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Agricultural waste survey 2003

A study of the management of non-natural agricultural waste on farms

Crop Protection Association

Biffaward
investing in the environment

defra
Department for Environment, Food and Rural Affairs

Environment Agency

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This document will provide information to the Agricultural Waste Stakeholders' Forum, the waste industry and farmers, to identify and address the issues raised by the planned extension of controlled waste legislation to agriculture.

Research Contractors:
Marcus Hodges Environment Ltd, BDB Associates, Westcountry Rivers Trust/Tamar Consulting, Scottish Agricultural College (SAC).

Environment Agency's Project Management:
Cormac Quigley, Head Office
Peter Braithwaite, Head Office

Foreword

This research project has been funded by the Environment Agency and a grant from Biffaward (under the Landfill Tax Credit Scheme), the latter being made possible by a contribution from the Department for Environment, Food and Rural Affairs (Defra) and the Crop Protection Association.

The Project Steering Group has included representatives of:

- British Veterinary Association (BVA)
- Chartered Institution of Wastes Management (CIWM)
- Country Land and Business Association (CLA)
- Crop Protection Association
- Department for Environment, Food and Rural Affairs (Defra)
- Environment Agency
- Environmental Services Association (ESA)
- National Farmers' Union (NFU)
- Northern Ireland Departments of the Environment (DOE) and Agriculture and Rural Development (DARD).
- Plastic and Industrial Films Association (PIFA)
- Scottish Environment Protection Agency (SEPA)
- Scottish Executive
- UK Agricultural Supply Trade Association (UKASTA)
- Welsh Assembly Government

Regular meetings have also been held with the R&D Sub-group of the national 'Agricultural Waste Stakeholders' Forum' (AWSF). This Sub-group, chaired by the Environment Agency, includes a number of the organisations listed above including Defra, NFU, Crop Protection Association, UKASTA, ESA, PIFA and the Welsh Assembly Government.

The Project Team is greatly indebted to all of the farmers and other landowners who gave up their valuable time to participate in this survey. The project's success is based largely on their co-operation and openness. Thanks also to:

- members of the Project Steering Group and the R&D Sub-group of the Agricultural Waste Stakeholders' Forum for their advice and support throughout the Project;
- Defra, the Scottish Executive and the Welsh Assembly Government for providing us with agricultural census data (upon which the survey sample is based);
- the various farming organisations in England, Wales and Scotland for helping to publicise the survey among the farming community.

Executive summary

This report describes a survey of registered agricultural holdings designed to provide data to help address the issues raised by the planned extension of controlled waste legislation to agriculture. The survey involved visits to a structured sample of 380 registered agricultural holdings in Great Britain during February to April 2003.

The primary objectives were to confirm the different types of waste arising on agricultural holdings; identify current management practices; estimate the quantities of wastes that are currently stored on holdings (with no plans for disposal); determine the extent of change in practices in recent years; and identify the general attitudes of farmers and other landowners.

The survey objectives were achieved by using a robust methodology designed in consultation with a Project Steering Group which included the R&D Sub-group of the Agricultural Waste Stakeholders' Forum and representatives of other key stakeholder organisations. Details of the sample design, data gathering methodology and tools are provided in the report.

The survey results show that a considerable range of wastes arise on all types and sizes of agricultural holdings. More than 75% of the survey respondents reported that they produce scrap metal, batteries, oils, tyres, agrochemical packs, fertiliser bags, animal health product packaging, used syringes/needles, bale twine, net wrap, and general building waste.

Also of note is the finding that 70% of all respondents are storing one or more waste streams on their holding with no plans for disposal. The most common wastes stored are scrap metal, tyres and asbestos roof sheets, and the total quantity in Great Britain is estimated at 780,000 tonnes.

However, some wastes are not as common as expected. For example, agrochemical concentrate was identified as a waste arising on 14% of all holdings and stored with no plans for disposal on only 6% of holdings. This has implications for the 'National Pesticide Retrieval Scheme' (NPRS) currently being organised by the Crop Protection Association under the Voluntary Initiative to minimise the impact of pesticides.

The survey results on current management practices show that 90% of the holdings surveyed are disposing of at least one waste stream using one or more practices that are likely to be illegal following extension of controlled waste legislation to agriculture. These practices include open burning (reported by 83%), inclusion in the household dustbin (reported by 77%) and disposal using a farm tip or burial elsewhere (reported by 32%).

As expected, the survey has confirmed that there are currently no widespread systems for agricultural waste collection and recovery, and generally the most practical and convenient methods available locally are being used (typically with no or limited direct cost). Thus most farmers and other landowners are using a combination of methods depending on the nature of the waste stream, the services available and their level of awareness.

However, the survey results highlight that practices are beginning to change – some suppliers are providing a waste take-back service (particularly vets and machinery specialists), and farmers and other landowners are generally aware of the importance of waste management. Particularly important findings are that:

- the take-back of waste by some suppliers is occurring even though it is not yet widespread; for example, vets are taking back some waste from 43% of all holdings;
- 91% of all respondents stated that they consider waste management to be 'fairly' or 'very' important to their business;
- 41% of respondents have changed their waste management practices in some way in recent years (48% of these citing the transfer of more waste to others such as suppliers and waste

contractors, 32% taking more steps to reduce waste, 22% stopping open burning and 22% increasing the re-use of waste);

- the level of support for waste collection schemes is high – 92% of respondents stated that they would participate in a scheme for waste plastics, and 87% indicated that they would be willing to improve their storage practices to make a scheme more cost-effective.

Based on these and other findings, several recommendations are made in the report. These include action to:

- consider how best to ensure appropriate management of the very small quantities of wastes arising on the many holdings where limited agricultural activity occurs;
- agree plans to make 'take-back' of waste by suppliers and service providers as widespread and cost-effective as possible;
- develop an effective recovery scheme for waste plastics;
- stimulate the collection and recovery of wastes that are currently stored on holdings (e.g. scrap metal and tyres) prior to the implementation of the regulations;
- reduce the risks associated with unused and revoked agrochemicals;
- develop a strategy to raise the awareness of farmers/landowners and encourage the uptake and development of best practices;
- develop a comprehensive monitoring and information system to help track and drive progress.

Overall, the report recommends that the Agricultural Waste Stakeholders' Forum and the Devolved Administrations should consider the survey results alongside the findings of other relevant research studies, and use the information to help develop effective strategies for agricultural waste prior to the implementation of the controlled waste regulations.

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1

Introduction

1.1 Background

The planned extension of waste management legislation to agriculture (Box 1.1) has highlighted the potential issues associated with the management of the various waste streams such as packaging and silage plastics. Attention has been drawn to the need for more reliable information to help develop practical and timely solutions.

Several research studies have been conducted recently to investigate the issues arising from the proposed legal changes and explore potential cost-effective solutions (see Table 1.1). In 2002, the Government established the 'Agricultural Waste Stakeholders' Forum' (Box 1.2) to tackle the issues – acting on a recommendation in one of these studies (Environment Agency, 2001a).

However, despite this good progress, there remain some fundamental gaps in data and information. This was highlighted by a study in 2002 (Environment Agency, 2002a), the aim of which was to review the current availability and accuracy of data, determine the short and long-term needs, and recommend the best approach. The study identified the immediate need for reliable data on:

- the practices currently employed for dealing with each agricultural waste stream;
- the quantity of waste that has accumulated on farms over past years and is currently being stored with no plans for disposal;
- farmers' awareness and attitudes on these issues.

The present survey is designed to address this need and to provide practical information to support the Government consultation process and help develop effective plans.

Box 1.1 Forthcoming legal changes

The UK has a legal obligation to implement the Waste Framework Directive (75/442/EEC, as amended) in the agricultural sector, and the Government intends to publish draft regulations for consultation in early 2004. The effect of the proposed regulations will be to extend waste management controls to 'agricultural waste' (waste produced on premises used for agriculture).

As a result of these regulations, the on-farm disposal of waste packaging, plastic films, and other so-called 'non-natural' wastes will most likely no longer be realistic; the only legal and cost-effective option could be to transfer the waste to a registered waste contractor for disposal or recovery at a licensed facility (as is the practice in most other industries). However, it is important to note that the specific requirements will only be known once the Government has responded to the public consultation process.

Box 1.2 The agricultural waste stakeholders' forum

The formation of the 'Agricultural Waste Stakeholders' Forum' was one of the measures announced by the Government after a meeting held with the Prime Minister and leaders of farming and other bodies in March 2002. Its objectives are:

"to provide a forum for stakeholders to discuss the Government's forthcoming consultation paper and its proposals for extending to agriculture the waste management controls required by the Waste Framework Directive; and

to inform Government and the Environment Agency on issues arising from the implementation of these waste management controls and other agricultural waste related matters that will affect the farming community".

Members of the Forum include representatives of a range of government and industry organisations.

For further information, see www.defra.gov.uk/environment/waste/agforum

1.2 Aim and objectives

The aim of the Agricultural Waste Survey was to provide specific data and information to help the Agricultural Waste Stakeholders' Forum, the Government, the Devolved Administrations, industry and other stakeholders to identify and address the issues raised by the planned extension of controlled waste legislation to agriculture. It was designed to build on previous research (see Table 1.1), address priority data needs, and provide a benchmark to help steer and monitor progress.

The primary objectives were to:

- identify the occurrence of 'non-natural' agricultural waste streams[1] on registered agricultural holdings[2] in Great Britain[3] (e.g. the proportion of holdings that generate waste silage plastics or scrap metal);
- confirm current practices for managing these waste streams;
- estimate the quantities of wastes that are currently stored on agricultural holdings in Great Britain (with no plans for disposal);
- determine the extent of change in agricultural waste management practices in recent years, the nature of these changes and the main drivers for change.

Secondary objectives (where the data make this possible) were to:

- indicate differences in waste arisings and management practices on different types and sizes of agricultural holdings;
- indicate any potential differences in waste arisings and management practices in England, Wales and Scotland, respectively (if they exist);
- determine the current level of awareness of the forthcoming waste legislation.
- The survey did not include Northern Ireland because access to the agricultural census data was not possible. Extensive discussions were held with the Northern Ireland Departments of Environment (DOE) and Agriculture and Rural Development (DARD) but it was not possible to proceed for legal reasons. Nevertheless, the DOE and DARD have remained closely involved in the project.

1 The Project Steering Group and the Agricultural Waste Stakeholders' Forum agreed that this survey should only cover the 'non-natural wastes' (such as plastics, oils and tyres) since the Government has already completed extensive research on the organic materials (principally manure and slurry).

2 The definition of 'registered agricultural holdings' is discussed in Box 2.2.

3 The primary objectives are to provide reliable data at the GB level, not at country level (i.e. England, Wales and Scotland). The total sample is stratified proportionally relative to the number of holdings in each country; therefore the sub-samples in Wales and Scotland are much smaller than in England (40 in Wales, 86 in Scotland and 254 in England). Because of budgetary constraints, the sample sizes had to be limited to these numbers. It was the opinion of the Project Steering Group that the variation between countries would be limited.

Table 1.1 Summary of other relevant research

Project title and summary	Date	Sponsors
Options for Agricultural Waste Collection – A methodical assessment of the main options for collecting agricultural wastes.	2003	Biffaward, Crop Protection Association and ESTET.
Improving Data on Agricultural Waste and Resources – A review of the current status of data and data needs, and presentation of a recommended approach to improve data accuracy and dissemination.	2002	Environment Agency
Fly-tipping on Agricultural Land in England and Wales – A telephone survey of 350 farms in England and Wales to determine the extent and nature of fly-tipping on agricultural land.	2002	Environment Agency and Defra (steered by the National Fly-tipping Stakeholders' Forum).
Research into Sustainable Options for the Recycling of Agricultural Plastics – A study of the technical and economic issues associated with recycling waste silage plastics.	2002	MAFF/Defra
2001 Farm Practices Survey (England) – A postal survey of a sample of farms in England to confirm current practices (including waste management practices).	2002	MAFF/Defra
A Survey of Current Farm Sprayer Practices in the UK – A survey of arable farms in the UK to collect information on sprayer practices (including visits to 402 arable holdings).	2002	Crop Protection Association and UKASTA
Agricultural Waste Mass Balance – A review of agricultural waste arisings, with particular focus on opportunities for energy recovery.	2002	Biffaward
Towards Sustainable Agricultural Waste Management – A strategic review of waste arisings, current practices in the UK and other EU Member States, and future management options.	2001	Biffaward and Environment Agency
Agricultural Waste Management Practices in Other EU Member States – A review of current practices in other EU Member States based on telephone interviews and literature review.	2001	Biffaward and Environment Agency
Assessment of the Environmental Benefits & Dis-benefits Associated with Various Waste Management Strategies for Waste Polythene Film from Agricultural Applications in Wales – A life cycle assessment study on different options for managing waste silage plastics in Wales.	2001	Environment Agency
Strategic Waste Management Assessments 2000 – Ten reports covering the planning regions of England and one report for Wales, (which include estimates of agricultural waste arisings derived using the Agricultural Waste Estimate Model).	2000	Environment Agency
Quantification of Agricultural Waste Arisings – A desk study conducted to support the Government's regulatory impact assessment.	2000	DETR
Estimates of Agricultural Waste Arisings in the Anglian Region – A desk study to develop a computer model to generate estimates of agricultural waste arisings and organic by-products.	1998	Environment Agency
Estimates of Agricultural Waste Arisings in England & Wales – Development of estimates for England and Wales based on the model referred to above.	1998	Environment Agency

1.3 General approach

To ensure the success of this survey, a carefully planned approach was taken including seven specific work stages, summarised in Figure 1.1. The project commenced in October 2002 and was completed in June 2003. More detailed information on the survey design and completion is provided in Section 2.

Figure 1.1 Summary of work

Stage 1
Survey Design
- Consultation with the project Steering Group and other relevant government and industry representatives in England, Wales, Scotland and Northern Ireland
- Development of survey design and tools
- Review of design by independent statistician
- Refinement of design and tools

Stage 2
Pilot Programme
- Telephone calls to a random selection of farmers to test the telephone script
- Visits to 3 farms to test the approach and questionnaire
- Review of lessons learned
- Further refinement of approach/tools

Stage 3
Survey Planning
- Submission of requests for data from the *June Census*
- Development of survey management system and procedures
- Development of publicity programme
- Further refinement of approach/tools

Stage 4
Survey Completion
- Recruitment of holdings via telephone (completed in Jan/Feb 2003)
- Visits to 380 recruited holdings (completed in Feb/April 2003)
- Supervision and quality control

Stage 5
Data Entry and Analysis
- Data input
- Data editing and tabulation
- Statistical analysis - completed in April/May 2003

Stage 6
Report Preparation
- Preparation of draft report
- Review of draft report by Steering Group and independent statistician
- Completion of final report

Stage 7
Dissemination
- Report publication and dissemination
- Publicity

1.4 Quality assurance

A variety of steps were taken during each stage of this project to ensure high quality outputs. The key steps were:

1. Consultation with stakeholders to confirm priority data needs.
2. Completion of a pilot programme to test the data gathering methodology.
3. Submission of the survey design report, and all associated procedures and tools, to the Project Steering Group and other relevant organisations for critical review.
4. Independent review of the survey design by a statistician appointed by the Environment Agency.
5. Development of a formal survey management system with documented procedures and specific instructions for staff.
6. Use of experienced and skilled staff for both the recruitment and visit phases of work.
7. Training of all staff.
8. Supervision of survey staff and checking of returned questionnaires.
9. Ongoing checking of progress against targets.
10. Ongoing checking of numbers of visits completed in each region in order to confirm a representative regional distribution of surveyed holdings.
11. Final checking of completed questionnaires prior to scanning.
12. Systematic checking of data in the statistical analysis report.
13. Internal reviews of the draft project report.
14. Independent review of the draft report by a statistician appointed by the Environment Agency.
15. Submission of the draft report to the Project Steering Group for critical review.

2

Survey design and completion

2.1 Sample design

The survey sample was designed in consultation with the Project Steering Group and statisticians from Defra and the Environment Agency. It is based on the June Agricultural Census (see Box 2.1) and is designed to achieve the survey objectives (presented in Section 1.2) and ensure a sample structure which is representative of the total population of registered agricultural holdings in Great Britain. As noted earlier in Section 1.2, Northern Ireland was not included because access to the agricultural census data was not possible.

Table 2.1 (overleaf) presents an overview of agricultural holdings in Great Britain. The survey sample has been structured so that the sub-samples for each country (England, Wales and Scotland) and the different holding types and sizes are proportional to the total population, as shown in Table 2.2.

The total sample size of 380 represents a balance between meeting the survey objectives and maintaining the costs at an acceptable level. During the survey design stage, consideration was given to the confidence limits associated with data arising from the total sample and various sub-samples (such as different size groups and types of holding). Confidence limits are discussed in Section 3 and Appendix B.

Contact details for agricultural holdings were provided by the relevant departments at Defra, the Welsh Assembly Government and the Scottish Executive (following formal approval of the survey and confirmation that details of individual holdings would be treated as confidential). A sample was selected from the Census database using a robust systematic random sampling procedure, specifically a '1 in N' sampling interval.

Box 2.1 The June Agricultural Census

The June Agricultural Census was selected to provide the sample frame for this survey because it is considered to be the most comprehensive and reliable source of data on agricultural holdings in the United Kingdom. The Census is a confidential postal survey conducted annually by each administration (i.e. Defra, the Welsh Assembly Government, and the Scottish Executive) to collect information on activities and land use on all 'registered holdings'. 'Registered holdings' are defined as "land on which agricultural activities are carried out and which is, by and large, farmed in one unit" and are classified by size and type (described in Box 2.2). As such, registered holdings include a broad range of agricultural premises ranging from very small units to large agricultural businesses comprising a number of different farms. In the context of this survey, it is important to note that the structure of agriculture in Great Britain is changing as a result of economic difficulties in the industry. In particular, the number of smaller holdings is increasing as agriculture ceases to be the main source of income for many occupiers of agricultural holdings (an increasing number of farmers are seeking income from other businesses/ jobs or taking early retirement but retaining a registered holding).

Table 2.1 Overview of agricultural holdings in Great Britain

	England	Wales	Scotland	GB
Arable				
Small	15,018	293	3,634	18,945
Medium	9,044	86	1,471	10,601
Large	7,269	39	1,259	8,567
TOTAL	**31,331**	**418**	**6,364**	**38,113**
Livestock				
Small	46,050	14,196	14,835	75,081
Medium	10,730	4,025	3,061	17,816
Large	6,128	1,016	1,422	8,566
TOTAL	**62,908**	**19,237**	**19,318**	**101,463**
Mixed and other				
Small	31,361	2,828	20,625	54,814
Medium	3,570	137	605	4,312
Large	2,741	75	408	3,224
TOTAL	**37,672**	**3,040**	**21,638**	**62,350**
TOTAL HOLDINGS	**131,911**	**22,695**	**47,320**	**201,926**

Note: Based on the most recent June Agricultural Census data available at time of survey design.
See Box 2.2 for definition of holding types and sizes.

Table 2.2 Structure of the sample

	Number of holdings visited			
	England	Wales	Scotland	Total for GB
Arable				
Small	28	1	6	35
Medium	20	1	3	24
Large	17	1	3	21
TOTAL	**65**	**3**	**12**	**80**
Livestock				
Small	84	22	27	133
Medium	21	7	7	35
Large	14	2	2	18
TOTAL	119	31	36	186
Mixed and other				
Small	57	4	36	97
Medium	8	1	1	10
Large	5	1	1	7
TOTAL	**70**	**6**	**38**	**114**
TOTAL	**254**	**40**	**86**	**380**

Note: See Box 2.2 for definition of holding types and sizes.

2.2 Data gathering methodology

The methodology used to gather data for this survey was agreed following a review of alternative approaches (described in Box 2.3) and consultation with the Project Steering Group and sponsors. Particular consideration was given to the specific objectives of the survey, the nature of the agricultural sector (e.g. the diversity of holding types and sizes, the typical working calendar/day, and the various pressures on farmers), and methods to minimise costs.

The main phases of work have been:

- recruitment of owners/managers of agricultural holdings to the survey (note that it was recognised at the outset that some of these would be full-time farmers, others part-time, some with other full-time jobs, and some retired or semi-retired);
- visits to the recruited holdings to gather the required data;
- checking and collation of returned questionnaires and photographs.

