The Waste Management (England and Wales)
Regulations 2005: Implications upon farms within
the East Anglian Region

By

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Abstract

Due to a range of factors the varied UK agricultural industry is undergoing rapid change, accompanied by constant economic pressures (Defra, 2001b). The agricultural industry has been presented with yet more regulation and legislation, accompanied by constant steps to make agriculture more environmentally sustainable (Evans et al., 2003). One of the most recent additions are the long awaited regulations on agricultural waste in England and Wales (ENDS, 2004). With the industry being so unstable, the concerns of farmers are forever heightening, and with the introduction of new regulations, such as the waste management regulations, these concerns, even with limited knowledge, are amplified even more.

This study surveyed 40 randomly selected farmers within the East Anglian region, collating information on farmers present waste management procedures, the farmers’ awareness of the regulations, there concerns about the waste management regulations and the perceived implication of the regulations. This data was analysed to determine common concerns and implications of which governmental bodies could need to take into consideration. Awareness of the waste management regulations was high (97%), higher than in previous studies by the Environment Agency. Understanding of the waste regulations was again higher than in previous studies, but still 80% only believed they new ‘A little’ or ‘Not much’. Farmers concerns about the regulations were high, with 50% of the farmers’ surveyed being ‘very’ concerned. Their concerns were of the perceived implication of cost, with 90% of farmers naming this as a main implication of the waste regulations.

To ensure the implementation of the waste regulations is successful, it was concluded that farmers need available options to ensure costs are not too high (producer responsibility take back systems are discussed). The introduction of these regulations could have benefits for the industry, as long as farmers themselves adopt a forward looking approach to waste management, ideally in the context of a wider environmental management system.
Chapter (1) - Introduction

The effect of continued intensification and specialisation of farming on the environment, through destruction of habitats and the use of harmful pesticides, was the catalyst for approaches which attempted to integrate environmental legislation into agricultural policy (Cobb, 1993). Within today's agricultural industry there is a greater amount of regulation and steps are constantly taken to make agriculture more environmentally sustainable (Evans et al., 2003). Some have argued that, as the developed nations become more technologically advanced, it is technology which can further intensify farming and hence cause further threat to the environment, but technology could also aid in the protection and enhancement of the environment and push sustainability to the forefront of the farming industry (Policy Commission on the Future of Farming and Food, 2002).

The Curry Report concluded that the agricultural industry should aim to work with a high environmental performance, and be proud of it (Policy Commission on the Future of Farming and Food, 2002). Support from farmers has been seen in the take-up voluntary many agri-environmental schemes, plus there has been support for research into farming systems which could improve environmental performance (Lewis and Tzilivakis, 1998). The Common Agricultural Policy developed in 1958, has undergone many changes of direction, but the last decade has seen the most rapid and potentially most radical policy shifts (Welford, 1994). As a result, farmers have been, and are, subject to a plethora of legislations and regulatory initiatives. It is in this context that this study researched the concerns and perceived implications of one of these changes - new waste regulations.

The proposed agricultural waste regulations, to bring the industry in line with the EU Waste Framework Directive are one of these legislative changes (Farming Online, 2004). Agricultural waste has not been regulated by the Waste Framework Directive since it was implemented, and farmers have been allowed to dispose of waste upon their farms. Examples of disposal can include burning, farm dumps or incineration (Environment Agency, 2003). The introduction of the waste management regulations have been estimated to cost the farming industry nearly £60 million pounds (Defra, 2004d), and there
are many concerns as to what the implications of the regulations will have upon the financially fragile farming industry. This study investigates these perceived implications and farmers concerns.
Chapter (2) – Agricultural and UK Waste

2(i) - UK Waste

Agricultural waste consists of organic matter such as manure, slurry, silage effluent and crop residues (Williams, 2005), but also includes non-natural waste such as packaging, films and animal treatment dips (Pellaumail, 2001). It can also include wastes such as lead-acid batteries, scrap metals, scrap machinery and general building waste. Agricultural waste has been, up to the present day, excluded from waste management controls in England and Wales, by virtue of section 75(7)(c) of the Environmental Protection Act 1990 (Defra, 2004c). The effect of this section is to exclude from the scope of controlled waste, "waste from premises used for agriculture within the meaning of the Agriculture Act 1947". However, the EU community have been putting pressure on the UK to bring agricultural waste under regulation. This has resulted in the introduction of the Waste Management (England and Wales) Regulations 2005.

