shows the 'Collectors' search facility on the website. The page title is 'Agricultural Waste Plastics Collection and Recovery Programme'. A navigation menu on the left includes 'The Programme', 'Ag Waste Plastics', 'Press', 'Feedback', 'Request Updates', 'Collectors', and 'Reprocessors'. The 'Search' section is active, showing 'Collectors' and 'Reprocessors' options. The main content area is titled 'Collectors' and contains the following text: 'If you are located in **England, Scotland or Wales**, you may search for your local collector of agricultural waste plastics by answering the questions below. Results will be presented further down the page.' Below this, it asks 'I have the following types of plastic that need collecting:' and provides a 'Search Options' section with checkboxes for: HDPE (Pesticide containers, Bale net wrap, Disinfectant/other chemicals), PVC (Liquid containers), LDPE (Silage plastic, Crop film, Fertiliser bag inner, Small fert/feed bags), PP (Fertiliser bags outer, Bale Twine, Seedbag outer, Plant pots), Polystyrene (Packaging, Seed trays), and Other waste plastics. A text input field for 'The plastic is located at the following postcode:' is followed by a 'Search Programme Database' button. A note for Northern Ireland users is provided, along with a link to view Northern Ireland collectors. A footer note states that information is based on responses from collectors to the Programme's survey and provides a link to [www.wastercycling.org.uk](http://www.wastercycling.org.uk).

## Adding & Amending Database

The database can be easily updated and any new or additional collection schemes entering into the industry added. There is a facility on the website for collectors to submit amended or new information

## Section 4: Agricultural Waste Plastic Reprocessors

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**Introduction** At the beginning of this Programme it was known that there was only a small number of AWP reprocessors, however there was no definitive list of who these companies were, where they were operating, the tonnages of materials they handled, who supplied them or what they produced.

In order to develop a web resource specifically focussed on AWP reprocessors, to estimate the current and future UK reprocessing capacity for AWP and to establish whether any issues exist with the supply and reprocessing of AWP, a comprehensive survey of reprocessors was carried out.

This section details the survey process, analysis, results and conclusions and outlines the AWP reprocessor information now available on the Programme website.

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### 4.1 AWP Reprocessor Survey

#### 4.1.1 The Survey & Surveying Process

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**Objectives** By surveying possible UK plastics reprocessors it was possible to identify those that are currently or potentially capable of accepting agricultural waste plastics. From this, an estimate of current and future capacity for AWP in the UK can be identified. In addition to this a thorough understanding of reprocessors' requirements for materials and their activities and end products will also be established.

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**Timescales** The telephone survey of reprocessors was conducted in May and June 2006. This was followed by some further depth interviews and visits to those reprocessors of particular interest in June and July 2006.

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**Activities** The reprocessor surveying process involved the following key activities:

- Identification of AWP Reprocessors
- Development of questionnaire
- Telephone surveying
- Depth interviews
- AWP Reprocessor Visits
- Analysis of survey results
- Reporting results and conclusions

Each of these activities is detailed below.

---

|  |   |
|--|---|
| <b>Identification of AWP Reprocessors</b>  | Various lists of those companies believed to be AWP reprocessors were sourced by Valpak including those from the Environment Agency, Valpak's sister company Valient and websites such as Recoup and Lets Recycle. In addition to this further companies were identified through secondary website research and from the AWP collectors survey conducted.   |
| <b>Development of Questionnaire</b>        | <p>A questionnaire was developed by Valpak (including input from Valient) with input from ADAS, the Project Management Board and Defra. Questions were split into sections which covered current and future capacity by material type, end product produced and reprocessing activities and quality requirements. Such questions were designed to distinguish between reprocessors, pre-treatment facilities and potential reprocessors. The questionnaire was structured as follows:</p> <ul style="list-style-type: none"><li>• Background company information</li><li>• Current activities</li><li>• Collection of plastics</li><li>• Material Specifications</li><li>• Potential activities if not currently reprocessing AWP</li></ul> |
| <b>Telephone Surveying</b>                 | Participants were interviewed as part of a telephone survey, which was considered the quickest, most economic and successful method of achieving a high participation rate. Over 60 companies took part in an interview between May and June 2006.  |
| <b>Depth Interviews</b>                    | Following the receipt of information from the telephone questionnaires, those companies identified as reprocessing AWP were contacted in order to gain further information about their activities and intentions.   |
| <b>AWP Reprocessor Visits</b>              | Where possible, those reprocessors handling large tonnages of AWP were visited and interviewed further in order to gain a thorough understanding of the activities being undertaken.  |
| <b>Analysis of Survey Results</b>          | Following the collation of AWP reprocessor information analysis of this data was carried out in order to identify UK reprocessing capacity as well as identifying any key industry characteristics including those concerning material and delivery specifications and activities performed for example.  |
| <b>Reporting Results &amp; Conclusions</b> | The principle results identified have been presented to the Project Management Board and are shown below. In addition to this key information concerning AWP reprocessor locations and requirements is also available on the programme website for farmers, collectors and other interested parties to use.   |