The key tasks and the outcome of each phase are summarised in Table 2.3.

Each of the tasks has been completed by specialist surveyors with a practical understanding of farming. All staff were provided with training and written instructions to ensure a consistent approach. Ongoing supervision and checking of completed questionnaires were also undertaken.

2.3 Data processing and analysis

The key data processing and analysis tasks comprised:

- scanning of questionnaires to input data;
- data editing and tabulation;
- statistical analysis (using N-Quantum analysis software);
- checking and review of data outputs.

Box 2.2 Classification of holding size and type

Holding size

Registered holdings are grouped by size of holding using the European Union's system of farm classification. This is based on Standard Gross Margins (SGM) per hectare for crops and per head of livestock. The total SGM for each holding is calculated by multiplying its crop area and livestock numbers by appropriate SGM coefficients (based on 1988 figures) and then summing the results for all aspects of the holding. Thus the SGM provides a measure of a holding's business size irrespective of its area, intensity of production, etc.

The sizes that have been defined for this survey are:

- Small – SGM of Euro 1-47,999*.
- Medium – SGM of Euro 48,000-119,999
- Large – SGM of Euro 120,000 and above.

* To ensure that inactive holdings are not included in the survey, holdings with an SGM of zero have been excluded from the sample frame.

The 'small' sub-sample stratum is equivalent to the 'very small' and 'small' categories used by each UK administration for the compilation of the June Census data. The 'medium' sub-sample stratum is equivalent to the 'medium' category. The 'large' sub-sample stratum is equivalent to the 'large' and 'very large' categories.

Holding type

The nine holding classifications used in the June Census have been grouped into three separate classifications for the purposes of this survey. These are:

- Arable – Cereals, General Cropping
- Livestock – Dairy, LFA (less favourable areas)
- Cattle and Sheep, Cattle and Sheep (lowland), Pigs and Poultry
- Mixed and other – Mixed, Horticulture, Other

A holding's type is determined by consideration of the contribution each aspect of the enterprise makes to the holding's SGM. For instance, a dairy holding is defined as one which possesses a SGM comprising two-thirds or more from the dairy part of the business. Holdings which possess a SGM which comprises more than a third from more than one type of farming are classified as mixed. For instance, a holding which derives 50% of its SGM from dairy and 50% from cereals would be classified as a mixed holding. It is important to note that this classification system is not linked directly to cropping areas and livestock numbers; it is the contribution which different aspects of the business make to the SGM that determines the holding type.

Box 2.3 Review of alternative survey approaches

Prior to commencing the survey design, a review of alternative survey approaches was conducted as part of a project commissioned by the Environment Agency (Environment Agency, 2002a). This considered the strengths and limitations of postal, telephone, internet and visit-based data gathering techniques (and methodologies based on a combination of these techniques). As a result, a visit-based methodology was selected for this survey because it would provide:

- more accurate and reliable data (because it allows visual inspection, particularly important in estimating the quantities of wastes stored on farms);
- a higher and relatively unbiased response;
- a higher level of stakeholder confidence in the data.

Postal and internet surveys generally provide a low rate of response and an associated response-bias. A telephone survey would overcome some of these limitations but was considered unlikely to be able to provide accurate information on the quantities of wastes stored on farms (which would require reliance on a farmer's ability to remember and estimate quantities).

Table 2.3 Summary of data gathering tasks

Phase of work	Key tasks	Outcome
Recruitment and scheduling	• Preparation and checking of census details provided by Defra and the Devolved Administrations. • Preparation of tools (telephone script, confirmation letter, appointment booking database, and written instructions and guidance for recruitment staff). • Training of staff. • Telephone recruitment using a script designed to encourage participation (emphasising the importance of the survey and its confidentiality). This included 20% over-recruitment to protect against cancellations and other problems. • Posting of confirmation letters to confirm appointments.	Recruitment of 380 holdings (as shown in Table 2.2) completed in February 2003. 57% participation rate (i.e. of those asked to participate in the survey, 57% agreed).
Visits to recruited holdings to gather data	• Visits to recruited holdings to gather data via interviews and observations (using the Survey Questionnaire shown in Appendix A). • Central management and supervision. • Regular checking of completed questionnaires to ensure consistent high quality data.	Successful completion of 380 surveys between February and April 2003. Quality control checks confirmed that the data gathering stage was completed effectively. This was supported by the feedback received from surveyors and respondents (91% of respondents indicated that they would be happy to participate in a follow-up survey).
Checking and collation of returned questionnaires and photographs	• Comprehensive checking of completed questionnaires for errors. • Collation of questionnaires ready for data processing. • Collation of photographs.	380 completed questionnaires checked, collated and dispatched for processing by April 2003.

3

General survey results

3.1 Introduction

This section of the report summarises the results of the survey. It covers:

- the occurrence of different types of waste on agricultural holdings (Section 3.2);
- current management practices (Section 3.3);
- awareness of legal changes (Section 3.4);
- general attitudes to waste management (Section 3.5);
- support for waste collection schemes (Section 3.6).

Further information on specific practices and the current practices for key waste streams is provided in Sections 4 and 5, respectively. More detailed data are provided in Appendices D and E.

When viewing the results, it is important to keep in mind the survey objectives (discussed in Section 1.2), the survey design (discussed in Section 2), and the confidence limits associated with data arising from different sub-samples. A discussion of these issues, together with the confidence limits associated with different sample sizes, is presented in Appendix B.

The primary objectives of the survey are to report data at the GB level and it is data based on the total GB sample size of 380 which provide the most accurate results (i.e. with smaller confidence limits). However, readers with a particular interest in the situation in individual countries (England, Wales or Scotland) or different types and sizes of holdings should note that a systematic comparison of the data has revealed only limited variations between these sub-strata. Where differences in results between sub-samples have been cited within this report, statistical tests have been applied to ensure such differences are statistically significant.

3.2 Occurrence of different wastes

3.2.1 Overview

Previous studies have identified the main types of wastes arising on farms and developed estimates of the quantities of the main waste arisings at national, regional and county levels (Environment Agency, 1998a, 1998b, 2001a). One of the primary objectives of this survey was to confirm the occurrence and nature of the various waste streams on agricultural holdings in Great Britain.

Table 3.1 presents a complete list of the wastes and shows the proportion of holdings on which they arise. Data for specific sub-strata (i.e. different countries, holding types and sizes) are provided in Appendix D.

Key findings are summarised below:

- While the types and quantities of waste generated relate to enterprise mix and size, a broad range of waste streams arises on most agricultural holdings – more than 75% of the holdings surveyed generate scrap metal, batteries, oils, tyres, agrochemical packs, fertiliser bags, animal health product packaging, used syringes/needles, silage wrap and bale twine, net wrap, and general building waste (see Plates 1 – 8).

Plate 1 Scrap metal and tyres

Plate 2 Lead-acid batteries

Plate 3 Agrochemical packaging

Plate 4 Oils and oil drums

Plate 5 Silage plastic and bale twine

- All holdings generate some form of packaging waste, much of which is plastic – 97% of respondents reported that they generate plastic packaging waste.
- Waste agrochemical packaging is common (reported by approximately 74% of respondents), and rinsing of packs after use appears to be a common practice (95% of those generating the waste stated that the packs are rinsed).
- Waste agrochemical concentrate does not appear to be common at present – only 14% of respondents stated that they generate this waste (many commented that chemicals are too expensive to waste and that they rely on advice from agronomists to ensure efficient usage).

Plate 6 Net wrap

- Waste silage wrap (used for bales) is significantly more common than silage sheet or bags – Table 3.1 shows that these waste streams occur on 58, 27 and 9%, respectively, of the holdings surveyed.

Plate 7 Animal syringes

- The most common animal health product wastes are used syringes/needles and aerosol containers (occurring on 78 and 72% of all holdings, respectively); waste medicines are less common (occurring on 28% of all holdings).

Plate 8 General building waste

- The occurrence of sheep dip waste is lower than expected – only 6% of holdings reported generating sheep dip concentrate and drench, respectively; 16% stated that they generate dilute sheep dip waste. These relatively low numbers may reflect the increasing use of injectables and pour-ons, and greater use of contractors who take responsibility for the waste.

Table 3.1 Agricultural holdings generating specific waste streams

Waste streams	Holdings generating each waste		
	Percentage of holdings surveyed[1]		Estimated number of holdings in GB[2]
Machinery and other metal			
Batteries	87%	(84–90%)	176,000
Vehicles or machinery	74%	(69–79%)	150,000
Machinery/vehicle parts	71%	(66–76%)	143,000
Scrap metal (e.g. roof sheeting)	93%	(90–96%)	188,000
Refrigeration equipment	17%	(13–21%)	34,000
Large-scale electrical equipment	10%	(7–13%)	20,000
Oils	86%	(83–89%)	174,000
Tyres	85%	(81–89%)	172,000
Plastic packaging			
Agrochemical packs (rinsed)	71%	(66–76%)	143,000
Agrochemical packs (unrinsed)	7%	(4–10%)	14,000
Fertiliser bags	79%	(75–83%)	160,000
Seed bags	34%	(29–39%)	69,000
Feed bags	64%	(59–69%)	129,000
Shrink wrap	33%	(28–38%)	67,000
Sheep dip/drench packaging	31%	(26–36%)	63,000
Cardboard and paper packaging			
Agrochemical packaging (outer)	64%	(59–69%)	129,000
Fertiliser bags	4%	(2–6%)	8,000
Seed bags	36%	(31–41%)	73,000
Feed bags	35%	(30–40%)	71,000
Other packaging			
Wooden pallets	75%	(71–79%)	151,000
Metal sheep dip/drench packaging	8%	(5–11%)	16,000
Medicine containers	77%	(73–81%)	155,000
Animal health outer packaging	75%	(71–79%)	151,000
Miscellaneous packaging	74%	(69–79%)	149,000
Oil containers	85%	(81–89%)	172,000
Silage plastics, bale twine and net wrap			
Silage wrap	58%	(53–63%)	117,000
Silage sheet	27%	(22–32%)	55,000
Silage bags	9%	(6–12%)	18,000
Plastic cores for silage plastic wrap	44%	(39–49%)	89,000
Cardboard cores for silage sheet	28%	(23–33%)	56,000
Bale twine and net wrap	84%	(80–88%)	169,000
Plastic cores for bale twine and net wrap	33%	(28–38%)	66,000
Cardboard cores for bale twine and net wrap	34%	(29–39%)	68,000
Horticultural plastics			
Greenhouse or tunnel film	6%	(4–8%)	12,000
Mulch or crop cover film	5%	(3–7%)	10,000
Mushroom bags	1%	(0–2%)	2,000
Seed trays and pots	10%	(7–13%)	20,000
Waste agrochemical concentrate	14%	(11–17%)	28,000
Animal health products			
Used syringes and needles	78%	(74–82%)	158,000
Aerosol containers	72%	(67–77%)	145,000
Waste medicines	28%	(23–33%)	57,000
Other animal health products (e.g. gloves, swabs, dressings)	50%	(45–55%)	101,000
Sheep dip			
Waste sheep dip concentrate	6%	(4–8%)	12,000
Waste sheep dip drench (pour-on)	6%	(4–8%)	12,000
Dilute sheep dip	16%	(12–20%)	32,000
Building waste			
General building waste (e.g. bricks)	80%	(76–84%)	162,000
Asbestos cement-bonded roof sheeting[3]	31%	(26–36%)	63,000
Other asbestos (e.g. pipe-lagging)	3%	(1–5%)	6,000

1 Base = all 380 agricultural holdings surveyed. Figures in brackets represent the 95% confidence limits for each percentage. For information on confidence limits, see Appendix B.

2 These figures have been extrapolated from the survey results using the June Agricultural Census figure for the total number of agricultural holdings in Great Britain (201,926). They are rounded to the nearest thousand.

3 Only those holdings that have or had generated waste asbestos sheets. Note that this figure does not refer to the number of holdings with asbestos-roofed buildings.

3.2.2 *Factors influencing the occurrence of waste streams*

Many waste streams clearly occur on all types and sizes of agricultural holdings throughout Great Britain, and there appears to be no marked difference between countries (England, Wales and Scotland).

It is particularly important to note that many holdings generate wastes associated with both livestock and arable enterprises even though the holding might be classified as a 'livestock' or 'arable' holding rather than a 'mixed' holding. For example, although 96% of livestock holdings were found to generate used syringes and needles so were 51% of the arable holdings. This is due to the design of the classification system used by Defra and the Devolved Administrations (discussed in Section 2.1).

Nevertheless, several factors do influence the occurrence of waste streams on agricultural holdings, and particularly the quantities of each waste stream. These factors include the mixture and scale of farm enterprises (such as dairy, sheep and arable farming), and farming practices (the latter being influenced by business drivers such as farm assurance schemes, and also by general awareness and management approach).

3.3 Current management practices

3.3.1 *Overview*

A primary objective of this survey was to determine current practices for managing agricultural waste in Great Britain. The aim was to benchmark the current situation and help determine the level and type of change needed to meet the requirements of controlled waste legislation.

The survey results confirm some common assumptions about current practices and reveal some interesting facts and trends that will be useful for planning purposes.

Table 3.2 presents a high level summary of the range of practices currently being used for managing agricultural wastes. This highlights that several practices are being used that may no longer be possible following extension of controlled waste legislation to agriculture. These include:

- *Burning* – 90% of holdings burning at least one type of waste (83% open burning).
- *Disposal using farm tips (dumps) or burial elsewhere on the holding* – Used by 32% of holdings.
- *Long-term storage with no plans for disposal* – Used by 72% of holdings.
- *Disposal via the household dustbin* – Used by 77% of holdings.
- *Transfer to a civic amenity site (household waste recycling centre)* – Used by 27% of holdings.

None of these practices are resulting in the recovery of any value from the waste (apart from some recovery that takes place from the use of civic amenity sites), and they are therefore at the bottom of the 'waste hierarchy' (the framework for sustainable waste management).

However, Table 3.2 also reveals that 96% of holdings are using other practices for at least one waste stream when a service is available (normally at no or low cost), for example collection by a waste contractor or return to the vet. This indicates that on-farm disposal practices are generally only used when no other practical cost-effective options are available. It is important since these other practices (transferring wastes off the holding) are likely to be the main legal option for most farms following extension of controls to agriculture and they provide more opportunity for waste recovery.

Re-use of waste also appears to be common (98% of holdings are re-using at least one type of waste for another purpose) but the quantities are generally small, apart from building waste (bricks and rubble) which is nearly all re-used for re-surfacing farm tracks.

See Section 4 of this report for more detailed information on specific management practices, and Section 5 for data on key waste streams.

Table 3.2 Use of specific waste management practices

Waste management practice	Holdings using the practice for at least one waste stream	
	Percentage of holdings surveyed[1]	Estimated number of holdings in GB[2]
Burning on-farm	**90% (87–93%)**	**182,000**
Burning in the open	83% (79–87%)	168,000
Burning in drum incinerator	15% (11–19%)	30,000
Burning in other incinerator	5% (3–7%)	10,000
Disposal using a farm tip or burial elsewhere on the farm	**32% (27–37%)**	**65,000**
Re-use on farm	**98% (97–99%)**	**198,000**
Long-term storage (with no plans for disposal)	**72% (67–77%)**	**145,000**
Use of household waste collection services/facilities	**82% (78–86%)**	**166,000**
Inclusion in the dustbin	77% (73–81%)	155,000
Use of civic amenity site	27% (22–32%)	55,000
Transfer to others	**96% (94–98%)**	**194,000**
Collection by waste contractor	57% (52–62%)	115,000
Taken to private waste facility	47% (42–52%)	95,000
Return to vet	43% (38–48%)	87,000
Return to distributor/merchant	43% (38–48%)	87,000
Return to machinery dealer or engineer	42% (37–47%)	85,000
Managed by agricultural contractors[3]	40% (35–45%)	81,000

3.3.2 Factors influencing practices

Based on the information and knowledge gained from this survey, it appears that the key factors that influence waste management practices are (to varying degrees):

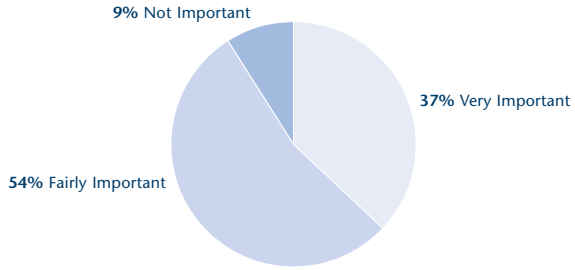
- *the nature of the waste stream* – for example whether it is combustible, small, bulky, or useful for another purpose;
- *the services available,* for example:
  - waste management services offered by suppliers (such as machinery specialists and veterinarians) and agricultural contractors;
  - regular visits by scrap metal dealers or easy access to local scrap metal yards;
  - local schemes for the recovery of waste silage plastics (e.g. those currently operating in Wales, Scotland and Cumbria);
  - household waste collection services.
- *the awareness and management approach of the farmer/landowner* – some farmers are actively seeking more environmentally sound options (particularly for waste plastics), some are regularly taking scrap machinery and other metal to a local scrap metal yard to keep the farmyard tidy, while others are storing wastes in the hope that they will become useful in the future;
- *farm assurance and organic farming schemes*[4] – at present this influence appears to be limited to specific waste streams; examination of the survey results did not reveal any significant variation. However, several respondents commented that farm assurance schemes require collection of used syringes and regular inspection of agrochemicals. Organic farmers stated that they do not use agrochemicals or burn waste plastics.

1 Base = all 380 agricultural holdings surveyed. Figures in brackets represent the 95% confidence limits for each percentage. For information on confidence limits, see Appendix B.
2 These figures have been extrapolated from the survey results using the June Census 2001 figure for the total number of agricultural holdings in Great Britain (201,926). They are rounded to the nearest thousand.
3 Contractors used, for example, for crop spraying and sheep dipping.
4 Of all the agricultural holdings surveyed, 50% are members of at least one farm assurance scheme (80% of 'large' holdings, 83% of 'medium' holdings, and 36% of 'small' holdings; 68% of 'arable' holdings, 52% of 'livestock' holdings, and 33% of mixed/other holdings; and 95% of 'large arable' holdings). The number of holdings registered as 'organic' was not quantified as part of this survey.

3.4 Awareness of legal changes

In view of the forthcoming extension of controlled waste legislation to agriculture, respondents of this survey were asked if they were aware of the proposed legal changes. A total of 41% of farmers contacted during the telephone recruitment stage stated that they were aware of impending legislation.[1] However, feedback from surveyors suggests that the actual level of awareness is much lower, and few people had any detailed knowledge of the proposals and their implications. This is due to the fact that many respondents seem to be confused about which new piece of legislation the survey concerned – many assuming that the question asked related to more recently enacted legislation such as the Animal By-Products Regulation (EC No. 1774/2002, as amended). In fact, many respondents commented on the large quantity of legislation which they felt is affecting the industry at present.

Another development with significant implications for the agricultural sector is the EU Review Programme on agrochemicals. This Programme will affect the list of chemicals which are approved for use in agriculture. Certain chemicals will be 'revoked', meaning that the chemicals should be used before a specific date or returned to the supplier. Therefore, as part of this survey, particular attention was given to waste agrochemicals currently stored on holdings. Of all respondents, 35% were aware that agrochemicals are being revoked as a result of this programme. Of those that were aware, 26% stated that they thought they had a 'good level of knowledge' of the resultant changes to approved agrochemicals, 48% a 'limited knowledge' and 26% 'no knowledge'. Anecdotal evidence suggests that in many cases farmers rely on their suppliers or agronomists to keep them informed of any changes to the list of approved agrochemicals.



Base: All 380 agricultural holdings surveyed.
Analysis of the data indicates little variation between different countries and between different types and sizes of holding.

Figure 3.1 Answers to the question, "How important do you consider waste management issues to your business?"