Within Europe waste levels generated continue to rise year upon year, with waste arisings being estimated to be 3000 million tonnes/year (European Environment Agency, 2003). The main areas of waste production within the United Kingdom are industry, demolition, mining/quarrying and agriculture (Williams, 2005). The European Commission Waste Framework Directive (Waste Framework Directive 75/442/EEC 1975), a central directive for waste management, classifies waste as “any substance or object which the holder discards or intends to discard”. Where the ‘holder’ is classified as “the producer of the waste or that person who is in possession of it” and the ‘producer’ is classified as “any person whose activities produce waste, or any person who carries out pre-processing, mixing or other operations resulting in a change in the nature or composition of this waste.” (Waste Framework Directive, 1975).

Waste management poses an ever increasing dilemma for government, local councils, business and industry, with the UK producing enough waste in an hour to fill the Albert Hall (Biffa, 2005). The main strategy on waste management has developed in line with the
waste hierarchy, developed to encourage waste reduction, re-use and recovery, with disposal of waste being shown to be the least desirable option (Williams, 2005). Waste producers are encouraged to aim as high up the hierarchy as possible, but in many situations this can be deemed uneconomical, inefficient or directly impossible due to lack of technology or possible options. An example is the waste management of plastic wrap from agriculture where, although technology has been tried and tested for the recycling and reuse, companies have shown it to be uneconomical, and hence there is no available option within the industry.

2(ii) - Agricultural waste and the need for regulation

There have been limited available data on agricultural waste – due mainly to the exclusion of agricultural waste from the definition of controlled waste (and therefore from regulatory control). The Agricultural Waste Survey 2003 conducted by the Environment Agency (EA) is a study of the management of the non-natural waste streams of farms. The report highlights many potentially environmentally harmful disposal techniques of farm waste, including burial, disposing within farm dumps and burning. Examples include 46% of agrochemical packaging and 61% of plastic fertilizer bags are burnt, and 69% of asbestos panelling is stored or buried (Environment Agency, 2003).

The report supports concerns over the lack of regulation of agricultural waste and the absence of waste management controls has been highlighted as a contravention of the Waste Framework Directive and the Landfill Directive (1999/31/EC). The government therefore have prepared the Waste Management Regulations 2005 to ensure that the environment and human health are properly protected (Defra, 2004c). As an additional factor, agriculture contributed 7.5% of greenhouse gases within Europe in 1990 (Defra, 2002c). Farm practises such as burying biodegradable waste can result in high levels of methane (a very potent greenhouse gas) being released. The government, in its reply to the Curry Report, explained that farmers need to take responsibility for their contributions to climate change (Defra, 2002c).
2(iii) - Waste Management (England and Wales) Regulations 2005

The new waste regulations take effect after a consultation period which ended July 2005, and will be finalised within 2005 (Defra, 2004c). The affect that this will have on the agricultural industry will partly depend on the speed of compliance and ability to comply. The rate of compliance depends on the awareness of farmers to the new regulations. The EA carried out a review in 2004 of the awareness of farmers to the new regulations, summarising that approximately 64% of farmers were aware of new regulations. However only 17% of farmers interviewed were aware that they were waste regulations, with 19% believing they understood the new waste regulations (Environment Agency, 2004). Stillwell (2004) studied the awareness of farmers to environmental regulations showing that farmers’ awareness of recent legislation and regulatory controls on pesticides was high with 94% of farmers interviewed showing awareness. However, one could argue that the data set for this investigation was small and concentrated in one area of the UK.

The CAP has been widely criticized for the creation of conditions which encourage environmentally damaging farming practises. Market regimes and government policies offer a scale of support through prices and product specific payments that may discourage farmers from more environmentally friendly production methods (Commission of the European Communities, 2002). However, with the latest CAP reforms and the introduction of the Single Farm Payment scheme, as previously mentioned farmers will be encouraged to act with the environment in mind, not discouraged. (Pretty et al., 2001) stated that one of the most promising options for discouraging negative externalities of agriculture was institutional and participatory mechanisms and that costs should be paid internally and not by the tax payer. The introduction of new waste management regulations aims to initiate a polluter pays program, providing better protection of the environment and human health (Defra, 2002c), and encouraging farmers to develop a more forward approach to management. However, the introduction of these regulations could have negative impacts on farm businesses, adding to the already complex farming situation and hence would contradict the main aim of CAP. The recent introduction of single farm payment schemes aims to simplify CAP, to give farmers greater freedom to farm to the
demands of the markets and at the same time better acknowledge and reward environmentally friendly farming practises (Defra, 2004b), the waste management regulations could jeopardise this freedom.

The introduction of the new waste management regulations into agriculture could bring unwanted implications to both farms and the government. Farmers will have to manage waste generated on the farm correctly, for example having waste removed by a licensed waste contractor, which could lead to increased costs. (Chapple et al., 2004) concluded that reducing waste and waste management leads to increased costs, a concern for all industries, especially one such as agriculture were the industrial crisis is becoming more and more evident (Walford, 2002). Within England and Wales a quarter of the 180,000 registered holdings have had problems with fly tipping upon their land, something which has caused increased costs for the land owner to dispose of the waste legally (Defra, 2001a). However, with the introduction of the waste management regulations farmers could choose to dump their waste illegally to avoid the possible costs of disposing of the waste legally, or due to ignorance and lack of care for the environment and human safety (Defra, 2005).