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## 4.1.2 Key Results and Statistics

### 4.1.2.1 Current AWP Reprocessors

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**Current AWP Reprocessors** Ten reprocessors have been identified as currently reprocessing a variety of AWP's in the UK.

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**Pre-Treatment Facilities** In addition to the reprocessors, a further three companies are believed to carry out washing and shredding type activities producing flake and granulate, in order to supply reprocessors with feedstock. Based on the definition given in the User's Guide to The Producer Responsibility Obligations (Packaging Waste)<sup>5</sup>, these companies are not classifiable as reprocessors and are therefore termed as 'pre-treatment facilities' in this report. The companies are predominantly AWP Collectors and tend only to pre-treat materials collected as part of their own schemes.

It is however important to note that where pre-treatment facilities provide flake/granulate produced from AWP to a reprocessor, tonnages are included in the figures calculated below. This is because the reprocessor will not necessarily have recognised the feedstock as AWP and therefore will not have included it in the tonnages provided.

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**Large Reprocessors** Four major AWP reprocessors account for approximately 88% of the AWP currently reported as reprocessed.

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### 4.1.2.2 Current and Potential Reprocessing Capacity

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**Current Reprocessing Levels (Total)** Using data provided by the reprocessors and pre-treatment facilities, the following key figures have been established:

- 58,647 tonnes of AWP was reprocessed in the UK in the past 12 months
- 71,640 tonnes of spare capacity (only 39% currently available)
- 136,000 tonnes of AWP is currently produced annually in the UK<sup>6</sup>

Therefore, if all available farm plastics are collected and recovered in the UK, this would imply a slight under capacity (5%) to reprocess it in the UK.

However, available reprocessing capacity is of more relevance by material type; below non-packaging agricultural waste films are discussed.

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**Current Reprocessing Levels (Films)** A breakdown of tonnages by polymer type was only available from three of the major reprocessors; the data below is therefore only indicative. It does, however, highlight that the UK processing capacity that has been reported is

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<sup>5</sup> As available at [www.defra.gov.uk](http://www.defra.gov.uk)

<sup>6</sup> Environment Agency, 2003 Waste Survey

in itself almost enough (99%) to handle current arisings of agricultural waste films (non-packaging):

- Upwards of 32,200 tonnes of contaminated LPDE film is reprocessed annually in UK
- Upwards of 39,400 tonnes of potential spare capacity (only 34% currently available)
- 72,500 tonnes of contaminated films currently produced annually in the UK<sup>6</sup>