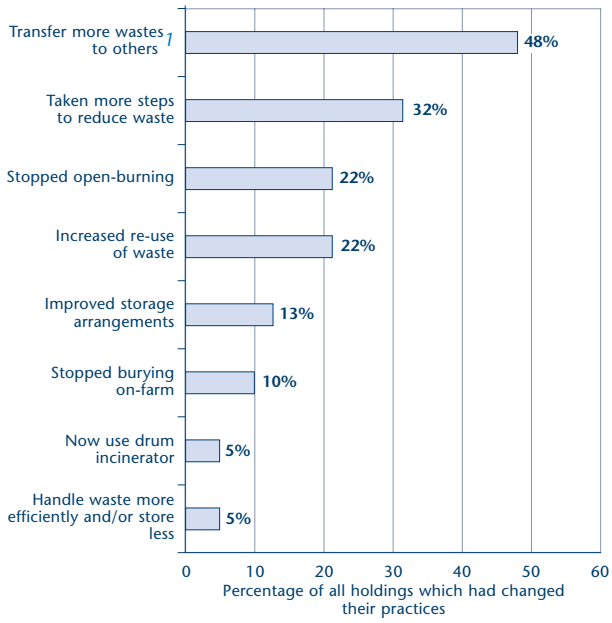
3.5 General attitudes to waste management

An accurate understanding of current attitudes to waste management is essential to implement the controlled waste legislation effectively. To help develop this understanding, the survey asked a number of questions to gather views on the importance of waste management, and to determine the extent to which practices have changed in recent years (and the reasons for any change).

The results of this survey show that:

- general awareness of the importance of waste management is relatively high in the agricultural sector – 91% of all respondents stated that they consider waste management to be 'fairly' or 'very' important to their business (see Figure 3.1);
- changes in practices are already occurring to some extent in the industry (even though many of the most common practices such as open burning continue) – 41% of all respondents reported that they have changed their practices in some way in recent years;
- a key change is the transfer of more wastes to others for recycling, recovery or disposal – Figure 3.2 shows that this was cited by 48% of the respondents who have changed their practices;
- other important changes include more attention to waste reduction (cited by 32%), stopping open burning (cited by 22%), and increasing re-use of waste (cited by 22%);
- the strongest driver for change in practices at present appears to be a sense of duty – Figure 3.3 shows that this was quoted by almost half (49%) of respondents who have changed their practices in some way, and this finding is supported by general comments made by many respondents about their desire for more environmentally sound options (particularly for waste silage plastics);
- other factors influencing practices appear to be farm assurance schemes (cited by 25% of those respondents who have changed their practices); legal pressure (cited by 22%); and the availability of waste collection services (cited by 16%);
- pressure to reduce costs was cited as a reason for change by only 14% of the respondents who have made changes, and very few respondents indicated that they had made any formal attempt to assess the cost of their waste (approximately 10% of all respondents stated that they had reviewed disposal costs for specific waste streams). This is to be expected given the fact that most farmers/landowners are not paying for waste disposal at present (at least not directly).

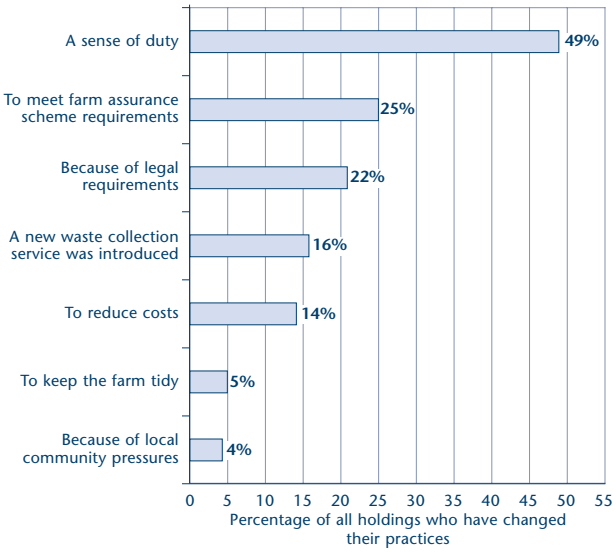
1 Where possible during the telephone recruitment stage the farmers contacted were asked whether they were aware of the proposed legislation. 393 of the farmers gave a response to this question. 41% of these stated that they were aware of the legislation.



Base: 154 holdings.
Analysis of the data has shown that there are some statistically significant differences between countries.
These include:

- Only 37% of respondents in England reported 'more transfer to others' compared to 69% in Scotland and 63% in Wales (this may possibly be partly explained by the fact that small-scale schemes for waste silage plastics have been established for a longer time in Scotland and Wales).
- 49% of respondents in Scotland reported that they had 'taken steps to reduce waste' in comparison with 28% in England and 19% in Wales.

Figure 3.2 Answers to the question "In what ways have your practices changed?" *(answered by the 154 respondents who stated that their practices have changed)*



Base: 154 holdings.

Figure 3.3 Answers to the question "Why did you change your waste management practices?" *(answered by the 154 respondents who stated that their practices have changed)*

3.6 Support for waste collection schemes

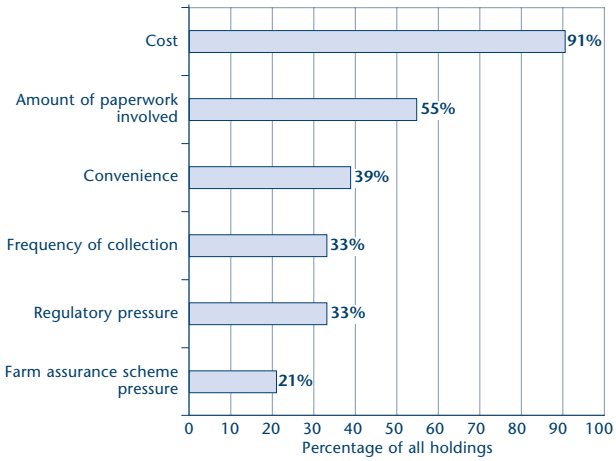
The need for organised waste collection schemes in the agricultural sector – particularly for waste plastics – has been the focus of much debate in recent years. In 1994, a national collection and recycling scheme for waste silage plastics was established by the Plastic and Industrial Films Association (PIFA) and polymer manufacturers (based on a product levy). Unfortunately, this collapsed in 1997 because two importers refused to pay the levy. At present, there are only a small number of small-scale, waste silage plastic schemes, including 'Second Life Plastics Wales' and the 'Cumbria Farm Plastics Recycling Scheme' (Environment Agency, 2001a).

As part of this survey, respondents were asked several questions to explore the need and potential demand for waste collection schemes.

The survey results show that:

- there is a considerable demand for waste collection schemes, particularly for waste plastics – 92% of all respondents stated that they would participate in an ongoing waste collection scheme for wastes such as silage plastics, while 86% stated that they would take part in a one-off waste collection scheme for materials such as scrap metal and tyres;
- the main factor that is likely to influence the take-up of schemes is cost – Figure 3.4 shows that 91% of respondents cited cost as a factor that would influence their decision (66% rated it as the most important factor);
- farmers and other landowners are willing to make an effort to make a scheme successful – 87% indicated that they would be willing to change and improve their waste storage practices if this makes collection and recovery more cost-effective.

1 'Transfer more wastes to others' refers to the transfer of wastes to suppliers, waste contractors or waste facilities for recycling, recovery or disposal.



Base: All 380 agricultural holdings.

Figure 3.4 Answers to the question "What would most influence your decision (with respect to participation in a waste collection scheme)?"

General comments made by respondents were also of interest:

- many livestock farmers stressed the need for a recovery scheme for waste plastics (some had participated in the national scheme in the 1990s and were disappointed that this had collapsed), but this opinion was also frequently voiced by those with arable and horticultural enterprises (generating waste packaging and horticultural films);
- many indicated that they would be willing to transport waste to a local collection point although most would favour collection from the farm;
- some stated that the frequency of collection could be just once per year although generally people considered the optimum frequency to be 2–3 times per year.

4 Information on specific practices

4.1 Introduction

This section of the report provides more detailed information on each of the various practices currently in use for managing agricultural waste.

These practices include:

- burning;
- disposal using farm tips or burial elsewhere on the holding;
- re-use;
- storage with no plans for disposal;
- inclusion in the household dustbin;
- use of civic amenity sites (household waste recycling centres);
- use of private waste contractors;
- take-back by suppliers;
- handling and disposal by agricultural contractors.

4.2 Burning

Earlier studies have indicated that burning is the most common practice used for disposal of many wastes on farms (Defra, 2002d; Environment Agency, 2001a).

Plate 9 Open burning of waste plastic

The survey results show that:

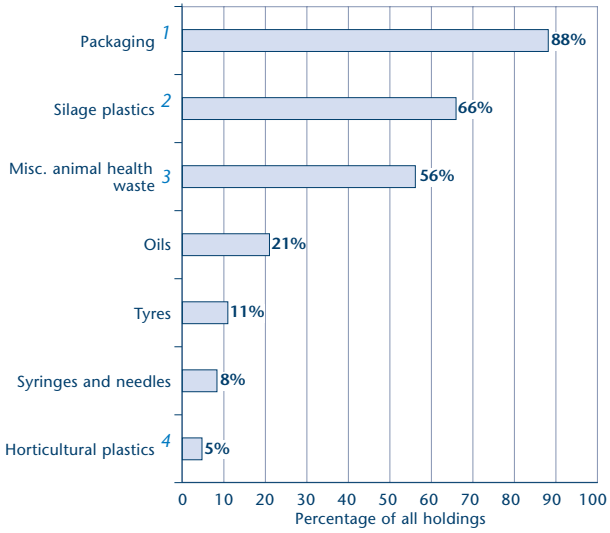
- burning is still a common waste disposal practice – 90% of the respondents are generally burning at least one waste stream (shown earlier in Table 3.2);
- open burning of waste is the most common practice but use of drum incinerators[1] and other forms of incinerators also occurs – 83% of respondents reported that they dispose of some waste by open burning (see Plate 9), 15% in a drum incinerator, and 5% in some other form of incinerator (see Plates 10 and 11);
- the waste streams that are most commonly burnt are packaging and silage plastics – Figure 4.1 shows that 88% of all respondents are burning waste packaging and 66% are burning silage plastics;
- small quantities of several potentially hazardous waste streams are also burnt on some holdings – Figure 4.1 shows that 56% of all respondents are burning miscellaneous animal health product waste such as gloves, swabs and dressings; 8% are burning syringes and needles; 21% are burning waste oils (generally to ignite fires for other waste, particularly green waste); and 11% are burning scrap tyres;
- the disposal of waste by burning is slightly less common in Scotland compared to England and Wales – Figure 4.2 shows that 77% of respondents in Scotland are burning waste packaging compared to 91% in England; and 50% are burning waste silage plastics in Scotland compared to 70% in England (a statistically significant difference).

1 A drum incinerator is a 205 litre metal drum with a series of holes in it – a design approved by the Crop Protection Association for waste agrochemical packaging;

Based on discussions with respondents, it seems that burning of combustible waste materials is common because it is the most convenient method available. Moreover, a number of respondents stated the opinion that burning of certain potentially hazardous wastes such as syringes and other miscellaneous animal health product waste is the safest method available at present. Some respondents reported that they have stopped burning due to concerns for the environment and/or the requirements of organic farming schemes but the large majority feel that they have no practical alternative.

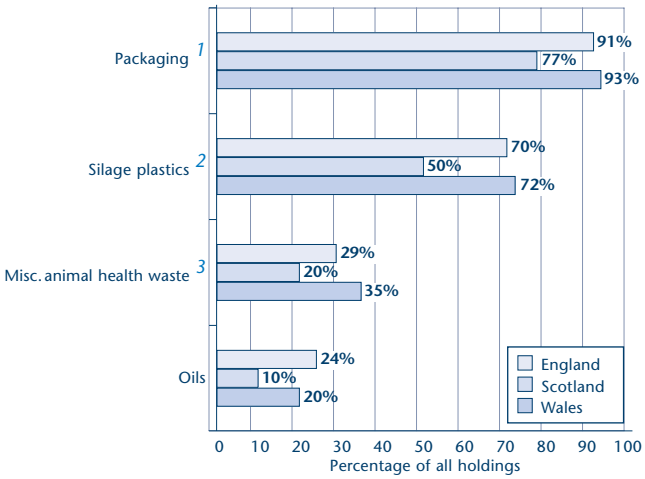
Plate 10 Metal drum used for burning packaging waste

Plate 11 Basic incinerator used for burning a variety of waste



Base: All 380 agricultural holdings surveyed.

Figure 4.1 Main waste streams burnt on agricultural holdings in Great Britain



Base: 254 agricultural holdings in England, 86 in Scotland, and 40 in Wales.

Figure 4.2 Comparison of the percentage of holdings burning waste in England, Scotland and Wales

4.3 Disposal using farm tips or burial elsewhere

Waste tips (or dumps) have been common on farms in Great Britain in the past. Their use is thought to have declined as legal controls and general public awareness have increased, and farming processes have changed (e.g. more products supplied in plastic and paper packaging rather than metal drums).

1 Packaging includes plastic agrochemical packs and associated cardboard packaging; plastic and paper feed, seed and fertiliser bags; plastic and metal sheep dip containers; glass and plastic animal health containers and associated cardboard packaging; wooden pallets and shrink wrap; and plastic and metal oil containers.
2 Silage plastics include silage wrap, silage sheet, silage bags, bale twine and net wrap.
3 Miscellaneous animal health waste includes gloves, swabs and dressings.
4 Horticultural plastics include mulch film, crop cover, greenhouse film and tunnel film.

The results of this survey show that use of farm tips (see Plate 12) and/or burial elsewhere on the farm are far less common than burning as methods of waste disposal but they are still occurring on roughly one-third of all holdings (shown earlier in Table 3.2).

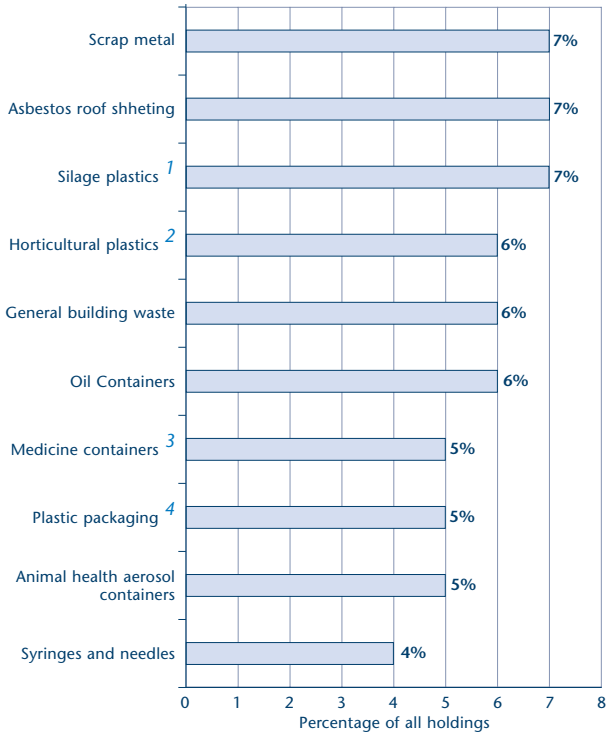
Plate 12 A tip in an old quarry

More detailed analysis of the data shows that:

- a broad range of wastes are currently being disposed of by these methods on some holdings, including some hazardous materials, as shown in Figure 4.3;
- 38% of all holdings in Great Britain have a recognised tip on the property, but only 29% of all holdings still use a tip for waste disposal (as shown in Table 4.1); this means that there are in the region of 76,500 farm tips across Great Britain of which about 59,100 are currently active;
- small holdings are significantly less likely to dispose of waste by burial in a tip – Figure 4.4 shows that 24% of the small holdings surveyed are using tips compared to 41% of large holdings (probably quite easily explained by the smaller land area and the smaller quantity of waste generated).

Generally, the survey respondents were aware of the potential risks associated with burial of wastes. Many of those who are burying wastes indicated that they only use this method for specific wastes that cannot be dealt with easily by other methods such as burning.

Finally, some farmers who had their stock slaughtered during the outbreak of foot-and-mouth disease in 2002 stated that a variety of waste items (such as scrap metal) was buried on the farm with the animal carcasses. However, this was not normal practice and was not quantified as part of this survey.



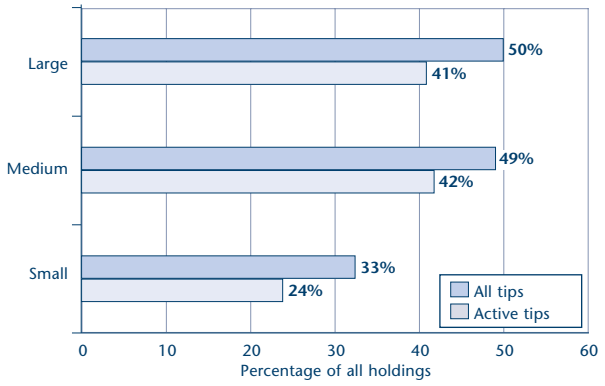
Base: All 380 agricultural holdings surveyed.

Figure 4.3 Main waste streams tipped or buried on agricultural holdings

Table 4.1 Summary of the number of farm tips in Great Britain

Country	Holdings with tips (active or inactive)		Holdings still using tips	
	Percentage	Estimated number[5]	Percentage	Estimated number[6]
England	38%	50,100	27%	35,600
Scotland	35%	16,600	33%	15,400
Wales	43%	9,800	35%	8,100
Total for GB	**38%**	**76,500**	**29%**	**59,100**

1 Silage plastics include silage wrap, silage sheet, silage bags, bale twine and net wrap.
2 Horticultural plastics include mulch film, crop cover, greenhouse film and tunnel film.
3 Medicine containers primarily comprise glass and plastic bottles.
4 Plastic packaging includes plastic agrochemical packs; plastic feed, seed and fertiliser bags; and plastic sheep dip containers.
5 Base: 254 agricultural holdings in England, 86 in Scotland, 40 in Wales, and 380 in Great Britain as a whole.
6 These figures have been extrapolated from the survey results using the June Census 2001 figure for the total number of agricultural holdings in Great Britain (201,926). They are rounded to the nearest thousand.

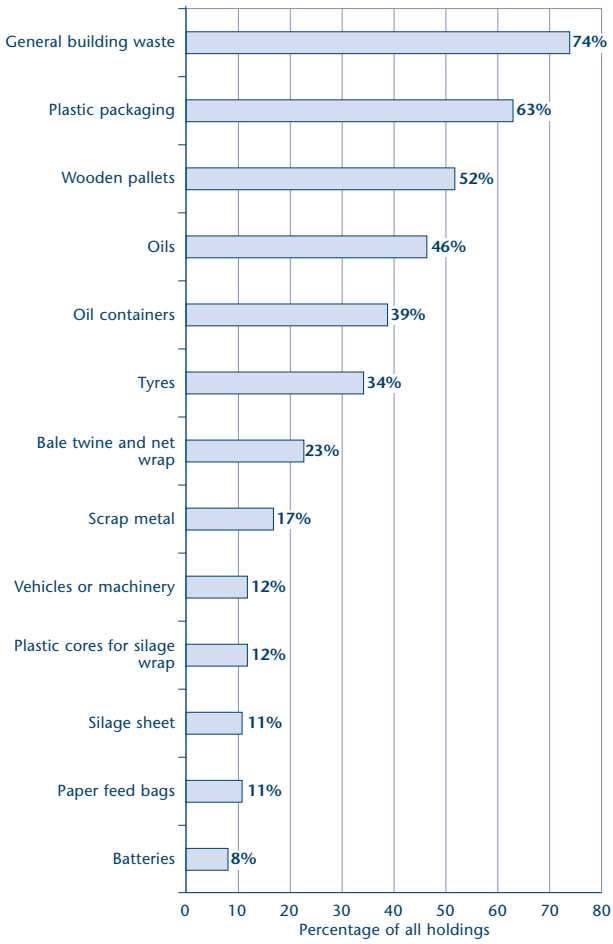


Base: All 380 agricultural holdings surveyed.

Figure 4.4 Percentage of small, medium and large holdings with tips

4.4 Re-use

Re-use of waste is clearly a practice that can have financial and environmental benefits.



Base: All 380 agricultural holdings surveyed.

Figure 4.5 Waste streams that are most commonly re-used

The results of this survey show that re-use of agricultural waste is common where practical. A total of 98% of respondents reported that they re-use at least one waste stream, although the quantities re-used are often relatively small (except building waste).