2(iv) - Agriculture policy change and the reaction of farmers.

Agriculture is experiencing an uncertain period and is constantly changing. With the latest CAP reforms agriculture, from livestock to pesticide intensive cropping operations, is under considerable pressure to improve its environmental performance (Castelnuovo, 1999). These times of change have highlighted the lack of clear policies and also delivery mechanisms across the EU (Evans et al., 2003).

The Common Agricultural Policy (CAP) was introduced in 1958, the main aim being to provide farmers with a reasonable standard of living and consumers with quality food at fair prices (Europa, 2004). The CAP has undergone many reforms since it was introduced, enhancing the policy to achieve its aims in a changing industry, economy and society. The
mid term review of the CAP, highlighted that there remained considerable hope for further improvement for agriculture to be in ‘harmony’ with the environment (Commission of the European Communities, 2002). However, the review also stated that there was a range of mechanisms within the common market organisation which continued to create many complex obligations for farmers and that complexity is a brake on initiative. New waste regulations could add to the complex list of regulations and policies, something that does not seem to have been investigated in any literature.

The Farming and Food Report completed by the Policy Commission on the Future of Farming and Food, chaired by Sir Donald Curry CBE (The Curry Report) reviewed the current farming situation in 2002 and what the members thought lay in the future. The report stated that farming needs to ‘reconnect with environment’ and that in doing so there are many ‘opportunities for farmers’. It also however, warns that the directives due to come into force over the next decade, including waste, mean substantial costs for farms. This is not to say that the government should look to financially support farmers in times of new regulations, ‘the government must seek to facilitate change- not to fund stagnation’ (P.18, Policy Commission on the Future of Farming and Food, 2002). However, the implementation of regulation has to be consistent and sensitive to the fact that many farmers are small businesses and the report suggest that the government should initiate a regulatory impact assessment based on cost-benefit analysis covering impacts on farms (Policy Commission on the Future of Farming and Food, 2002). As with many industries public policy has been used to ensure environmental protection within agriculture, through increased regulation (Castelnuovo, 1999). Walford (2002) concluded that there is a clear reaction against the compulsive action within policy changes, as this approach hinders adaptive behaviour, eventually subverting policies aims and the promotion of agricultural production in the longer term.

The latest reforms have seen the introduction of the Single Farm Payment Scheme, which will replace ten major CAP subsidy schemes, giving the farmers greater freedom to farm to the demands of the market, with good environmental practises being better acknowledged and rewarded (Defra, 2004b). To receive full payments farmers must cross comply with a
series of standards. Cross compliances will ensure farms are environmental aware and to ensure both human and animal welfare upon farms (Environment Agency, 2005a). Farms will be visited by assessors to ensure compliance. The standards include:

Good Agricultural and Environmental Condition (GAEC) - this involves the management of environmental parameters on farms. Including soil protection, management of hedgerows, management of set aside and the conservation of heritage features such as stone walls.

Statutory Management Requirements (SMR) – this involves compliance with several articles of EU Directives and regulations covering environmental protection, human health and animal and plant welfare.

Compliance with the new waste management regulations does not form part of the cross compliance scheme. However, certain waste disposal practises, such as disposal of sheep dip, must be done in accordance with Groundwater Authorisation Directives, which form part of the SMR.

The latest CAP reform have also introduced the Entry Level Scheme (ELS), and agri-environmental scheme, financially rewarding farmers for managing their farm environments correctly to enhance flora and fauna habitats. It is fair to say that many farmers show willingness to comply when offered money to care for the land (Walford, 2002), more so than volunteering. However, it is safe to assume that now; more farmers are involved in countryside management than ever before (Morris and Potter, 1995), working alongside conservation groups. Farmers have had to make changes to farming strategy, taking land out of production and hence decreasing total possible income from farming, to conserve Environmentally Sensitive Areas (ESA’s). When participating in voluntary Agri-Environmental Policy (AEP) farmers tend to do so in a way that causes minimal disruption to their conventional farming practises (Walford, 2002). It is obviously of no benefit to farmers if they have to take out more land from production for conservation, when it will decrease their financial income.
Agri-environmental schemes can also have benefits for the farmer, such as set aside policies, resulting in many farmers using set aside as a management tool to support agricultural production (Walford, 2002). With the introduction of agri-environment schemes and new policies there are many consultation groups offering advice and education for farmers. But as Evans et al. (2003) highlighted, DEFRA groups did not meet frequently and hence progress of new policies and schemes was slow, surely a disadvantage to both farmers and the environment.