### 4.1.3 Activities and Facilities

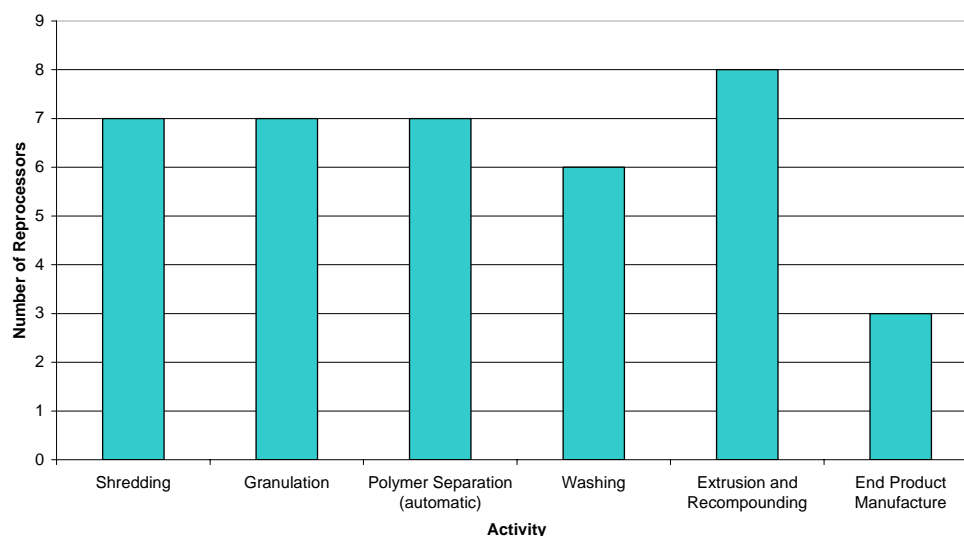
#### Washplants

Five reprocessors have their own washplants and three are in the process of setting one up. Two reprocessors indicated their plants used a form of technology to clean the polymers; one stated this involved nano-technology and one would not provide further details.

#### Activities

Reprocessors were asked to confirm which of six key activities they carried out as part of their process. The results are illustrated in Figure 23 below.

**Figure 23: Activities performed by reprocessors**



#### End Markets

Only three reprocessors manufacture a product from AWP and these include:

- woodplas for use in picnic benches, bollards, fencing, etc.
- aquidine for drainage
- plastic board and sheet

The remaining reprocessors produce pellets which are supplied to other plastic manufacturers for use in the production of a variety of plastic products (including films for agricultural use).

#### 4.1.4 Collection of Farm Plastics

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##### Collection Logistics

Information was also gathered about where reprocessors source their farm plastics. It was evident that various methods were used, with the majority using multiple collection schemes and several operating their own collections from farms and hubs. A number also allow farmers to deliver AWP directly into them.

---

##### Gate Fees

Gate fees are commercially sensitive information and not necessarily charged by reprocessors, depending on the quality of material received and the contracts in place with collectors. Gate fees mentioned by reprocessors in the course of this research ranged from £20 - £70 per tonne.

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##### Exclusive Contracts

Three major reprocessors are exclusively supplied by an associated collection scheme. These contracts work as partnerships and benefit both parties. Reprocessors benefit through:

- better estimates of supply tonnages
- larger collection network and tonnages
- shared best practice amongst collection franchises

Reprocessors working in exclusive partnership with one collection scheme or network have the largest and most sustainable supply of material.

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#### 4.1.5 Material Specifications

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##### Contamination

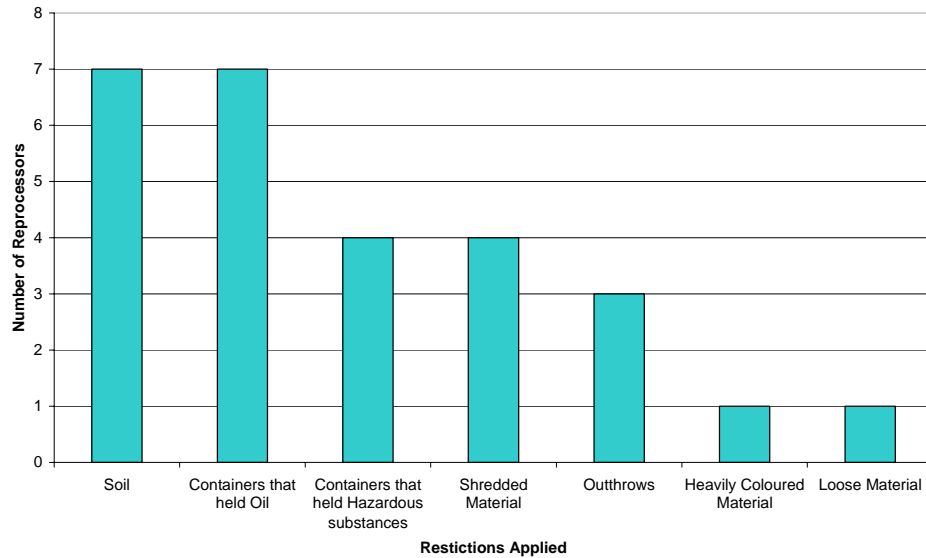
Respondents<sup>7</sup> were asked to provide information about any specifications they had for the plastics they accept. This included levels of soil contamination, containers that have held hazardous chemicals or oil, heavily coloured material, outthrows, shredded and loose material. Soil contamination is particularly important with regards to AWP, as levels can be extremely high, contributing for example 80% to the weight of plastic collected.