Most farmers are very practical and will generally find a use for a waste if one exists. Moreover, the financial pressures in the industry have increased attention to getting the maximum value out of any product. Storage of some waste items in the hope that they will have a use in the future is fairly common (particularly for scrap machinery and other metal), as discussed in Section 4.5.

Typical practices for re-using these materials are as follows:

- *General building wastes (such as bricks and rubble)* – for re-surfacing tracks and filling in potholes (see Plate 13);
- *Waste packaging (such as feed bags and oil containers)* – for storage and feed containers (see Plates 14 and 15);
- *Wooden pallets*[4] – for fencing and as a fuel (often on the household fire);
- *Oils* – for protecting machinery against rust or mixed with diesel to create a creosote substitute;
- *Waste tyres* – on silage clamps (although car tyres are mostly used for this purpose); some tyres are used to make scrapers for cleaning yards;
- *Bale twine and net wrap* – for binding;
- *Scrap metal, vehicles and machinery* – often cannibalised for spare parts and for fixing other items;
- *Plastic cores* – for setting out rat poison as they prevent dogs and cats eating the poison;
- *Silage sheet* – re-used a second year either as underlay on the clamp to protect the new sheet or to cover the shoulders;
- *Batteries* – for powering electric fences.

Plate 13 Building rubble used to fill a pothole

4 Although most are now taken back by suppliers.

Plate 14 Waste bags used to store waste silage wrap

Plate 15 Empty containers used as water feeders

4.5 Storage with no plans for disposal

Conventional wisdom suggests that some wastes such as scrap metal and tyres often accumulate on farms over many years – typically as a result of both a lack of a low-cost convenient option for disposal and the view that the items might have some use or value in the future.

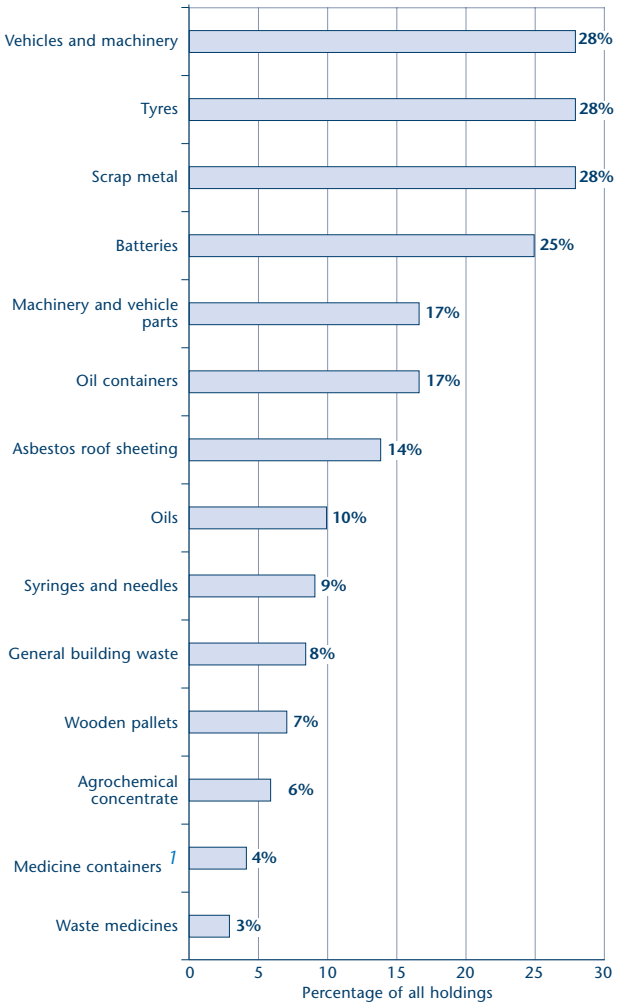
The survey results show that:

- long-term storage of some waste materials (with no plans for disposal within the next year) is relatively common – 72% of the holdings surveyed are storing at least one waste stream (as presented earlier in Table 3.2);
- the wastes that are most commonly stored are scrap vehicles, machinery, other metal, tyres and batteries – Figure 4.6 shows that 25% or more of all holdings surveyed are storing these wastes;
- hazardous waste materials are also being stored on some holdings – Figure 4.6 shows that 14% of the holdings are storing waste asbestos roof sheeting, 10% are storing waste oils, 9% are storing syringes and needles, 6% are storing waste agrochemical concentrate, and 3% are storing waste medicines;
- interestingly, a significantly greater proportion of holdings in Scotland appear to be storing wastes – Figure 4.7 compares the results for England, Wales and Scotland and shows, for example, that 40% of holdings in Scotland are storing scrap vehicles and machinery compared to 25% in England and 23% in Wales.

Table 4.2 Estimates of the quantities of the main wastes stored with no plans for disposal[1,2]

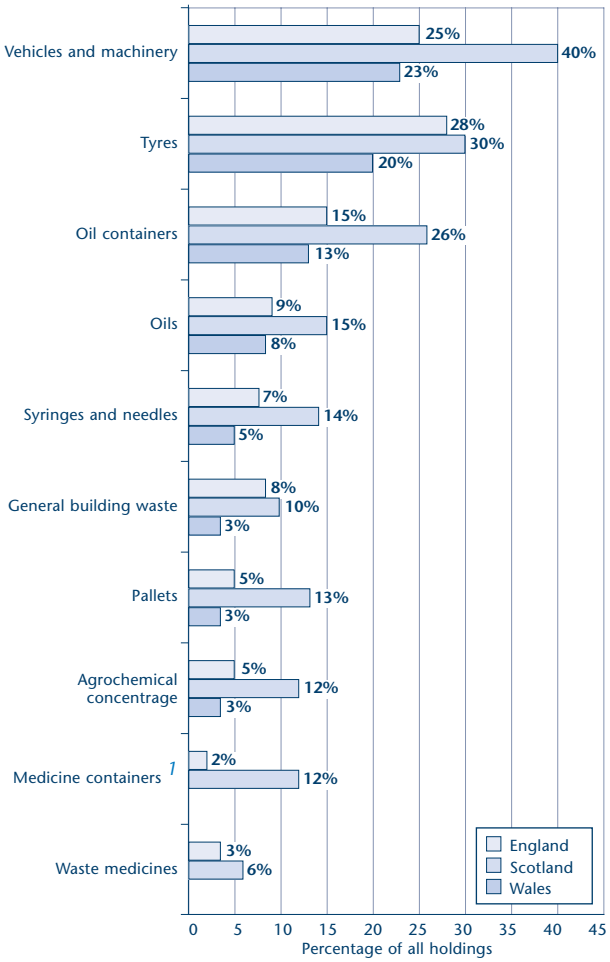
Waste type	Estimates of the total quantity of wastes stored on GB holdings (tonnes)
Tyres	153,000
Batteries	2,000
Scrap metal[3]	576,000
Asbestos roof sheeting	51,000
TOTAL	782,000

1 The estimates should be considered with caution as they are based on relatively small sample sizes and were derived from estimates of quantities on individual holdings which were in turn based on visual inspection and discussion with the interviewees.
2 Reliable estimates of quantities of less common wastes (e.g. waste agrochemicals) could not be derived because of low sample sizes.
3 'Scrap metal' includes machinery and other general metal.



Base: All 380 agricultural holdings surveyed.

Figure 4.6 Main Waste streams that are being stored with no plans for disposal



Base: 254 holdings in England, 86 in Scotland, and 40 in Wales.

Figure 4.7 Comparison of the percentage of holdings storing wastes in England, Scotland and Wales

4.6 Inclusion in the household dustbin

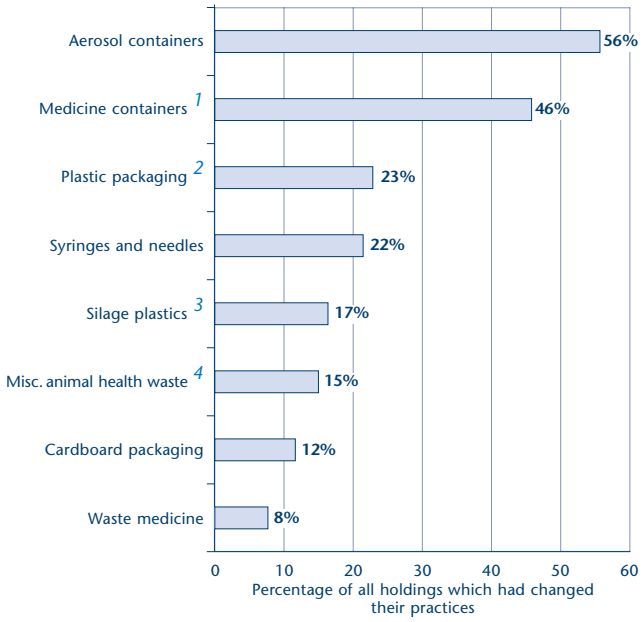
Earlier studies have indicated that use of the household dustbin for the disposal of certain agricultural wastes is relatively common (Defra, 2002d; Environment Agency, 2001a).

The survey results show that:

- inclusion of agricultural waste in the dustbin is relatively common – 77% of all holdings use the dustbin for the disposal of at least one waste stream (as shown earlier in Table 3.2);
- wastes from animal health products are some of the most common materials disposed of via this route – Figure 4.8 shows that 56% of all holdings surveyed are using this route for aerosol containers; 46% for medicine containers; 22% for used syringes and needles; 15% for other miscellaneous materials like gloves, swabs and dressings; and 8% for waste medicines;
- it is a fairly common route for the disposal of waste packaging – 23% of all respondents stated that they are putting some plastic packaging wastes in the dustbin, and 12% are using this route for cardboard packaging;
- some bulky items such as silage plastics are also being included in the dustbin – 17% of all respondents stated that they dispose of silage plastics via this route;
- small holdings make most use of this disposal route – Figure 4.9 shows, for example, that 50% of small holdings are putting waste medicine containers in the dustbin compared to 30% of large holdings (a statistically significant difference).

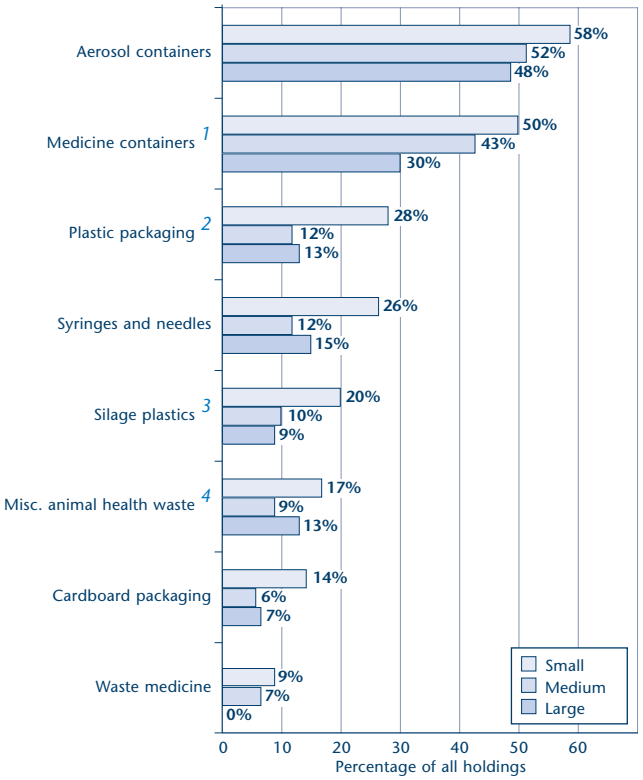
A number of respondents commented that disposal via the dustbin is the most convenient method for small waste items, and some felt that this route is more environmentally sound than burning. Some respondents stated that they include recyclable materials (such as packaging) in the waste recycling collection bin provided.

1 Medicine containers primarily comprise glass and plastic bottles.



Base: All 380 agricultural holdings surveyed.

Figure 4.8 Main wastes that are included in the household dustbin



Base: 265 small holdings, 69 medium holdings, and 46 large holdings

Figure 4.9 Comparison of the percentage of small, medium and large holdings using the dustbin for waste disposal

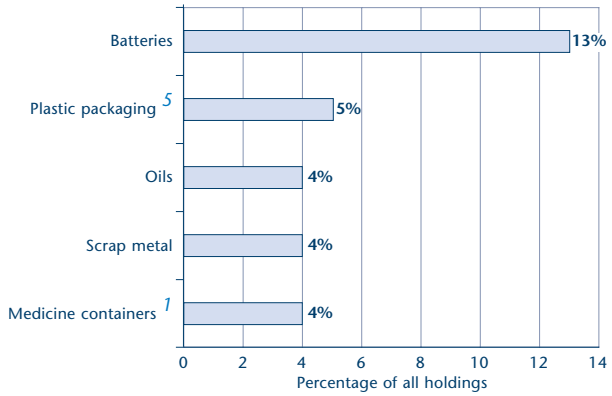
4.7 Use of civic amenity sites (household waste recycling centres)

Local authorities have a legal duty to offer waste collection services and facilities for household waste, and the number of civic amenity sites (often now referred to as 'household waste recycling centres') has grown in recent years.

The use of these sites by farmers in the UK has been a topic of discussion recently since this is known to be a common practice in some other EU Member States such as Germany and the Netherlands (Environment Agency, 2001a; 2001b).

The results of this survey show that:

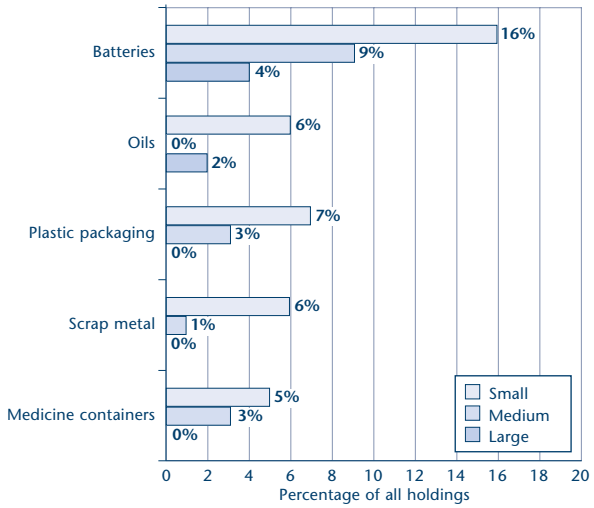
- use of civic amenity (CA) sites for agricultural waste is not particularly common at present – only 27% of all respondents stated that they use this route for one or more waste streams (as shown earlier in Table 3.2);
- scrap batteries are most commonly taken to CA sites – Figure 4.10 shows that 13% of all respondents have taken batteries to the local CA site;
- other items that are being taken to CA sites (but to a lesser extent) include waste packaging (reported by 5% of all respondents), oils (4%), scrap metal (4%) and medicine containers (4%);
- small holdings appear to be more likely to use CA sites than large and medium-sized holdings – Figure 4.11 shows that 16% of the small holdings surveyed take batteries to civic amenity sites compared with 4% of large holdings (a statistically significant difference).



Base: All 380 agricultural holdings surveyed.

Figure 4.10 Main waste streams that are taken to civic amenity site

1 Medicine containers primarily comprise glass and plastic bottles.
2 Plastic packaging includes agrochemical packs; feed, seed and fertiliser bags; and sheep dip containers.
3 Silage plastics include silage wrap, silage sheet, silage bags, bale twine and net wrap.
4 Miscellaneous animal health waste includes gloves, swabs, dressings, etc.



Base: 265 small holdings, 69 medium holdings, and 46 large holdings

Figure 4.11 Comparison of the use of civic amenity sites by small, medium and large holdings

4.8 Use of private waste contractors

Other industries that are already obligated under the controlled waste legislation typically use private waste management companies to collect their waste for disposal or recovery, and in the future this may be the principal option available to agricultural holdings (if no other services are developed).

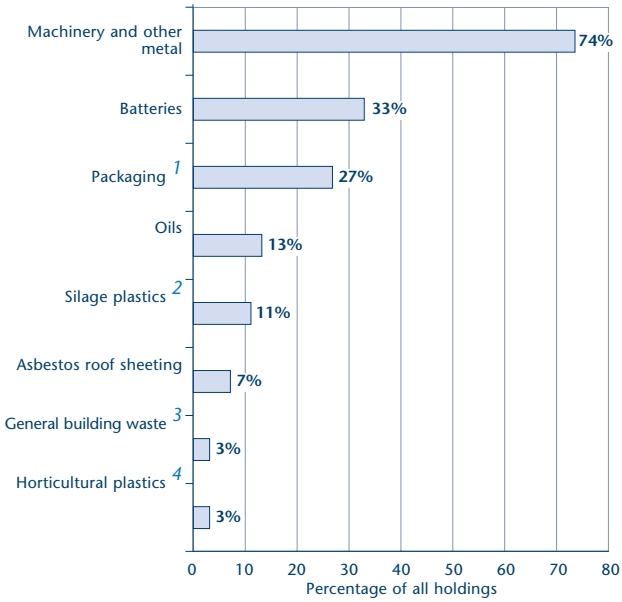
One of the objectives of this survey has been to determine the extent to which farmers and other landowners are using private waste contractors at present.

The survey results show that:

- the transfer of scrap metal and machinery to waste contractors is common – Figure 4.12 highlights that 74% of all respondents are using this route (either having the scrap metal collected by a local scrap metal dealer or transporting it to a local facility, as shown in Figure 4.13);
- the transfer of other wastes (such as packaging, oils and silage plastics) is less common at present (as shown in Figure 4.12);
- larger holdings are more often using private waste contractors – analysis of the survey results reveals that 70% of large holdings are using a waste contractor for one or more waste types compared with 53% of small holdings (a statistically significant difference);
- the only statistically significant difference between countries appears to be the collection of more waste silage plastics in Wales – 28% of holdings in Wales reported use of waste contractors for silage plastics, compared to 4% in England and 8% in Scotland. This could be explained by the 'Second Life Plastics' scheme in Wales.

Overall, the general impression is that the transfer of scrap metal to scrap metal dealers is well established, but use of contractors for other wastes is far less common. A small number of holdings have a permanent skip for collection by a private waste contractor but this is not typical and it is often associated with diversification activities such as a farm shop or market garden. The annual charge for such a skip is normally in the range of £100 to £200.

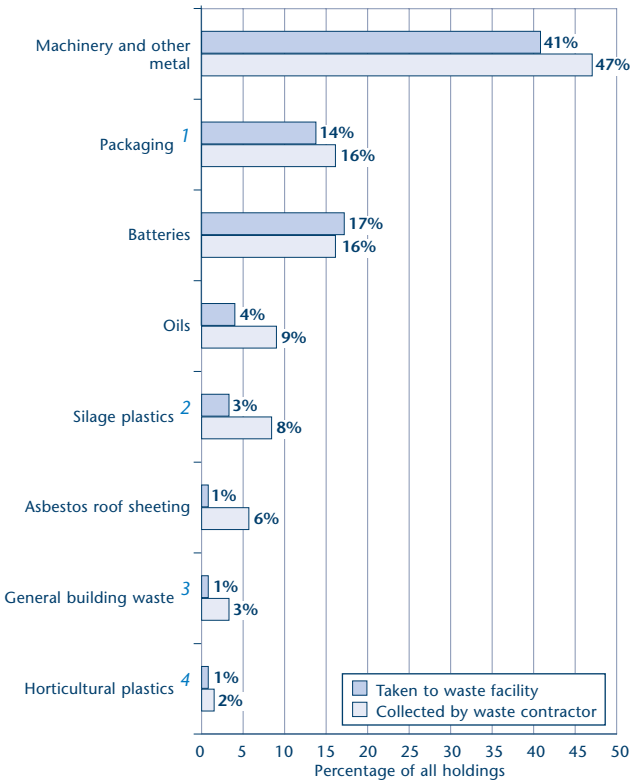
The majority of respondents stated that they are not paying for the collection of scrap metal but nor are they generally receiving an income. This reflects the current market for metals. Some respondents reported that they simply wait for a scrap metal dealer to visit the farm (a practice that seems to be less frequent than in the past when the market was more buoyant); others stated that they phone the local scrap dealer when they have enough metal to fill a skip; and others commented that they generally take scrap metal to the local scrap yard (typically using a tractor and trailer).



Base: All 380 agricultural holdings surveyed.

Figure 4.12 Wastes transferred to waste management contractors

1 Packaging includes plastic agrochemical packs and associated cardboard packaging; plastic and paper feed, seed and fertiliser bags; plastic and metal sheep dip containers; glass and plastic animal health containers and associated cardboard packaging; wooden pallets and shrink wrap; and plastic and metal oil containers.
2 Silage plastics include silage wrap, silage sheet, silage bags, bale twine and net wrap.
3 General building waste includes bricks, rubble, etc.
4 Horticultural plastics include mulch film, crop cover, greenhouse film and tunnel film.



Base: All 380 agricultural holdings surveyed.

Figure 4.13 Comparison of practices for transfer of wastes to waste contractors

4.9 Take-back by suppliers

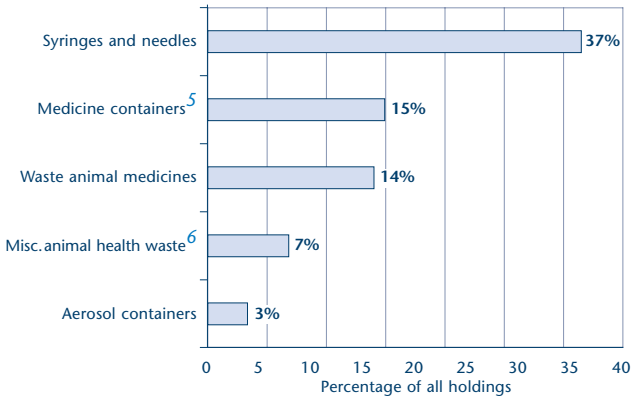
With the development of producer responsibility legislation and growing public awareness of environmental issues, pressure on suppliers to take-back waste (particularly packaging) has increased significantly in many industry sectors.

The results of this survey show that:

- in general, the return of agricultural waste streams to suppliers is occurring but not widespread – more than 40% of all respondents reported that they return one or more waste streams to the supplier(s), as shown earlier in Table 3.2;
- return of waste animal health products to veterinarians is relatively common, particularly for used syringes and needles – Figure 4.14 shows that 37% of all holdings are returning used syringes and needles to vets (usually in yellow 'sharps bins', as shown in Plate 16); 15% are returning medicine containers and 14% are returning waste medicines;
- the other main waste streams that are commonly returned to suppliers are machinery wastes such as vehicles, tyres and batteries (returned to dealers and engineers) – Figure 4.15 shows that 39% of all holdings surveyed are returning tyres, 20% are returning machinery and 18% are returning batteries;
- few holdings are returning packaging to distributors or merchants – Figure 4.15 shows that just 3% of all holdings are returning plastic packaging to their suppliers.

The general impression is that take-back of waste by suppliers is fragmented at present, and only occurs for specific waste streams. In addition, comments made by respondents indicate that there are no consistent charging systems in place. Practices vary widely.

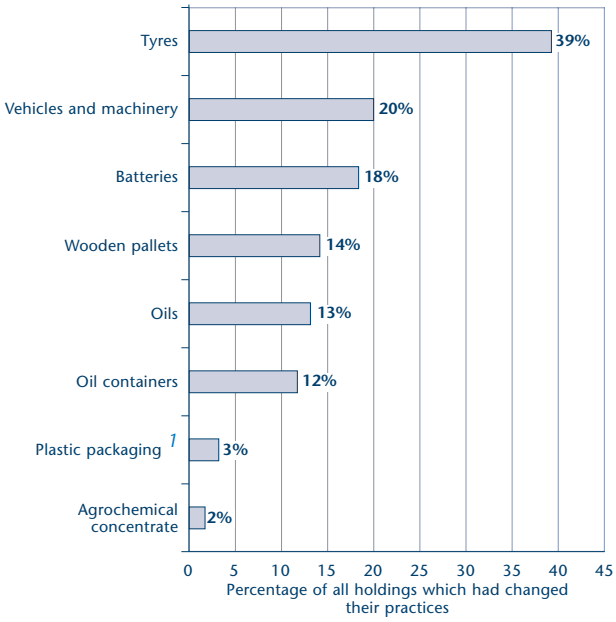
Plate 16 Examples of bins provided by some vets



Base: All 380 agricultural holdings surveyed.

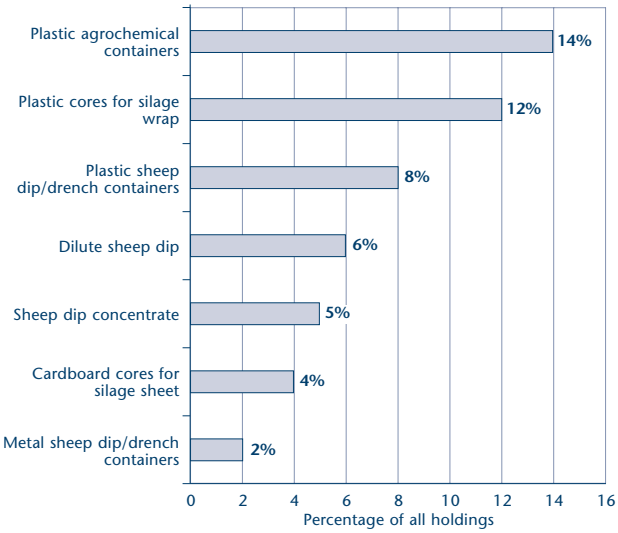
Figure 4.14 Wastes taken by veterinarians

1 Packaging includes plastic agrochemical packs and associated cardboard packaging; plastic and paper feed, seed and fertiliser bags; plastic and metal sheep dip containers; glass and plastic animal health containers and associated cardboard packaging; wooden pallets and shrink wrap; and plastic and metal oil containers.
2 Silage plastics include silage wrap, silage sheet, silage bags, bale twine and net wrap.
3 General building waste includes bricks, rubble, etc.
4 Horticultural plastics include mulch film, crop cover, greenhouse film and tunnel film.
5 Medicine containers primarily comprise glass and plastic bottles.
6 Miscellaneous animal health waste includes gloves, swabs, dressings, etc.



Base: All 380 agricultural holdings surveyed.

Figure 4.15 Waste returned to distributors, merchants, machinery dealers or engineers



Base: All 380 agricultural holdings surveyed.

Figure 4.16 Wastes taken by agricultural contractors

4.10 Handling and disposal by agricultural contractors

To minimise costs and avoid the need for investment in expensive machinery, it is increasingly common for farmers to use contractors for certain land and livestock management tasks such as crop spraying, silage baling and sheep dipping.

The results of this survey show that many agricultural contractors are currently dealing with the waste generated from their operations, particularly those undertaking crop spraying, silage baling, and sheep dipping. Figure 4.16 shows that contractors are taking responsibility for waste agrochemical packs on 14% of all holdings, plastic cores on which silage wrap is supplied on 12%, and plastic sheep dip packaging on 8%.

It is important to note that many agricultural contractors are based on farms themselves so it is likely that many of these wastes are currently being disposed by methods that may be prohibited following extension of controlled waste legislation to agriculture.

1 Plastic packaging includes agrochemical packs; feed, seed and fertiliser bags; and sheep dip containers.

5

Current practices for key waste streams

5.1 Introduction

This section of the report presents a breakdown of the current practices for key agricultural waste streams.

These key waste streams include:

- Tyres
- Oils
- Batteries
- Vehicles and machinery
- General scrap metal
- Agrochemical concentrate
- Agrochemical packaging
- Fertiliser bags
- Animal feed bags
- Plastic sheep dip/drench packaging
- Silage wrap
- Silage sheet
- Medicine containers
- Used syringes and needles
- Unused medicines
- Other animal health products
- Asbestos cement-bonded roof sheeting

These waste materials are considered 'key waste streams' due to their relatively high level of occurrence and/or potential hazards.

In reviewing the pie charts presented in this sesction, it should be noted that:

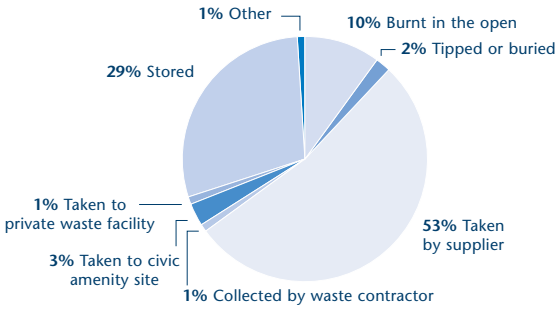
- The charts illustrate the most common practices (ranked '1' in the completed questionnaires). They do not include 're-use' (reported separately) nor do they include practices that were ranked '2' or '3' by respondents or practices that were quoted by only a small number of respondents.
- 'Stored' wastes are defined as those which are stored with no plans for disposal within the next year.
- 'Taken by supplier' refers to waste taken by either a machinery engineer or dealer, a veterinarian, distributor or merchant.
- 'Taken to CA site' refers to waste taken by the farmer or landowner to a local authority civic amenity site or household waste recycling centre.

More detailed data for all types of agricultural waste are provided in Appendix E. Information on confidence limits is presented in Appendix B.

5.2 Scrap tyres

Figure 5.1 shows the range of practices currently being used for dealing with scrap tyres.

Some re-use of scrap tyres also occurs (not included in Figure 5.1) – 40% of respondents with scrap tyres reported that they re-use some of them either on silage clamps or for making yard scrapers.



Base: 271 holdings.

Figure 5.1 Current practices for scrap tyres

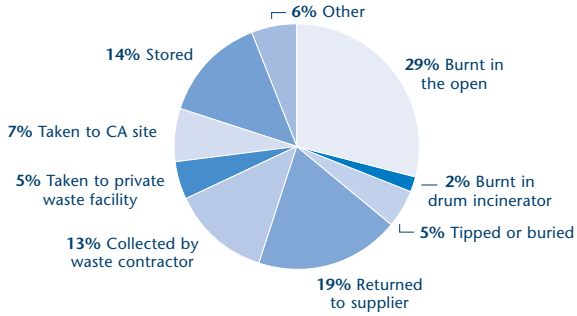
Plate 17 Scrap tyres from a redundant silage clamp

Plate 18 Tractor tyre

5.3 Waste oils

Figure 5.2 shows the range of practices currently being used for dealing with waste oils.

Re-use of waste oils (not included in Figure 5.2) was reported by 53% of the respondents producing this waste stream (typically for lubricating machinery).



Base: 240 holdings.

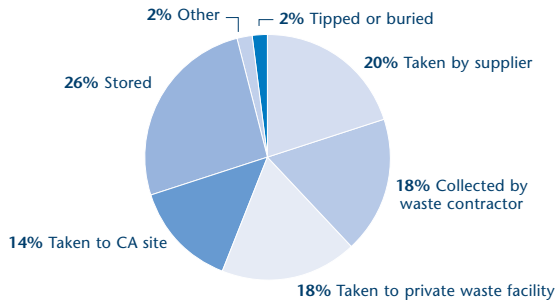
Figure 5.2 Current practices for waste oils

Plate 19 Oils and oil drums

5.4 Scrap batteries

Figure 5.3 shows the range of practices currently being used for dealing with scrap batteries.

Re-use of batteries (not included in Figure 5.3) was reported by 10% of respondents producing this waste stream (typically for powering electric fences).



Base: 320 holdings.

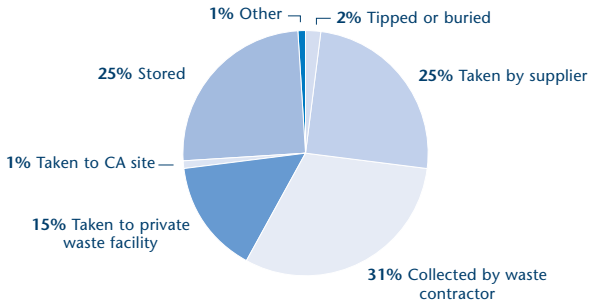
Figure 5.3 Current practices for scrap batteries

Plate 20 Lead-acid battery

5.5 Redundant vehicles and machinery

Figure 5.4 shows the range of practices currently being used for dealing with redundant vehicles and machinery.

Re-use of redundant vehicles and machinery (not included in Figure 5.4) was reported by 12% of respondents producing this waste stream (typically for repairing other machinery).



Base: 271 holdings.

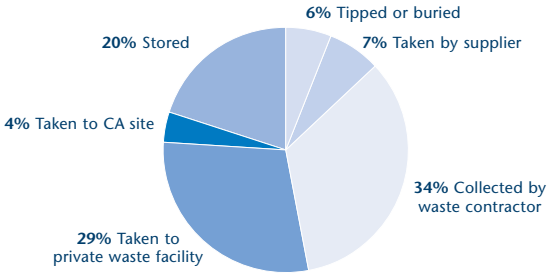
Figure 5.4 Current practices for redundant vehicles and machinery

Plate 21 Scrap vehicle

5.6 General scrap metal

Figure 5.5 shows the range of practices currently being used for dealing with general scrap metal.

Re-use of scrap metal (not included in Figure 5.5) was reported by 18% of respondents producing this waste stream (typically for repairing machinery and other items).



Base: 337 holdings.

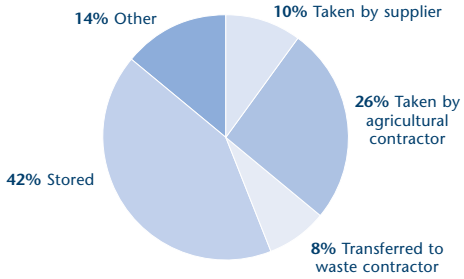
Figure 5.5 Current practices for general scrap metal

Plate 22 General scrap metal

5.7 Waste agrochemical concentrate

Figure 5.6 shows the range of practices currently being used for dealing with waste agrochemical concentrate.

No re-use of this waste stream was reported.



Base: 50 holdings.

Figure 5.6 Current practices for agrochemical concentrate

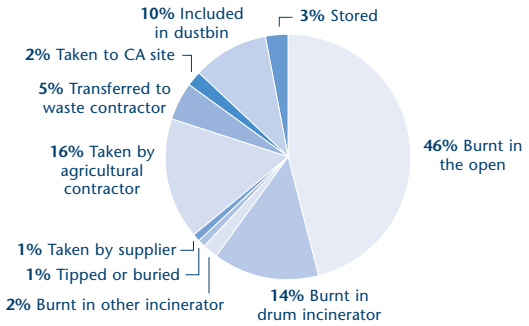
Plate 23 Unused agrochemical concentrate

5.8 Plastic agrochemical packaging

Figure 5.7 shows the range of practices currently being used for dealing with waste plastic agrochemical packaging.

The chart presents the results for rinsed agrochemical containers only and does not include results for unrinsed agrochemical containers (26 respondents stated that they generated unrinsed agrochemical containers).

Re-use of plastic agrochemical packs (not included in Figure 5.7) was reported by 10% of the respondents producing this waste stream (typically for storage containers).



Base: 263 holdings.

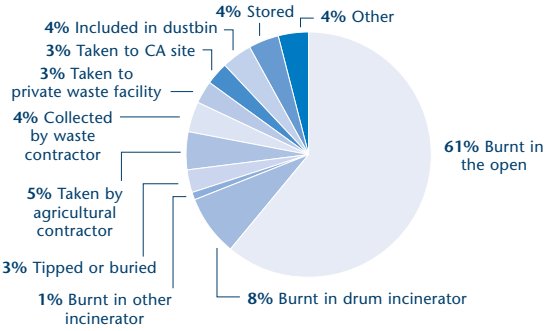
Figure 5.7 Current practices for plastic agrochemical packaging

Plate 24 Pesticide containers

5.9 Plastic fertiliser bags

Figure 5.8 shows the range of practices currently being used for dealing with waste plastic fertiliser bags.

Re-use of plastic fertiliser bags (not included in Figure 5.8) was reported by 29% of the holdings producing this waste stream (often to improve farm tracks).



Base: 279 holdings.

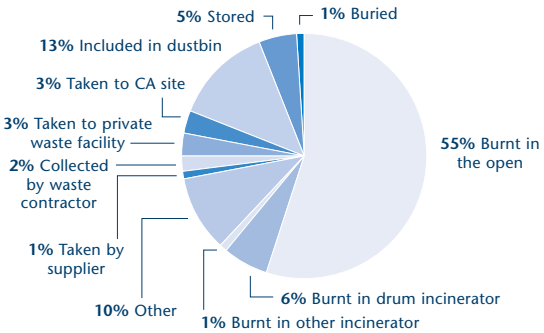
Figure 5.8 Current practices for waste plastic fertiliser bags

Plate 25 Fertiliser bags

5.10 Plastic animal feed bags

Figure 5.9 shows the range of practices currently being used for dealing with waste plastic animal feed bags.

Re-use of plastic feed bags (not included in Figure 5.9) was reported by 67% of the holdings producing this waste stream (typically for storage).



Base: 215 holdings.

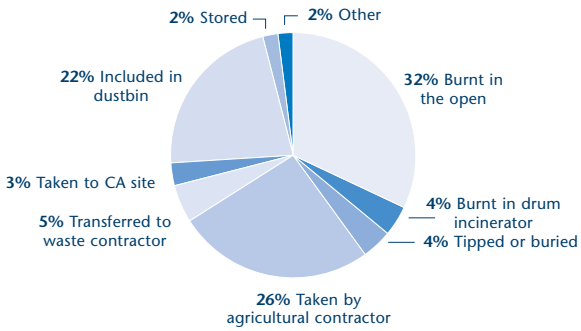
Figure 5.9 Current practices for waste plastic feed bags

Plate 26 | Pig feed bags

5.11 Plastic sheep dip/drench packaging

Figure 5.10 shows the range of practices currently being used for dealing with waste plastic sheep dip/drench packaging.

Re-use of plastic sheep dip/drench packaging (not included in Figure 5.10) was reported by 4% of respondents producing this waste stream (typically for storage).



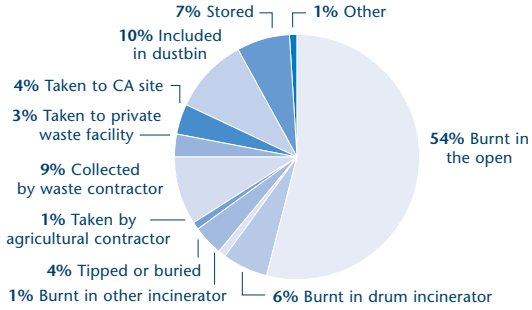
Base: 116 holdings.

Figure 5.10 | Current practices for plastic sheep dip/drench packaging

5.12 Waste silage wrap

Figure 5.11 shows the range of practices currently being used for dealing with waste silage wrap (from silage bales).

Re-use of waste silage wrap (not included in Figure 5.11) was reported by 2% of the respondents producing this waste stream (typically as a base to store bales).



Base: 217 holdings.

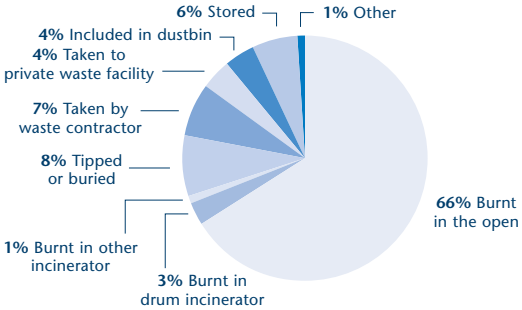
Figure 5.11 | Breakdown of current practices for waste silage wrap

Plate 27 | Waste silage wrap

5.13 Waste silage sheet

Figure 5.12 shows the range of practices currently being used for dealing with waste silage sheet from clamps.

Re-use of silage sheets (not included in Figure 5.12) was reported by 40% of respondents producing this waste stream. The sheets are often re-used a second year, either as underlay on the clamp to protect the new sheet or to cover the shoulders.



Base: 100 holdings.

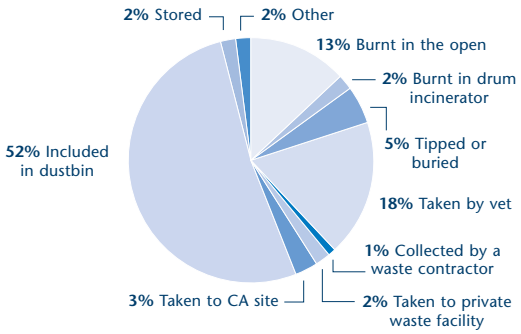
Figure 5.12 | Current practices for waste silage sheet

Plate 28 Waste silage sheet

5.14 Medicine containers

Figure 5.13 shows the range of practices currently being used for dealing with empty medicine containers.