Figure 24 below illustrates how many reprocessors apply the above restrictions to the materials received. This reveals most apply some level of restriction on soil contamination, containers holding oil are accepted by only one reprocessor and containers that have held hazardous substances, but have been triple rinsed, were only accepted by four. In contrast, heavily coloured and loose materials are seen to be accepted by most reprocessors.

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<sup>7</sup> Only eight out of 10 reprocessors completed this section of the survey

**Figure 24: Companies Applying Material Restrictions**



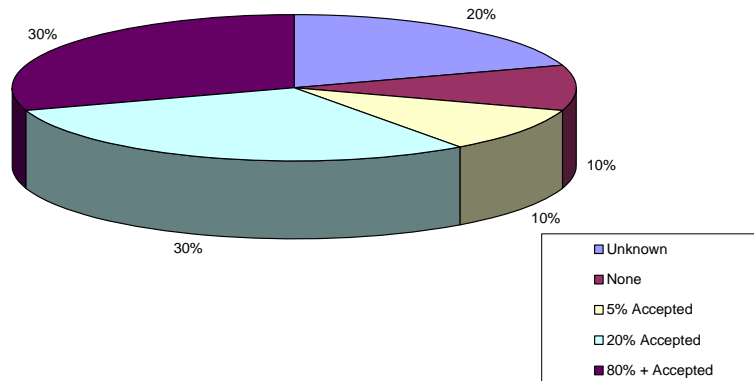
**Soil Contamination**

Levels of soil contamination accepted by reprocessors are displayed in the figure below; three reprocessors are able to handle levels of 80% and above.

Soil contamination levels are a significant issue within the reprocessing industry and as such it is important for farmers and collectors to try and minimise them. Reducing contamination levels can:

- Improve input and output capacities
- Improve the efficiency/life of equipment
- Enable a wider range of reprocessors to accept materials

**Figure 25: Levels of soil contamination accepted by reprocessors**



#### 4.1.6 Receivership of Farm Plastics

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##### **Baled/ Unbaled Material**

In general reprocessors have a preference to receive material baled, for the following key reasons:

- Easier to handle
- Higher quantity of plastic (water/contamination squeezed out)
- Easier to estimate tonnage
- Easier/more compact to store

However, most of the reprocessors spoken to were happy to take in AWP loose. In this format it is generally easier to assess contamination levels; it also does not involve the expense of baling (for the collector). The economics of whether to bale or not are currently undefined. Location, tonnages handled, transport used and distance transported all impact the overall cost effectiveness of the investment.

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##### **Materials with a PRN value**

From the depth interviews and visits conducted it was established that it is not cost effective to separate out packaging from non-packaging plastics at the reprocessing stage. In order for PRNs to be issued, packaging would need to be either segregated at source or subject to a protocol, however the following issues exist:

- Segregated at source can have cost implications if separate compartments or different vehicles are required to transport
  - No robust figure exists for what percentage of AWP is packaging
  - Clarity required as to whether silage wrap on purchased bales is packaging
  - No way of identifying/tracking wrap sold as packaging.
- 

##### **Load Requirements**

Of those reprocessors able to provide information, five had a minimum load or bale size. Bale size minimums reported were between 200–300kg (enforced by two reprocessors) and load maximums reported were 2–10 tonnes (enforced by four reprocessors).