Re-use of medicine containers (not included in Figure 5.13) was reported by only 2% of respondents producing this waste stream (typically for storage).



Base: 286 holdings.

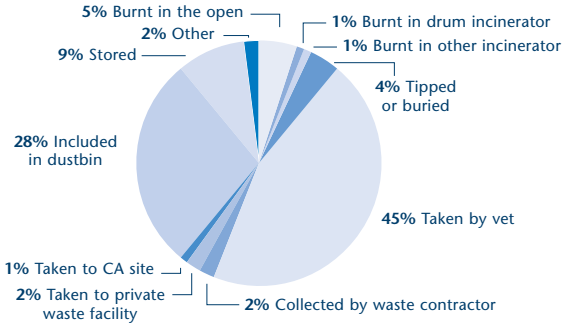
Figure 5.13 Current practices for medicine containers

Plate 29 Medicine container

5.15 Used syringes and needles

Figure 5.14 shows the range of practices currently being used for dealing with used syringes and needles.

No respondents reported re-use of this waste.



Base: 285 holdings.

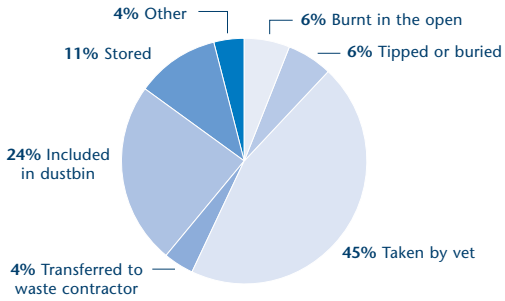
Figure 5.14 Current practices for used syringes and needles

Plate 30 Syringes

5.16 Unused medicines

Figure 5.15 shows the range of practices currently being used for dealing with unused medicines.

No respondents reported re-use of this waste.



Base: 105 holdings.

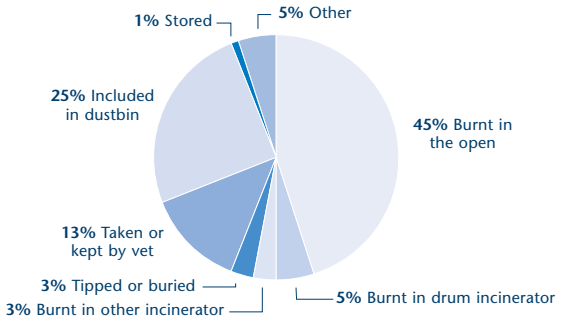
Figure 5.15 Current practices for unused medicines

Plate 31 Medicines

5.17 Other animal health products

Figure 5.16 shows the range of practices currently being used for dealing with other waste from animal health products such as used gloves, swabs and dressings.

No respondents reported re-use of this waste.



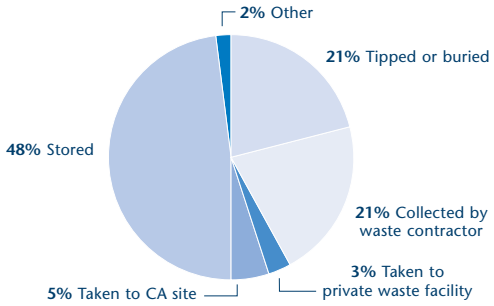
Base: 188 holdings.

Figure 5.16 Current practices for other animal health products (gloves, swabs, dressings, etc.)

5.18 Asbestos cement-bonded roof sheeting

Figure 5.17 shows the range of practices currently being used for dealing with waste asbestos roof sheeting.

Re-use of asbestos roof sheets (not included in Figure 5.17) was reported by 17% of respondents producing this waste stream. Many of these respondents stated that they break the sheets and use them to fill potholes and ditches – a potential health risk.



Base: 104 holdings.

Figure 5.17 Current practices for waste asbestos roof sheeting

Plate 32 Asbestos roof sheets

6

Implications of the results

6.1 Introduction

The Agricultural Waste Survey has generated considerable data and information to help stakeholders understand and address the issues raised by the planned extension of waste management legislation to agriculture. The survey was designed to provide reliable data that reflect the current situation on registered agricultural holdings in Great Britain, and it has achieved this aim.

Above all, the success of the survey is due to the high participation rate (57% of the farmers and other landowners asked to participate) and the openness and co-operation of those who participated. Other important factors that have contributed to the quality and reliability of the results include the extensive consultation with stakeholders and other experts during the design stage, and the fact that the data was gathered via both face-to-face interviews and visual observations by trained and experienced surveyors.

As with all surveys, there are clearly some limitations – such as the small size of some sub-strata limiting the amount of detailed analysis – but the results as a whole are believed to provide an accurate representation of the agricultural waste streams, current practices and attitudes across Great Britain.

The next step is to consider the practical implications of the survey results. This section of the report summarises the key findings about:

- the agricultural sector;
- agricultural waste;
- the level of change in practices needed to meet the requirements of controlled waste legislation;
- the constraints and opportunities for achieving beneficial change (i.e. change that not only ensures legal compliance but also brings environmental, economic and social benefits).

6.2 The agricultural sector

The survey has highlighted certain characteristics of the agricultural sector that need to be fully considered when planning regulatory regimes and strategies for sustainable waste management in the United Kingdom. In particular:

- There is a significant and growing number of very small agricultural holdings with limited farming activity (often occupied by retired farmers or people with other full-time jobs). This reflects the structural changes taking place in the industry. For future agricultural waste strategies, it is important to keep this in mind since it affects the distribution, range and quantities of wastes, and the practicality of potential management options. The survey results show that small holdings are more likely to dispose of some agricultural wastes via household waste collection routes. This is not surprising given that the quantities are often small relative to the household waste streams. Moreover, many very small holdings are little different from residential properties.

- Often there is a mixture of enterprises (e.g. arable and livestock farming) being undertaken on one agricultural holding. Thus, as the survey results reveal, an agricultural holding that is classified as 'arable' under the classification system operated by Defra and the Devolved Administrations may also generate waste from livestock farming (and vice versa). This reflects the design of the classification system, which has been developed primarily as a system for considering productivity (see Section 2.1). In the context of this report, this means that the holding type classification alone has limited use in predicting the range of waste arising from it.
- There is increasing use of agricultural contractors for land and livestock management activities (e.g. crop spraying, silage baling and sheep dipping). The survey results show that, at present, agricultural contractors quite often take responsibility for wastes such as empty agrochemical packs and plastic cores from silage wrap. However, the delineation of responsibility is vague, and contractors may be reluctant to take the responsibility in the future unless there is widespread agreement and clarity on legal responsibilities and cost recovery.
- The supply chains already play an important role in waste reduction by improving product and packaging design, and by providing advice to farmers. There is clearly potential for increasing their role in waste management, for example by providing take-back services where this proves to be the most cost-effective option.
- Farm assurance and organic schemes are becoming increasingly important in the agricultural sector. The survey results show that these schemes currently have only a limited influence on waste management practices (possibly because of their fragmented nature). However, since their requirements are linked to the marketability and value of agricultural products, these schemes could be important drivers for waste reduction and recovery in the future.
- Many farmers feel a strong sense of duty as part of their role in the rural community. This is demonstrated by the finding that of the 41% of survey respondents who have changed their practices in recent years, 49% stated a primary reason to be "a sense of duty" – a much higher percentage than those who cited farm assurance schemes (25%), legal requirements (22%), or pressure to reduce costs (14%).

6.3 Agricultural waste streams

The survey has confirmed the range of agricultural waste streams reported in earlier studies (Environment Agency 1998a; 2001a). It was not designed to produce quantitative estimates of waste arisings since the existing 'Agricultural Waste Estimate Model' (described in Box 6.1) serves this purpose. Moreover, this is generally not practical at present at the farm level.

Box 6.1 The 'Agricultural Waste Estimate Model'

The 'Agricultural Waste Estimate Model' was first developed under contract to the Environment Agency in 1998 (Environment Agency, 1998a; 1998b) and later improved under a project funded by Biffaward and the Environment Agency (Environment Agency, 2001a). It is based on wide consultation and literature review, and comprises calculation methodologies for 41 agricultural waste arisings and organic by-products (see Table 6.1). Each of these methodologies has been established using Microsoft Excel and derives a 'unit waste estimate' for a specific waste stream. This value links the quantity of a specific waste or by-product generated each year to a single agricultural unit (e.g. the quantity of agrochemical packaging per hectare, or the quantity of manure per livestock head). To generate estimates for specific areas, such as regions or counties, the unit waste estimates are then linked to the June Agricultural Census data (compiled by Defra and the Devolved Administrations).

However, in line with the overall aim, the survey has increased our knowledge considerably by identifying the extent to which the various waste streams arise and the way they are managed on agricultural holdings throughout Great Britain. This includes the quantities of the main wastes that are being stored with no plans for disposal.

Particularly important findings are that:

- a significant range of waste streams arises on all types and sizes of agricultural holdings – more than 75% of the holdings surveyed generate scrap metal, batteries, oils, tyres, agrochemical packs, fertiliser bags, animal health product packaging, used syringes/needles, bale twine, net wrap and general building waste;
- waste plastics form a major proportion of the total waste stream – over 90% of holdings generate waste plastic packaging, and over 80% generate one or more of silage plastics, net wrap or bale twine;

- a range of hazardous wastes arises, including waste oils on 86% of all holdings, used syringes and needles (on 78% of holdings), unused animal medicines (28%) and asbestos cement roof sheeting (31%);
- long-term storage of scrap metal, machinery, batteries, tyres and asbestos roof sheeting (with no plans for disposal) is relatively common. Over 70% of the holdings surveyed are storing one or more waste stream, and the total quantity of the main wastes stored is estimated to be in the order of 780,000 tonnes in Great Britain.
- some waste streams are not as common as expected, particularly waste agrochemical concentrate, which was identified as a waste arising on only 14% of all agricultural holdings, and stored on 6%. The latter equates to approximately 12,000 holdings in Great Britain. The main reason is that farmers are typically acting on guidance given by agronomists and other advisers, thus making considerable efforts to minimise wastage and therefore costs. This has implications for the proposed 'National Pesticide Retrieval Scheme' (NPRS) (Crop Protection Association, 2001); however, it is important to bear in mind that the survey is a snapshot and that there will undoubtedly be more agrochemical waste in the near future as a result of revocations under the EU Review Programme and from changes in the agrochemical industry.

Table 6.1 National and UK estimates of agricultural waste arisings (derived from the 'Agricultural Waste Estimate Model') – 1998 (tonnes/year)

Type	Accuracy	England	Wales	Scotland	Northern Ireland	UK total
Packaging						
Plastic						
Agrochemical packaging	Medium	1,720	30	276	374	2,400
Fertiliser bags	Medium	8,748	984	1,654	815	12,200
Seed bags	Medium	840	15	134	12	1,000
Animal feed bags	Medium	6,419	1,283	2,019	1,680	11,400
Animal health packaging	Medium	444	105	124	76	750
Oil containers	Low	501	47	84	38	669
Miscellaneous packaging	Medium	2,063	331	1,166	240	3,800
Total plastic packaging		20,734	2,794	5,457	3,235	32,219
Cardboard and Paper						
Agrochemical packaging	Medium	1,146	20	184	249	1,600
Animal health packaging	Medium	148	35	41	25	250
Animal feed bags	Medium	3,378	675	1,063	884	6,000
Seed bags	Medium	1,511	26	240	22	1,800
Silage wrap boxes	Medium	156	75	73	31	335
Total paper and card packaging		6,340	832	1,601	1,212	9,985
Metal, Wood, Glass and Rubber						
Animal health metal and rubber (incl. sheep dip containers)	Medium	5.9	1.4	1.7	1.0	10
Animal health glass	Medium	444	105	124	76	750
Oil drums	Low	873	81	147	66	1,166
Wooden pallets	Low	16	2.1	4.2	2.7	25
Total metal, wood, glass and rubber		1,339	190	277	145	1,951
Total Packaging		**28,413**	**3,817**	**7,335**	**4,592**	**44,156**
Non-Packaging Plastics						
Films						
Silage plastic	Medium	12,425	5,016	5,029	2,530	25,000
Silage plastic + contamination	Low	24,851	10,032	10,058	5,060	50,000
Greenhouse and tunnel film	Medium	468	10	12	11	500
Mulch film and crop cover	Medium	3,738	30	657	76	4,500
Mulch film and crop cover + contamination	Low	18,689	148	3,283	380	22,500
Total Films		16,631	5,055	5,698	2,616	30,000
Total Films + Contamination		44,008	10,189	13,353	5,450	73,000
Other Non-Packaging Plastics						
Cores for silage wrap	Medium	703	339	327	138	1,506
Other horticultural plastics	Low	5,617	114	143	127	6,000
Bale twine and net wrap	Medium	7,934	821	1,683	662	11,100
Tree guards	Medium	6,694	532	4,492	182	11,900
Total Non-Packaging Plastics		37,579	6,860	12,341	3,726	60,506
Total Non-Packaging Plastics (including contamination)		64,956	11,994	19,997	6,559	103,506
Non-Packaging Cardboard						
Cores for silage sheet	Low	542	122	146	118	929
Animal Health Products						
Sheep dip	Low	56,537	23,598	27,959	8,360	116,454
Used syringes	Low	31	5	5	5	46
Machinery Waste						
Oils	Low	20,272	1,893	3,406	1,524	27,095
Batteries	Low	2,228	222	362	see Note [2]	2,812
Tyres	Low	20,680	1,981	3,312	see Note [2]	25,974
Redundant vehicles and machinery	Low	18,573	1,637	3,102	see Note [2]	23,312
Building Waste						
Asbestos cement roof sheeting	Low	18,243	2,925	10,312	2,122	33,602

1 This does not include estimates for several known waste arisings, such as general building waste and unused pesticides and medicines, because of a lack of reliable data.

2 Estimates of machinery waste not available for Northern Ireland.

6.4 Level of change in practices needed

Overall, the survey results highlight that considerable change is needed to meet controlled waste legislation and achieve greater sustainability in the sector. Of the agricultural holdings surveyed, 90% are disposing of at least one waste stream using one or more practices that are likely to be illegal following extension of controlled waste legislation to agriculture. These include:

- burning – 83% of all respondents reported open burning of at least one waste stream, 15% use drum incinerators, and 5% use some other form of incinerator;
- disposal using farm tips and/or burial elsewhere on the holding – reported by 32% of all respondents;
- inclusion in the household dustbin – 77% of all respondents reported use of the dustbin for the disposal of at least one waste stream (and common wastes entering this route include medicine and aerosol containers, and other packaging).

As expected, the survey has confirmed that there are currently no widespread systems for agricultural waste collection and recovery, and generally the most practical and convenient methods available locally are being used (typically with no or limited direct cost). Thus most farmers and other landowners are using a combination of methods depending on the nature of the waste stream, the services available, and their level of awareness.

However, the survey results highlight that practices are beginning to change – some suppliers are providing a waste take-back service (particularly vets and machinery specialists), and farmers and other landowners are generally aware of the importance of waste management. Particularly important findings are that:

- the take-back of waste by some suppliers is occurring even though it is not yet widespread; for example, vets are taking back some waste from 43% of all holdings;
- 41% of respondents have changed their waste management practices in some way in recent years (48% of these citing the transfer of more waste to others such as suppliers and waste contractors, 32% taking more steps to reduce waste, 22% stopping open burning, and 22% increasing the re-use of waste);
- 74% of all respondents stated that they are transferring scrap metal and machinery to waste contractors.

6.5 Opportunities and constraints

One of the major benefits of this survey is that it has highlighted the practical realities of waste management on agricultural holdings. A closer look at these in the context of the planned legal changes reveals several factors that could drive or inhibit progress.

On the positive side, the survey results show that:

- most farmers and other landowners generally regard waste management as an important business issue (91% of all respondents stated that they consider waste management to be 'fairly' or 'very' important to their business);
- many are keen to improve their waste management practices (often because they feel a strong sense of duty);
- the level of support for waste collection schemes is high – 92% of respondents stated that they would participate in a waste collection scheme for plastics, and 87% indicated that they would be willing to improve their storage practices to make a scheme more cost-effective;
- some suppliers are already offering take-back services for wastes (particularly vets and machinery specialists), as discussed above.

This suggests that practical and cost-effective opportunities would be readily taken up by most farmers and other landowners.

However, based on the survey results and the general discussions with respondents, there are clearly several potential constraints that need to be addressed. These include:

- the limited availability of cost-effective services for the collection and recovery of waste plastics (e.g. silage plastics and packaging);
- inconsistency in provision of the take-back services by suppliers;
- a lack of formal mechanisms to communicate information on best practices to and from farmers and other landowners;
- general lack of awareness of the implications of waste regulations, and confusion regarding the applicability of the controlled waste legislation to very small agricultural holdings (e.g. retired farmers or people with other full-time jobs who have retained the holding registration but with limited or no farming activity);
- wide anecdotal evidence of a perception in the industry that any new legislation will be a major cost burden.

7

Recommendations

The data and knowledge gained from this survey have provided a clearer picture of the action needed. The Agricultural Waste Stakeholders' Forum (AWSF) and the Devolved Administrations may find it useful to consider the survey results alongside the findings of other relevant research studies and use the information to help develop strategies for agricultural waste prior to the implementation of the controlled waste regulations.

Attention should be directed to the opportunities and constraints highlighted in Section 6.5 and particularly to the following recommendations:

1 *Consideration should be given to how best to ensure appropriate management of the small quantities of waste arising on the many and growing number of holdings where limited agricultural activity occurs.*

The survey has highlighted the large and growing number of very small registered agricultural holdings with limited agricultural activity (often occupied by retired farmers or people with other full-time jobs). There is currently a grey line between those holdings that could be viewed as 'working farms' and those that are more like residential households. Clarity is needed to ensure appropriate management of the waste arising on these holdings.

2 *Discussions should be held with the national organisations representing key suppliers and service providers in order to agree plans to make 'take-back' of waste as widespread and cost-effective as possible.*

The survey findings support the importance of the supply chain in waste management. They confirm that take-back of waste by certain suppliers such as vets and machinery specialists is occurring to some extent but it is inconsistent and not widespread.

This has been reviewed in more detail in a recent report entitled *Options for Agricultural Waste Collection* (Marcus Hodges Environment *et al.*, 2003), and the survey results support the conclusion that take-back of waste by suppliers has an important role to play in a strategy for agricultural waste (where feasible and cost-effective).

3 *Careful consideration should be given to the steps needed to develop an effective recovery scheme for waste plastics.*

The survey results support the already widely held view that a robust UK/national scheme for the recovery of waste plastics is needed. They show that waste plastics form a major proportion of the total agricultural waste stream, and that farmers are strongly in favour of a scheme. A total of 92% of survey respondents stated that they would participate in a recovery scheme for waste plastics, and many expressed strong opinions that a scheme is essential.

This supports the conclusions of a recent report on Options for Agricultural Waste Collection (Marcus Hodges Environment *et al.*, 2003), and an earlier review report (Environment Agency, 2001a). Steps should therefore be taken to facilitate the development of an effective recovery scheme for waste plastics (including other waste materials if and where feasible).

4 *To limit future costs for farmers, and minimise the impact on the environment, action is recommended to stimulate the collection and recovery of stored wastes prior to the implementation of the controlled waste legislation.*

The survey results highlight that at least one waste stream is being stored (with no plans for disposal) on approximately 70% of agricultural holdings. This is especially common for scrap metal, machinery, batteries, tyres and asbestos roof sheeting, and the total quantity of these wastes on GB holdings is estimated to be some 780,000 tonnes. Anecdotal evidence suggests this is due to both a lack of a convenient low-cost option for disposal and the commonly held view that the materials might have some use or value in the future.

Action should be taken to raise awareness and stimulate action on this issue (targeted at farmers/landowners and waste management contractors).

5 *Careful consideration should be given to the most cost-effective measures to reduce the risks associated with unused and revoked agrochemicals.*

The survey found that waste agrochemical concentrates are stored on only 6% of all holdings surveyed, which is less common than expected. Anecdotal evidence suggests that improvements in agrochemical management are being driven by financial pressures, advice from agronomists, and farm assurance schemes. However, the quantities of waste agrochemicals could increase in the near future as a large number of agrochemicals are being revoked under the EU Review Programme and as a result of changes in the agrochemical industry (a matter of which 35% of the survey respondents are aware).

The Crop Protection Association has a commitment under the 'Voluntary Initiative' (Crop Protection Association, 2001) to organise and implement a scheme for collecting unused agrochemicals – the 'National Pesticide Retrieval Scheme' (NPRS) – similar to a scheme run in the early 1990s. This should be reviewed in light of the survey results.

6 *A comprehensive communication strategy for agricultural waste management is recommended (to raise the awareness of farmers/landowners and encourage the uptake and development of best practices).*

The survey findings indicate that to date there has been only limited transfer of information and advice to farmers and other landowners on waste management issues. As a result, there is often confusion about the services available, legal requirements and best practices. It is also clear from the survey that most farmers and other landowners generally regard waste management as an important business issue (91% of all respondents stated that they consider waste management to be 'fairly' or 'very' important), and many are keen to improve their waste management practices.

There is therefore a unique opportunity to develop a positive communication campaign. To be most effective, this should be developed and implementation commenced prior to the introduction of the controlled waste regulations in order to bring clarity and avoid frustration and scepticism within the industry.

Particular consideration should be given to existing advice and information channels (e.g. via suppliers and agronomists), development of farm assurance scheme standards, and the potential for grants to facilitate improvements in waste storage facilities on agricultural holdings (where best practice guidance is particularly needed).

7 *A comprehensive monitoring and information system should be developed to help track and drive progress.*

As set out in the objectives, this survey has benchmarked the current situation with regard to agricultural waste management, and it has built considerably on the data and information provided by earlier research studies.

Action is now needed to ensure that reliable, up-to-date information is readily available to all key stakeholders to help track progress and target resources.

This is the subject of another report entitled *Improving Data on Agricultural Waste and Resources* (Environment Agency, 2002a). The report sets out a plan for improving access to practical, reliable data on agricultural waste and resource management. This is based on development of a user-friendly information system that builds on the Agricultural Waste Survey and the existing Agricultural Waste Estimate Model (discussed in Section 6.3), and utilises data from a variety of sources (including government, the supply industry, and specific research where needed). On this matter, it is interesting to note that 91% of the survey respondents stated that they would be happy to participate in a follow-up survey. This may be useful in the future to determine the level of change since this first survey.

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Appendix A:

Survey questionnaire

Farm Waste Survey 2003 Questionnaire - STRICTLY CONFIDENTIAL

Category

Sample Unit Reference Number

Census Reference Number

Farm Size: (hectares)

To change acres into hectares multiply by 0.404

Date:

Farm Contact Person

Surveyor

Country

- England ☐
- Wales ☐
- Scotland ☐

About the Survey

New regulations due to be introduced in 2003/4 will mean that on-farm burning and burial of plastics, packaging and other similar materials will probably no longer be possible due to stringent controls. Like other businesses, farmers will need to transfer these wastes to registered waste contractors, and the cost of this could be significant. To tackle the problem, a range of organisations - including farming and input supply organisations, Government and Government agencies - are working together to develop practical solutions. But to do this successfully, they need to learn more from farmers' knowledge and experience. They particularly need to know what wastes arise and how they are currently dealt with. They also need estimates of the quantities of materials such as scrap tyres, metal and unwanted pesticides that are stored on farm since this will encourage the development of collection schemes before the regulations come into force.

A total of 360 farms across Great Britain are being visited as part of this survey. Your help is much appreciated. All information you provide will be handled in strict confidence; the results of the survey will be reported at the aggregate, national level and will not be linked to individual farms.

The visit should take 1 - 2 hours. To complete the survey, I'd appreciate both talking with you and walking around the areas of the farm where wastes are stored. If you approve, I'd also like to take a small number of photographs, but these will be focused on the waste materials and will avoid any recognisable features of the farm.

Note:

The survey is funded by Biffaward (with 10% contribution from Defra and the Crop Protection Association), and the Environment Agency. It is being carried out by a team including Marcus Hodges Environment, BDB Associates, the Westcountry Rivers Trust and Scottish Agricultural College.

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Section A - Waste Arisings and Management Practices

Q1. Can we discuss what waste materials you produce on your farm, and what you typically do with them? Read out list of waste materials

Note to surveyor: *Complete the table below through a combination of (1) discussion with the farmer and (2) observation during a walkover of relevant areas of the farm*

Waste material	Waste Management Practice Rank first, second and third options by inserting '1','2' and '3' Read out list once at beginning of question																	Quantities of Stored Wastes (with no plans for disposal within the next year) To be completed during farm walkover			
	Produced by the farm? (insert X)	Re-used on farm? (insert X)	Burnt on farm in the open	Burnt in drum incinerator	Burnt in other incinerator	Put when a 'Farm tip' or 'dump'	Burnt/disposed on the farm	Included with household rubbish	Taken or kept by vet	Taken or kept by machinery dealer or engineer	Taken by (registered) merchant	Taken by agricultural contractor	Collected by waste contractor	Taken by farmer to civic amenity site	Taken by farmer to other waste facility	Other	Stored (with no plans for disposal within the next year)	Estimate quantity in the most convenient terms (e.g. numerical estimate for tyres) Weight (tonnes)	Numeric	Volume	Don't know?
Tyres	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Batteries	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Oils	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Oil Containers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Vehicles or machinery	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Machinery/Vehicle parts	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐

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Waste material	Waste Management Practice Rank first, second and third options by inserting '1','2' and '3' Read out list once at beginning of question																	Quantities of Stored Wastes (with no plans for disposal within the next year) To be completed during farm walkover Estimate quantity in the most convenient terms (e.g. numerical estimate for tyres)			
	Produced by the farm? Insert X	Re-used on farm? Insert X	Burnt on farm on the open	Burnt in drum incinerator	Burnt in other incinerator	Put into a 'farm tip' or 'dump'	Burned elsewhere on the farm	Included with household rubbish	Taken or kept by vet	Taken or kept by machinery dealer or engineer	Taken by distributor/merchant	Taken by agricultural contractor	Collected by waste contractor	Taken by farmer to civic amenity site	Taken by farmer to other waste facility	Other	Stored (with no plans for disposal within the next year)	Weight (tonnes)	Numbers	Volume	Don't know
Silage sheet (for clamps)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Silage wrap (for bales)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Silage bags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Plastic cores for silage wrap	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Cardboard cores for silage sheet	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Bale twine and net wrap	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Plastic cores for bale twine or net wrap	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Cardboard cores for bale twine or net wrap	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Greenhouse or tunnel film	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Mulch or crop cover film	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Mushroom bags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐

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Waste material	Waste Management Practice Rank first, second and third options by inserting '1','2' and '3' Read out list once at beginning of question																	Quantities of Stored Wastes (with no plans for disposal within the next year) To be completed during farm walkover Estimate quantity in the most convenient terms (e.g. numerical estimate for tyres)			
	Produced by the farm? Insert X	Re-used on farm? Insert X	Burnt on farm on the open	Burnt in drum incinerator	Burnt in other incinerator	Put into a 'farm tip' or 'dump'	Burned elsewhere on the farm	Included with household rubbish	Taken or kept by vet	Taken or kept by machinery dealer or engineer	Taken by distributor/merchant	Taken by agricultural contractor	Collected by waste contractor	Taken by farmer to civic amenity site	Taken by farmer to other waste facility	Other	Stored (with no plans for disposal within the next year)	Weight (tonnes)	Numbers	Volume	Don't know
Seed bags and pots	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Empty plastic agrochemical packaging (rinsed)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Empty plastic agrochemical packaging (unrinsed)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Cardboard agrochemical packaging	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Waste agrochemical concentrate	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	COMPLETE Q9			☐
Plastic fertiliser bags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Paper fertiliser bags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Plastic seed bags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Paper seed bags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Plastic feed bags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐

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Waste material	Waste Management Practice Rank first, second and third options by inserting '1','2' and '3' Read out list once at beginning of question																	Quantities of Stored Wastes (with no plans for disposal within the next year) To be completed during farm walkover Estimate quantity in the most convenient terms (e.g. numerical estimate for tyres)			
	Produced by the farm? Insert X	Re-used on farm? Insert X	Burnt on farm in the open	Burnt in drum incinerator	Burnt in other incinerator	Put into a 'farm tip' or 'dump'	Buried elsewhere on the farm	Included with household rubbish	Taken or kept by vet	Taken or kept by machinery dealer or engineer	Taken by distributor/merchant	Taken by agricultural contractor	Collected by waste contractor	Taken by farmer to civic amenity site	Taken by farmer to other waste facility	Other	Stored (with no plans for disposal within the next year)	Weight (tonnes)	Numeric	Volume	Don't know
Paper feed bags	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Wooden pallets	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Shrink wrap	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Plastic sheep dip/ drench packaging	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Metal sheep dip/ drench packaging	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Waste sheep dip concentrate	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Waste sheep drench (pour on)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Dilute sheep dip	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Waste animal medicines	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Used syringes and needles	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐

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Waste material	Waste Management Practice Rank first, second and third options by inserting '1','2' and '3' Read out list once at beginning of question																	Quantities of Stored Wastes (with no plans for disposal within the next year) To be completed during farm walkover Estimate quantity in the most convenient terms (e.g. numerical estimate for tyres)			
	Produced by the farm? Insert X	Re-used on farm? Insert X	Burnt on farm in the open	Burnt in drum incinerator	Burnt in other incinerator	Put into a 'farm tip' or 'dump'	Buried elsewhere on the farm	Included with household rubbish	Taken or kept by vet	Taken or kept by machinery dealer or engineer	Taken by distributor/merchant	Taken by agricultural contractor	Collected by waste contractor	Taken by farmer to civic amenity site	Taken by farmer to other waste facility	Other	Stored (with no plans for disposal within the next year)	Weight (tonnes)	Numeric	Volume	Don't know
Animal health product containers (e.g. glass/ plastic bottles)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Animal health product outer packaging (e.g. cardboard, paper, or plastic/card blister packs)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Animal health aerosol products	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Other animal health products (e.g. swabs, dressings, etc.)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Miscellaneous packaging (e.g. cleaning fluid containers)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
General building waste (e.g. bricks, rubble etc.)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Asbestos cement/corrugated roof sheeting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐
Other asbestos (e.g. pipe-lagging)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐				☐

Waste Management Practice
Rank first, second and third options by inserting '1','2' and '3'
Read out list once at beginning of question

Quantities of Stored Wastes (with no plans for disposal within the next year)
To be completed during farm walkover

Estimate quantity in the most convenient terms (e.g. numerical estimate for tyres)

Waste material	Produced by the farm? Insert 'X'	Re-used on farm? Insert 'X'	Burnt on farm in the open	Burnt in drum incinerator	Burnt in other incinerator	Put in/on a 'farm tip' or 'dump'	Buried elsewhere on the farm	Included with household rubbish	Taken or kept by vet	Taken or kept by machinery dealer or engineer	Taken by distributor/merchant	Taken by agricultural contractor	Collected by waste contractor	Taken by farmer to civic amenity site	Taken by farmer to other waste facility	Other	Stored (with no plans for disposal within the next year)	Weight (tonnes)	Numbers	Volume	Don't know
Scrap metal (e.g. roof sheeting, gates)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Refrigeration equipment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Large scale electrical equipment (e.g. generators or transformers)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other waste Please specify ☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other waste Please specify ☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other waste Please specify ☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

IF 'OTHER' WASTE MANAGEMENT PRACTICES CODED AT Q1, PLEASE SPECIFY BELOW.

1 ☐
2 ☐
3 ☐

ASK Q2 AND Q3 BELOW IF BURIED OR TIPPED ON FARM WAS NOT CODED IN Q1.

IF BURIED OR TIPPED ON FARM WAS CODED IN Q1, THEN COMPLETE THE QUESTIONS YOURSELF AND CONTINUE TO Q4.

Q2. Is there a dedicated waste disposal site ('tip or 'dump') on the farm?

Yes	☐
No	☐
Don't know	☐

Q3. Is the farm tip/dump still in use?

Yes	☐
No	☐
Don't know	☐

IF THE ANSWER TO Q3 IS 'YES' BUT BURIED OR TIPPED ON FARM WAS NOT CODED DURING Q1, THEN RETURN TO Q1 AND COMPLETE FOR WASTES WHICH ARE CURRENTLY TIPPED.

Section B - Agrochemicals

To help with a proposed scheme for collecting unwanted agrochemicals (currently being organised under the 'Voluntary Initiative'), could I please ask you some questions on this subject. (Note: As proposed, there will be a charge for collection and disposal of agrochemicals under this scheme).

Q4 Do you have any unwanted agrochemicals?

Yes	☐
No	☐
Don't know	☐

If Yes to Q4 ask Q5. If no/don't know, go to Q6.

Q5. Are these agrochemicals unwanted because they are:...?

ALLOW MORE THAN ONE ANSWER

No longer needed	☐
Out-of-date (revoked/unapproved)	☐
Other (please specify)	☐

☐

Q6 Are you aware that approval to use and store a large number of agrochemicals is being revoked as a result of the EU Review Programme?

Yes	☐
No	☐
Don't know	☐

If 'Yes' to Q6, Ask Q7. If 'No', go to Q8.

Q7 Do you know which agrochemicals have been or are being revoked?

Good level of knowledge about this	☐
Limited knowledge about this	☐
No knowledge about this	☐
Don't know	☐

Q8 To help with the planning of the Pesticide Retrieval Scheme, would you mind being contacted again for further information (if necessary)?

Yes	☐
No	☐
Don't know	☐

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Q9. If 'Yes' to Q4, then complete table below during farm walkover with the farmer (see note).

Unwanted and/or out of date agrochemicals identified by the farmer (see note)	Product quantity Insert number of packs					
	1Litre	5Litres	10Litres	20Litres	>20-50Litres	>50Litres
Labelled chemicals						
Less than 2 years old						
2 -10 years old						
More than 10 years old*						
Age not known						
Chemicals with illegible labels (i.e. unidentified)						
Less than 2 years old						
2 -10 years old						
More than 10 years old						
Age not known						

*Names of labelled chemicals more than 10 years old (note manufacturer and brand name where possible):

Note: This table is based on unwanted/out-of-date agrochemicals identified by the farmer. It is not the Surveyor's responsibility to identify any revoked/out-of-date chemicals if not known by the farmer.

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Section C - Changes and Attitudes to Waste Management Practice

Q10. Have you made any changes to the way you handle your waste in recent years?

- Yes ☐
- No ☐

If yes to Q10, complete Q11 and Q12. If no, go to Q13.

Q11. In what ways have your practices changed?

ALLOW MORE THAN ONE ANSWER

- Taken steps to reduce waste ☐
- Stopped open-burning ☐
- Stopped burying on-farm ☐
- Increased re-use of waste ☐
- Improved storage arrangements ☐
- Transfer more wastes to others for recycling, recovery or disposal ☐
- Other (Specify) ☐

Q12. Why did you change?

ALLOW MORE THAN ONE ANSWER

- To reduce costs ☐
- To meet farm assurance scheme requirements ☐
- Because of legal requirements ☐
- Because of local community pressures ☐
- A sense of duty ☐
- A new waste collection/management service was provided ☐
- Other (Specify) ☐

Q13. How important do you consider waste management issues to be within the management of your farm?

READ OUT LIST

- Very important ☐
- Fairly important ☐
- Not important ☐
- Don't know ☐

Q14. Have you assessed the cost of your waste?

- Yes ☐
- No ☐

Q15. If a short term/one-off waste collection/recovery scheme was developed, for example for unwanted agrochemicals, scrap tyres and metal, would you use it (in principle)?

- Yes ☐
- No ☐
- Don't know ☐

Q16. In the longer-term, would you participate in a scheme (or schemes) for the collection and recovery of other materials like plastics and packaging if it was developed?

- Yes ☐
- No ☐
- Don't know ☐

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Q17. What would most influence your decision?

Read out list and rank '1', '2' and '3'

- Frequency of collection ☐
- Cost ☐
- Amount of paperwork involved ☐
- Regulatory pressure ☐
- Convenience ☐
- Farm assurance scheme pressure ☐
- Other (Specify) ☐

Q18. Would you change your waste storage arrangements to make collection and recovery easier and more cost-effective (e.g., cleaning and segregating waste; or storing it in a special container)

- Yes ☐
- No ☐
- Don't know ☐

Section D - General Questions

Q19. Are you a member of a farm assurance scheme?

- Yes ☐
- No ☐
- Don't know ☐

Q20. Bearing in mind how useful this survey will be for all farmers, would you be prepared to take part in a similar survey in the future?

- Yes ☐
- No ☐

If no at Q20, ask Q21. If yes, go to Q22

Q21. Would a small payment for your time change your mind?

- Yes ☐
- No ☐

Q22. Are there any other comments or suggestions you would like to make?

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Closing Comments

Thank you very much your time. The information you have provided will help in developing some practical solutions to the farm waste problem.

We will send you a copy of the final report when it is complete.

Surveyor's Notes (add any particularly useful information learnt from the farm visit and not covered in the main questionnaire):

Appendix B:

Confidence limits for data outputs

As would be expected, the accuracy of estimates obtained from a survey is largely dependent on the sample size. The larger the sample, the more accurate the estimates and the lower the associated confidence limits. In the majority of cases, the findings discussed in this report refer to percentage estimates (e.g. the percentage of holdings with asbestos waste). The confidence limits associated with these findings are shown in Table B1.

The findings presented in Section 4.5, which seek to provide weight estimates of quantities of wastes stored with no plans for disposal, relate to *measured* data (as opposed to percentage data). The confidence limits associated with this measured data are presented in Appendix C.

Table B1 Confidence limits associated with percentage estimates (95% confidence limits for different percentages and sample sizes)

Sample Size	Percentage				
	50% 50%	40% 60%	30% 70%	20% 80%	10% 90%
50	± 13.9%	± 13.6%	± 12.7%	± 11.1%	± 8.3%
60	± 12.7%	± 12.4%	± 11.6%	± 10.1%	± 7.6%
70	± 11.7%	± 11.5%	± 10.7%	± 9.4%	± 7.0%
80	± 11.0%	± 10.7%	± 10.0%	± 8.8%	± 6.6%
90	± 10.3%	± 10.1%	± 9.5%	± 8.3%	± 6.2%
100	± 9.8%	± 9.6%	± 9.0%	± 7.8%	± 5.9%
150	± 8.0%	± 7.8%	± 7.3%	± 6.4%	± 4.8%
200	± 6.9%	± 6.8%	± 6.4%	± 5.5%	± 4.2%
250	± 6.2%	± 6.1%	± 5.7%	± 5.0%	± 3.7%
300	± 5.7%	± 5.5%	± 5.2%	± 4.5%	± 3.4%
350	± 5.2%	± 5.1%	± 4.8%	± 4.2%	± 3.1%
400	± 4.9%	± 4.8%	± 4.5%	± 3.9%	± 2.9%
450	± 4.6%	± 4.5%	± 4.2%	± 3.7%	± 2.8%
500	± 4.4%	± 4.3%	± 4.0%	± 3.5%	± 2.6%
1,000	± 3.1%	± 3.0%	± 2.8%	± 2.5%	± 1.9%
2,000	± 2.2%	± 2.1%	± 2.0%	± 1.8%	± 1.3%

Appendix C:

Methodology for developing estimates of the quantities of wastes stored with no plans for disposal

One of the objectives of this survey was to estimate how much waste is currently being stored on agricultural holdings with no plans for disposal.