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##### **Vehicle Requirements**

Vehicle restrictions were not considered an issue by any of the reprocessors interviewed.

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#### 4.1.7 Potential AWP Reprocessors

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##### **Introduction**

Of the companies contacted not currently reprocessing AWP, 21 showed an interest in expanding their operations to handle AWP in the future. 80% were interested in further information on doing so, through a leaflet, website or workshop.

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##### **Potential AWP Reprocessors**

Of these 21 companies, most anticipate accepting a wide range of plastic polymers with LDPE film (packaging and non-packaging) and HDPE rigid

being the most commonly mentioned. Seven of those interested already have wash plants; however only four companies would accept hazardous containers and only seven would accept soil contamination. In addition to contamination restrictions, seven companies had load requirements in place and three would not accept all vehicles.

One interested company plan to be an operational AWP reprocessor by the end of the year.

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## 4.1.8 Key Conclusions

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**Introduction** From the analysis carried out and presented above, a number of key conclusions can be drawn and these are outlined below.

### **There are a small number of AWP reprocessors spread across the UK**

#### **Current AWP Reprocessors**

- Ten AWP reprocessors have been identified in the UK
  - Four major reprocessors account for 88% of AWP currently reprocessed
  - Three major reprocessors provided breakdown of tonnages by material
  - One further reprocessor could be 'major' but no tonnage figures supplied
  - Locations of ten reprocessors are spread across UK
- 

### **Reprocessing capacity for farm plastics collected as a total is adequate to cope with materials collected**

#### **Current Reprocessing Levels (Total)**

- 58,647 tonnes of AWP was reported to be reprocessed
  - 71,640 tonnes of spare capacity (only 39% currently available)
  - 136,000 tonnes of AWP is currently produced annually in the UK<sup>8</sup>
  - Potentially 105% capacity available overall
- 

### **Reprocessing Capacity is available for nearly all waste farm films currently produced in the UK**

#### **Farm Films**

A breakdown of tonnages by polymer type was only available from three of the major reprocessors; the data below is therefore only indicative. It does, however, highlight that the UK processing capacity that has been reported is in itself almost enough (99%) to handle current arisings of agricultural waste films (non-packaging):

- Upwards of 32,200 tonnes of contaminated LPDE film is reprocessed annually in UK

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<sup>8</sup> Environment Agency, 2003 Waste Survey

- Upwards of 39,400<sup>6</sup> tonnes of potential spare capacity (only 34% currently available)
  - 72,500 tonnes of contaminated films currently produced annually in the UK<sup>6</sup>)
- 

### **Levels of soil contamination on film can exceed 80% and can only be handled by a few reprocessors**

#### **Soil Contamination**

- Contamination levels, particularly of crop cover, can exceed 80%
  - Three reprocessors are able to handle contamination levels of 80% or above
  - Reducing contamination levels can:
    - Improve input and output capacities
    - Improve the efficiency/life of equipment
    - Enable a wider range of reprocessors to accept materials
  - Bag and bin collection systems appear to minimise contamination levels to a certain extent
- 

### **Reprocessors working in exclusive partnership with one collection scheme/network have the largest and most sustainable supply of material**

#### **Exclusive Contracts**

- Three major reprocessors are each exclusively supplied by an associated collection scheme
  - These contracts work as partnerships and benefit both parties. Reprocessors benefit through:
    - Better estimates of supply tonnages
    - Larger collection network and tonnages
    - Shared best practice amongst collection franchises
- 

### **Reprocessors receive material both baled and loose**

#### **Baled/ Unbaled Material**

Reasons for receiving material loose:

- Easier to assess contamination levels
- Can only fit 22,000 tonnes of waste plastic on a truck – baled or not

Reasons for receiving material baled:

- Easier to handle
- Higher quantity of plastic (water/contamination squeezed out)
- Easier to estimate tonnage
- Easier/more compact to store
- Easier and cheaper to transport

## **It is not cost effective to separate out packaging from non-packaging plastics at the reprocessing stage**

### **Materials with a PRN value**

- If not separated at source, it is not cost effective to separate out packaging materials from non-packaging AWP
  - Source segregated waste has cost implications if separate compartments or different vehicles required to transport
  - No robust figure exists for what percentage of AWP is packaging
  - Clarity required as to whether silage wrap on purchased bales is packaging
  - No way of identifying/tracking wrap sold as packaging
- 

## **Reprocessors sourced their AWP in a number of ways**

### **Supply of AWP**

Reprocessors were found to operate various forms of collection of AWP, these were one or more of the following:

- Exclusive contract with one AWP collection scheme
  - Various AWP collection schemes deliver into site
  - Collection from hubs or collection points
  - Collection directly from farms
  - Direct deliveries of AWP to site by farmers
- 

## **Material specifications by reprocessors were minimal, although level of contamination was a restriction for some**

### **Delivery/Collection Requirements**

- Most reprocessors accept some soil contamination
  - Three reprocessors accept 80% or more soil contamination
  - Containers that held oil were the least accepted form of contamination
  - Five reprocessors had minimum load/bale size requirements in place
- 

## **21 general plastics reprocessors expressed an interest in reprocessing AWP**

### **Potential AWP Reprocessors**

21 companies expressed an interest in reprocessing AWP in the future; however the majority said they would not accept soil contamination or containers that have held hazardous substances. It is therefore unlikely that more than one-third will diversify into AWP reprocessing.

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## 4.2 AWP Reprocessor Profiles (Database)

**Purpose of Database** Providing information concerning the current companies reprocessing AWP on a public website will aid both collectors and farmers identify an end market for their AWP.

**Description & Content** The website provides an interactive map of those companies currently reprocessing AWP, as shown in Figure 26. Key information such as contact details, materials accepted and restrictions in operation is also supplied for each reprocessor displayed, as example profile is shown in Figure 27 below.

Figure 26: Interactive Reprocessor Map from the Website



Figure 27: Example Reprocessor Profile as seen on the Website



## Adding & Amending Database

The database can be easily updated and any new or additional reprocessors entering into the industry added. A mechanism for submitting updated or additional information has been incorporated and is shown below.

Figure 28: Reprocessor Modification Page from the Website

The screenshot shows a web page titled "Agricultural Waste Plastics Collection and Recovery Programme" with a header image of a tractor. A left-hand navigation menu includes links for "The Programme", "Ag Waste Plastics", "Press", "Feedback", "Request Updates", "Collectors", and "Reprocessors". Below the menu is a search box with "Collectors" and "Reprocessors" entered. The main content area is titled "Reprocessor Add/Modify your details" and contains a text box for "Comments", followed by input fields for "Name", "Business Name", "Phone", and "Email". A "Send Information" button is located at the bottom right of the form. A copyright notice at the bottom of the page reads "© 2006 Site designed and developed by Internet Solutions from AD&S".

## Section 12: Glossary of Terms

|                              |  |
|------------------------------|--|
| <b>AWP</b>                   | Agricultural waste plastics.   |
| <b>Baler</b>                 | Machine that compresses plastic with a ram in a chamber, and produces a cuboidal package of plastic, which is tied with a band of wire/plastic to retain its shape.  |
| <b>Biodegradable</b>         | Biodegradable plastic will degrade as a result of bacterial activity. In order to also be classified compostable, the degradation must meet certain specified criteria such as rate biodegradation, maximum residue of material left at a specific point in time and a requirement for the material to have no harmful impact on the final compost or the composting process. All compostable plastic is therefore also biodegradable. |
| <b>Biodegradable Plastic</b> | A degradable plastic in which the degradation results from the action of naturally-occurring micro-organisms such as bacteria, fungi and algae.  |
| <b>BREW</b>                  | The Business Resource Efficiency and Waste (BREW) programme – which recycles revenue generated through the Landfill Tax – provides support to business that specifically targets waste minimisation, the diversion of waste away from landfill, and improvements in resource efficiency.   |
| <b>CATI</b>                  | Computer Aided Telephone Interview   |
| <b>Collection Hub</b>        | A collection point where more than one farmer/grower will take plastic, and where material is accumulated for a collector to pick up.  |
| <b>Collection Point</b>      | The physical point at which a plastic collecting company takes physical possession of the waste, and at which point becomes the responsible holder of that waste   |
| <b>Compactor</b>             | A machine that presses waste (plastic) into a fixed volume vessel to optimise the capacity of the vessel. The industry uses compactors fitted onto mobile lorries (commonly municipal collections) or onto RoRo containers or skips.   |
| <b>Compostable Plastic</b>   | A plastic that undergoes degradation by biological processes during composting to carbon dioxide, water, inorganic compounds, and biomass at a rate consistent with other known, compostable materials and leaves no visually distinguishable or toxic residue.  |
| <b>Degradable</b>            | A plastic designed to undergo a significant change in its chemical structure   |