In order to do this, the following steps were taken:

1. During visits to agricultural holdings, the surveyors identified any waste that was being stored with no plans for disposal within the next year, and then estimated the quantity using a combination of visual observation and discussion with the farmer. Estimates were recorded by the surveyor in either weight, numeric or volumetric terms depending on the nature and quantity of the waste. For example, the quantity of tyres was normally recorded numerically while the quantity of general building waste was commonly recorded in volume (typically number of skip loads). Digital photographs were also taken for verification and recording purposes.
2. Data from all 380 completed questionnaires were processed and tabulated.
3. The mean weight for each waste type was calculated. Volumetric and numerical estimates were converted into weight estimates using appropriate conversion factors. These conversion factors are shown in Table C1 and are based on consultation with industry experts.
4. Estimates for the total quantity of stored wastes in Great Britain were obtained by multiplying the mean weight values by the total population of agricultural holdings in Great Britain (201,925, based on the most recent June Agricultural Census). The estimates are shown in Table C1.

Table C1 Estimates and associated confidence limits for quantities of wastes stored with no plans for disposal

Type	Sample size	Mean[1]	Standard deviation	Standard error interval	95% confidence (tonnes)[2]	Grossed estimates (tonnes)	Waste estimate ranges (tonnes per item)[3]	Numeric conversion factor (tonnes per skip)[4]	Volumetric conversion factor
Tyres	380	0.757	4.266	0.2188	0.429	153,000	66,000–239,000	0.0085	3
Batteries	380	0.012	0.031	0.0016	0.003	2,400	1,800–3,000	0.008	N/A
Asbestos roof sheeting	380	0.253	1.047	0.0537	0.105	51,000	30,000–72,000	0.05	3.5
Oil containers	380	0.002	0.012	0.0006	0.001	400	200–600	0.001	0.15
Scrap metal	380	1.093	2.785	0.1429	0.280	221,000	164,000–277,000	0.2	2.25
Vehicles and machinery	380	1.537	4.710	0.2416	0.474	310,000	215,000–406,000	1	3
Parts	380	0.224	0.960	0.0492	0.097	45,000	26,000–65,000	0.02	1.5
Total[4]	-	-	-	-	-	**782,000**	**503,000–1,063,000**	-	-

Notes:

1 Means have been calculated by dividing the total weight of each waste category (obtained from sampled holdings containing each waste category) by the entire sample of 380 holdings.

2 Grossed estimates (rounding applied) have been calculated by multiplying mean scores by the total population of holdings (201,925)

3 Factors used to convert the numeric and volumetric estimates of waste quantities into weight estimates.

4 The 'Total' quantity calculated represents the sum of estimated quantities of all wastes for which estimates were calculated.

Appendix D:

Tabulated data on the occurrence of waste streams

The table on the following pages shows the percentage of survey respondents who reported specific waste arisings.

This is presented for:

- Great Britain as a whole;
- England, Scotland and Wales;
- the different holding types – 'arable', 'mixed/other' and 'livestock';
- the different holding sizes – 'small', 'medium' and 'large'.
- Sample sizes are given in the table.

Waste stream	Total GB	Country			Farm Type			Farm Size		
		England	Scotland	Wales	Arable	Livestock	Mixed/Other	Small	Medium	Large
	Sample size									
	380	254	86	40	80	186	114	265	69	46
Tyres	85%	89%	69%	98%	93%	90%	71%	80%	94%	98%
Batteries	87%	91%	72%	93%	91%	91%	76%	82%	97%	96%
Oils	86%	90%	72%	93%	94%	89%	76%	82%	96%	100%
Oil containers85%	89%	72%	85%	96%	86%	75%	80%	96%	96%	
Vehicles or machinery	74%	78%	70%	65%	84%	76%	65%	70%	83%	87%
Machinery/vehicle parts	71%	77%	66%	48%	84%	70%	65%	67%	77%	89%
Silage sheet (for clamps)	27%	25%	24%	45%	21%	36%	17%	17%	45%	59%
Silage wrap (for bales)	58%	57%	52%	70%	35%	73%	49%	57%	65%	52%
Silage bags	9%	10%	3%	18%	6%	11%	9%	9%	12%	4%
Plastic cores for silage sheet	44%	45%	37%	48%	34%	54%	33%	41%	57%	39%
Cardboard cores for silage sheet	28%	30%	23%	23%	19%	33%	25%	24%	35%	39%
Bale twine and net wrap	84%	83%	86%	90%	71%	94%	79%	85%	90%	76%
Plastic cores for bale twine and net wrap	33%	37%	29%	18%	36%	34%	30%	33%	30%	41%
Cardboard cores for bale twine or net wrap	34%	35%	33%	28%	35%	38%	27%	29%	48%	41%
Greenhouse or tunnel film	6%	7%	1%	3%	4%	2%	12%	6%	3%	4%
Mulch or crop cover film	5%	7%	2%	3%	8%	1%	11%	6%	7%	-
Mushroom bags	1%	-	-	3%	-	1%	1%	-	-	2%
Seed trays and pots	10%	12%	8%	3%	6%	5%	22%	13%	4%	2%
Empty plastic agrochemical packaging (rinsed)	71%	72%	64%	83%	93%	68%	61%	63%	88%	93%
Empty plastic agrochemical packaging (unrinsed)	7%	9%	2%	3%	6%	8%	6%	6%	6%	13%
Cardboard agrochemical packaging	64%	68%	49%	75%	88%	61%	54%	55%	83%	91%
Waste agrochemical concentrate	14%	13%	19%	13%	19%	17%	8%	11%	20%	24%

Waste stream	Total GB	Country			Farm Type			Farm Size		
		England	Scotland	Wales	Arable	Livestock	Mixed/Other	Small	Medium	Large
	Sample size									
	380	254	86	40	80	186	114	265	69	46
Plastic fertiliser bags	79%	80%	79%	80%	96%	75%	75%	75%	93%	83%
Paper fertiliser bags	4%	4%	3%	3%	4%	4%	4%	3%	10%	-
Plastic seed bags	34%	38%	31%	18%	71%	22%	28%	26%	46%	63%
Paper seed bags	36%	38%	29%	40%	44%	34%	33%	30%	51%	48%
Plastic feed bags	64%	61%	72%	70%	35%	81%	57%	68%	52%	59%
Paper feed bags	35%	33%	42%	33%	23%	39%	37%	38%	30%	20%
Wooden pallets	75%	74%	77%	78%	84%	75%	70%	72%	81%	85%
Shrink wrap	33%	34%	37%	15%	38%	30%	33%	26%	41%	59%
Plastic sheep dip/drench packaging	31%	23%	45	50%	16%	39%	27%	34%	29%	15%
Metal sheep dip/drench packaging	8%	6%	13%	10%	6%	11%	5%	8%	7%	9%
Waste sheep dip concentrate	6%	4%	15%	3%	6%	4%	9%	6%	4%	9%
Waste sheep drench (pour-on)	6%	3%	13%	8%	5%	7%	4%	6%	9%	-
Dilute sheep dip	16%	13%	24%	15%	9%	19%	15%	14%	16%	22%
Waste animal medicines	28%	28%	28%	28%	25%	37%	17%	29%	29%	24%
Used syringes and needles	78%	75%	77%	95%	51%	96%	66%	78%	80%	72%
Animal health product containers (e.g. glass/plastic bottles)	77%	73%	80%	93%	53%	92%	68%	77%	81%	67%
Animal health product outer packing (e.g. cardboard, paper, or plastic/card blister packs)	75%	73%	74%	90%	54%	90%	65%	74%	80%	72%
Animal health aerosol products	72%	69%	79%	78%	46%	87%	65%	72%	72%	67%
Other animal health products (e.g. swabs, dressings, etc.)	50%	56%	37%	38%	39%	59%	44%	48%	55%	57%
Miscellaneous packaging (e.g. cleaning fluid containers)	74%	77%	62%	83%	71%	82	63%	72%	83%	76%
General building waste	80%	84%	64%	88%	91%	79%	73%	77%	86%	89%

Waste stream	Total GB	Country			Farm Type			Farm Size		
		England	Scotland	Wales	Arable	Livestock	Mixed/Other	Small	Medium	Large
	Sample size									
	380	254	86	40	80	186	114	265	69	46
Asbestos cement-bonded roof sheeting	31%	35%	27%	15%	45%	25%	30%	29%	36%	33%
Other asbestos (e.g. pipe-lagging)	3%	4%	1%	-	5%	3%	1%	3%	4%	2%
Scrap metal (e.g. roof sheeting, gates)	93%	95%	85%	100%	93%	96%	89%	92%	97%	96%
Refrigeration equipment	17%	19%	8%	20%	16%	20%	12%	15%	19%	22%
Large-scale electrical equipment (e.g. generators or transformers)	10%	10%	10%	5%	16%	9%	7%	8%	10%	17%
Other waste	9%	8%	15%	-	8%	9%	9%	8%	9%	13%
Groups of waste streams										
All types of packaging	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Plastic packaging	97%	98%	95%	100%	100%	97%	96%	97%	99%	98%
Cardboard and paper packaging	84%	87%	73%	93%	98%	81%	81%	79%	93%	100%
Other packaging	99%	100%	98%	100%	99%	100%	98%	99%	100%	100%
Silage plastics, bale twine, net wrap, etc.	88%	85%	90%	98%	71%	98%	82%	88%	91%	80%
Horticultural plastics	13%	16%	8%	8%	13%	6%	25%	16%	10%	4%
Sheep dip wastes (incl. packaging, concentrate, drench and dilute dip)	21%	16%	33%	23%	15%	24%	19%	18%	26%	24%
Other animal health wastes (medicines, syringes, etc.)	81%	78%	86%	95%	54%	98%	73%	83%	83%	72%
Building waste	82%	86%	67%	88%	94%	81%	75%	78%	90%	91%

Appendix E:

Tabulated data on current practices for all waste streams

The table on the following pages shows the percentage of GB survey respondents who reported specific waste management practices.

For each waste type, the percentage figures represent the proportion of the holdings producing the waste that use a particular waste management practice. These figures include the practices which were ranked '1', '2' and '3' on the questionnaire and are thus different to those presented in the pie-charts in Section 5, which illustrated the primary or most common practice (rank '1') for each waste type.

The table also presents sample sizes.

Waste stream	Sample size	Citing of re-use	Waste management practices														
			Burnt in the open	Burnt in drum incinerator	Burnt in other incinerator	Put in/on a 'farm tip' or 'dump'	Buried elsewhere on the farm	Included in household duspin	Taken or kept by vet	Taken by supplier	Taken by agricultural contractor	Collected by waste contractor	Taken to civic amenity site	Taken to other waste facility	Other	Stored (no plans for disposal in next year)	Don't know/ not specified
Tyres	323	34%	13%	0%	0%	1%	1%	<1%	0%	46%	1%	1%	3%	2%	2%	33%	15%
Batteries	329	8%	1%	<1%	0%	2%	1%	1%	0%	20%	1%	19%	15%	20%	1%	29%	3%
Oils	328	46%	23%	2%	0%	1%	3%	0%	0%	15%	0%	11%	5%	4%	5%	12%	27%
Oil containers	323	39%	19%	3%	0%	5%	2%	4%	0%	14%	<1%	11%	7%	5%	2%	20%	20%
Vehicles or machinery	283	12%	1%	0%	0%	2%	1%	0%	0%	27%	<1%	37%	2%	21%	0%	37%	4%
Machinery/ vehicle parts	271	12%	2%	0%	0%	3%	1%	5%	0%	12%	1%	41%	4%	29%	<1%	24%	5%
Silage sheet (for clamps)	103	11%	69%	4%	1%	7%	5%	6%	0%	0%	0%	7%	1%	4%	1%	9%	3%
Silage wrap (for bales)	219	1%	60%	7%	1%	5%	5%	13%	0%	0%	1%	10%	4%	3%	1%	9%	1%
Silage bags	35	3%	37%	6%	0%	3%	6%	3%	0%	0%	0%	14%	3%	3%	0%	6%	26%
Plastic cores for silage sheet	166	12%	39%	7%	1%	2%	1%	5%	0%	2%	27%	3%	0%	1%	1%	8%	8%
Cardboard cores for silage sheet	105	1%	68%	3%	2%	2%	0%	3%	0%	2%	13%	1%	1%	0%	3%	0%	6%
Bale twine and net wrap	321	23%	65%	7%	2%	2%	2%	16%	0%	<1%	1%	3%	3%	2%	2%	2%	4%
Plastic cores for bale twine and net wrap	127	2%	37%	5%	1%	2%	1%	6%	0%	1%	44%	2%	1%	2%	0%	0%	6%
Cardboard cores for bale twine or net wrap	129	1%	50%	8%	0%	1%	0%	4%	1%	1%	33%	1%	2%	1%	2%	1%	2%
Greenhouse or tunnel film	21	2%	33%	5%	0%	0%	0%	5%	0%	0%	14%	24%	5%	10%	5%	10%	0%
Mulch or crop cover film	20	2%	40%	5%	5%	0%	0%	5%	0%	0%	5%	15%	5%	10%	0%	5%	10%
Mushroom bags	2	<1%	50%	0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%
Seed trays and pots	39	6%	18%	5%	0%	0%	3%	23%	0%	5%	0%	13%	5%	5%	5%	8%	18%
Empty plastic agrochemical packaging (rinsed)	270	7%	49%	15%	1%	1%	1%	10%	0%	2%	18%	4%	2%	2%	0%	5%	3%
Empty plastic agrochemical packaging (unrinsed)	26	1%	27%	4%	0%	8%	0%	8%	0%	4%	35%	4%	0%	0%	0%	0%	19%
Cardboard agrochemical packaging	245	1%	59%	16%	2%	<1%	0%	9%	0%	0%	15%	4%	1%	1%	1%	1%	<1%

Waste stream	Sample size	Citing of re-use	Waste management practices														
			Burnt in the open	Burnt in drum incinerator	Burnt in other incinerator	Put in/on a 'farm tip' or 'dump'	Buried elsewhere on the farm	Included in household duspin	Taken or kept by vet	Taken by supplier	Taken by agricultural contractor	Collected by waste contractor	Taken to civic amenity site	Taken to other waste facility	Other	Stored (no plans for disposal in next year)	Don't know/ not specified
Waste agrochemical concentrate	55	1%	4%	0%	0%	2%	2%	0%	0%	11%	24%	7%	0%	0%	5%	44%	9%
Plastic fertiliser bags	302	23%	61%	8%	1%	1%	2%	6%	0%	<1%	5%	4%	3%	3%	3%	5%	7%
Paper fertiliser bags	14	1%	57%	14%	0%	7%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	21%
Plastic seed bags	130	17%	61%	14%	2%	0%	0%	5%	0%	1%	5%	1%	1%	2%	2%	3%	10%
Paper seed bags	137	7%	79%	8%	1%	1%	1%	6%	0%	0%	2%	1%	0%	1%	1%	0%	4%
Plastic feed bags	244	43%	53%	5%	1%	2%	1%	14%	0%	1%	0%	2%	4%	3%	11%	6%	11%
Paper feed bags	132	11%	70%	4%	1%	2%	0%	17%	0%	1%	0%	3%	2%	2%	4%	3%	4%
Wooden pallets	286	52%	35%	1%	2%	0%	0%	0%	124%	19%	<1%	<1%	<1%	<1%	23%	9%	24%
Shrink wrap	124	1%	69%	11%	2%	0%	0%	13%	0%	2%	1%	4%	2%	1%	1%	0%	1%
Plastic sheep dip/drench packaging	117	1%	32%	5%	0%	3%	1%	26%	0%	0%	26%	3%	3%	2%	2%	5%	1%
Metal sheep dip/drench packaging	31	<1%	3%	0%	0%	6%	16%	10%	0%	3%	23%	6%	6%	13%	3%	13%	3%
Waste sheep dip concentrate	23	0%	0%	0%	0%	4%	0%	0%	0%	0%	78%	0%	0%	0%	9%	4%	4%
Waste sheep drench (pour-on)	21	<1%	14%	5%	0%	5%	14%	24%	59%	5%	14%	5%	5%	10%	0%	10%	0%
Dilute sheep dip	59	0%	0%	0%	0%	3%	2%	0%	0%	0%	37%	0%	0%	0%	56%	2%	2%

Waste stream	Sample size	Citing of re-use	Waste management practices														
			Burnt in the open	Burnt in drum incinerator	Burnt in other incinerator	Put in/on a 'farm tip' or 'dump'	Buried elsewhere on the farm	Included in household duspin	Taken or kept by vet	Taken by supplier	Taken by agricultural contractor	Collected by waste contractor	Taken to civic amenity site	Taken to other waste facility	Other	Stored (no plans for disposal in next year)	Don't know/ not specified
Waste animal medicines	107	1%	7%	0%	0%	3%	5%	27%	50%	0%	1%	1%	0%	3%	3%	12%	2%
Used syringes and needles	295	9%	7%	2%	1%	2%	3%	28%	48%	<1%	1%	2%	1%	2%	1%	11%	3%
Animal health product containers	291	2%	16%	3%	1%	2%	4%	61	20%	<1%	1%	1%	5%	3%	<1%	5%	1%
Animal health product outer packing	285	1%	49%	6%	2%	1%	<1%	41%	7%	0%	1%	1%	1%	1%	2%	1%	1%
Animal health aerosol containers	273	1%	4%	<1%	<1%	3%	4%	78%	4%	<1%	0%	2%	3%	3%	0%	3%	1%
Other animal health products (e.g. swabs, dressings, etc.)	190	<1%	48%	5%	3%	2%	1%	30%	15%	0%	1%	2%	1%	0%	3%	2%	1%
Miscellaneous packaging	282	8%	44%	9%	2%	3%	1%	43%	<1%	0%	<1%	4%	3%	2%	<1%	3%	4%
General building waste	303	74%	1%	<1%	0%	5%	2%	0%	0%	0%	0%	4%	3%	1%	1%	10%	75%
Asbestos cement-bonded roof sheeting	117	5%	0%	0%	0%	5%	16%	0%	0%	0%	0%	19%	4%	3%	3%	45%	11%
Other asbestos (e.g. pipe-lagging)	11	1%	0%	0%	0%	0%	27%	0%	0%	0%	0%	18%	0%	0%	0%	27%	27%
Scrap metal (e.g. roof sheeting, gates)	354	17%	0%	0%	0%	4%	4%	0%	0%	8%	1%	36%	5%	33%	0%	30%	5%
Refrigeration equipment	64	3%	2%	0%	0%	0%	0%	0%	0%	9%	2%	16%	20%	11%	2%	34%	13%
Large-scale electrical equipment (e.g. transformers)	37	1%	3%	0%	0%	0%	0%	0%	0%	5%	0%	32%	3%	24%	0%	35%	3%
Other waste	33	2%	33%	3%	0%	3%	3%	12%	0%	0%	0%	15%	6%	3%	18%	24%	6%

CONTACTS:

THE ENVIRONMENT AGENCY HEAD OFFICE

Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS32 4UD.
Tel: 01454 624 400 Fax: 01454 624 409

www.environment-agency.gov.uk
www.environment-agency.wales.gov.uk

ENVIRONMENT AGENCY REGIONAL OFFICES

ANGLIAN
Kingfisher House
Goldhay Way
Orton Goldhay
Peterborough PE2 5ZR
Tel: 01733 371 811
Fax: 01733 231 840

MIDLANDS
Sapphire East
550 Streetsbrook Road
Solihull B91 1QT
Tel: 0121 711 2324
Fax: 0121 711 5824

NORTH EAST
Rivers House
21 Park Square South
Leeds LS1 2QG
Tel: 0113 244 0191
Fax: 0113 246 1889

NORTH WEST
PO Box 12
Richard Fairclough House
Knutsford Road
Warrington WA4 1HG
Tel: 01925 653 999
Fax: 01925 415 961

SOUTHERN
Guildbourne House
Chatsworth Road
Worthing
West Sussex BN11 1LD
Tel: 01903 832 000
Fax: 01903 821 832

SOUTH WEST
Manley House
Kestrel Way
Exeter EX2 7LQ
Tel: 01392 444 000
Fax: 01392 444 238

THAMES
Kings Meadow House
Kings Meadow Road
Reading RG1 8DQ
Tel: 0118 953 5000
Fax: 0118 950 0388

WALES
Cambria House
29 Newport Road
Cardiff CF24 0TP
Tel: 029 2077 0088
Fax: 029 2079 8555

ENVIRONMENT AGENCY GENERAL ENQUIRY LINE
0845 9 333 111

ENVIRONMENT AGENCY FLOODLINE
0845 988 1188

ENVIRONMENT AGENCY EMERGENCY HOTLINE
0800 80 70 60

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