|  |  |
|--|--|
| <b>Plastic</b>                             | under specific environmental conditions resulting in a loss of some properties that may vary as measured by standard test methods appropriate to the plastic and the application in a period of time that determines its classification.   |
| <b>Energy from Waste (EFW)</b>             | Waste, has a calorific value similar to coal. As such, this waste can be burned at high temperatures to create energy in the form of heat and electricity. This process is called energy from waste.   |
| <b>EA</b>                                  | Environment Agency   |
| <b>FWAG</b>                                | Farm Wildlife Advisory Group   |
| <b>Farm Gate</b>                           | Farm premises  |
| <b>HDPE</b>                                | High Density Polyethylene, generally in the form of a container.   |
| <b>LDPE</b>                                | Low Density Polyethylene, a flexible/film. Likely to cover crops, sheet.   |
| <b>LLDPE</b>                               | Linear Low Density Polyethylene. A thin, strong and flexible film that is 'tacky' (like cling film).   |
| <b>Packaging Waste Recovery Note (PRN)</b> | A PRN is issued by an accredited reprocessor, and represents packaging which has been recycled or recovered. Every PRN represents a certain tonnage of recycled material. A PERN is the export equivalent of a PRN.  |
| <b>Packaging Waste Regulations</b>         | The full title of the packaging regulations is The Producer Responsibility Obligations (Packaging Waste) Regulations 2005. These regulations require companies with a turnover of over £2m, handling over 50 tonnes of packaging a year, to pay for recycling some of the packaging they handle. |
| <b>PET</b>                                 | Polyethylene Terephthalate. Rigid plastic such as a coke bottle.   |
| <b>PMB</b>                                 | Project Management Board   |
| <b>PP</b>                                  | Polypropelene in a flexible or rigid format, such as netting or seed trays.  |
| <b>Producer Responsibility</b>             | Framework used to ensure producers of packaging or products are legally responsible in some way for the recovery and recycling of them.  |

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|                    |  |
|--------------------|--|
| <b>PS/EPS</b>      | Polystyrene or Expandable Polystyrene  |
| <b>PVC</b>         | Polyvinyl Chloride, likely to be used for chemical containers.   |
| <b>Pyrolysis</b>   | The thermo-chemical decomposition of a substance in the absence of oxygen. The lack of oxygen means that there are fewer harmful gaseous oxides, such as carbon monoxide, produced. The result of the process is a mixture of gaseous and liquid fuels and a solid inert residue. The gases can be cooled and refined to produce a fuel product; some of which can be used to drive the pyrolysis equipment. |
| <b>QPSMR</b>       | A market research statistical analysis software program  |
| <b>Recovery</b>    | Includes recycling and the burning of waste for energy (EFW). This is also a generic term applied to the waste industry as a whole.  |
| <b>Recycling</b>   | Recycling is defined in the Packaging Regulations as "the reprocessing in a production process of the waste materials for the original purpose or for other purposes". This includes composting, but excludes energy from waste (EFW).   |
| <b>Reprocessor</b> | For plastics, the reprocessor will normally be the business melt processing the waste plastic packaging to produce new products or materials, but not the business which just carries out size reduction or washing where the material goes through a subsequent melt process.   |
| <b>ROI</b>         | Republic of Ireland.   |

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