2(v) - Environmental Management Systems within the farming industry

An Environmental Management System (EMS) is defined as a transparent, systematic process, with the purpose of assigning and implementing environmental goals, policies and responsibilities, alongside regular auditing of the systems in place (Steger, 2000). Newbold et al. (1997) observed how irregular it is that agriculture has been left out of environmental management standards, being so closely involved with the environment. Irregular also due to the fact that such standards could aid agriculture significantly. However, EMS’s that have been placed within the industry have seen little commitment, perhaps because the industry has not seen the possible benefits, and only the costs, especially time (Newbold et al., 1997).

Industries within the UK and across the developed world are continuing to strive for sustainability, and the agriculture industry is of no exception. Many agricultural firms are now considering sustainable practices and management of its environmental impacts to gain a competitive advantage (Wall et al., 2001). The farm assurance schemes discussed earlier are aiding agriculture to control its environmental impacts; however, the schemes attempts at offering environmental management initiatives have caused little improvement in the agriculture sectors environmental performance (ENDS, 2002). The government is also attempting to increase environmental performance within agriculture through the introduction of the new waste regulations. With the example of legislation, unlike voluntary schemes, the penalty for not complying could be very expensive and an
inversion of business progression.

EMS’s placed within industry can result in many positive changes (Boiral and Sala, 1998), benefits besides reduced impacts on the environment. For example with a register of relevant legislation, a common product of an EMS, a business could increase the likelihood of compliance with legislation/regulation and reduce the number of environmental infractions, avoiding the likelihood of prosecution. The adherence to regulations can also improve farms public relations, reducing regulation pressure from the government upon individual farms and the whole industry (Wall et al., 2001). The increase in conformance to regulations could also reduce possible risk liability giving reductions in insurance costs.

An EMS can be a structure for continued improvement in environmental performance of a farm (Castelnuovo, 1999), however it can also give benefits which hold a greater financial and business appeal. An EMS within a business can encourage the production process to be evaluated, sometimes highlighting opportunities for cost saving, for example in resource use and waste issues (Wall et al., 2001). With the constant increase in environmental awareness of consumers, an EMS certification scheme, such as ISO 14001, would be an internationally recognised scheme able to be placed upon farms products. With increasing interest from supermarket chains, certification could give a farm a competitive advantage within the market (Newbold et al., 1997).

EMS’s within industry also have there costs, and if these out weigh the benefits then very few agricultural firms will introduce them into their farms (Wall et al., 2001). There are many costs with implementing an EMS, for example in conducting an Initial Environmental Review, changes to be made to a business to meet the requirements of an EMS and finally the cost of certification, and auditing (Wall et al., 2001).
2(vi) - Assurance schemes

The lack of current waste management regulations has not resulted in an industry which is not encouraged to manage its waste. The need for agriculture to adopt environmental management, including waste management, has become more apparent over the last few decades (Newbold et al., 1997). The recognition of which, has been supported by the evolution of farm assurance schemes. Farm assurance schemes are a voluntary system which ensures producers and consumers that food is being produced in a satisfactory way according to all relevant legislation and regulation, covering animal welfare issues, food safety, environmental protection and any other characteristics deemed important by the consumer (Co-op, 2005).

2(vi)(a) - LEAF - Linking Environment and Farming

LEAF has been described as being instrumental in the developing and demonstrating farming practises which are both environmentally friendly and financially viable (Newbold et al., 1997). LEAF began in 1991 and was based on a scheme in Germany which had been running since 1986 (LEAF UK, 2005). The scheme was introduced to narrow the gap between producer and consumer and to enable farming to move towards a more sustainable approach.

The scheme relies upon self assessment through a LEAF audit, aimed to help the farmer record, evaluate and improve a range of his/her farming practises in accordance with integrated farm management standards (Husband, 2003). The scheme encourages a whole farm approach, allowing farmers to set targets for a range of practises including certain aspects of waste management, encouraging farmers to dispose of waste correctly so as not to damage the environment.

LEAF has been highly praised by governments, farming groups and environmentalists for its efforts and achievements. However, weaknesses have also been highlighted including
the lack of a feedback mechanism for farmers in order to highlight future improvements which could be made (Newbold et al., 1997).

2(vi)(b) - Environment Agency - EMSF

The EA has developed a system aimed to promote sustainable farming through Environmental Management Systems for Farms (EMSF). The EMSF has been introduced because the EA believes that environment performance of farms within England and Wales needs to be improved (Tzilivakis, 2005). Integrated Farm Management (IFM) is a whole farm system providing efficient and profitable production in an environmentally responsible way (UK Agriculture, 2005). The EMSF system concentrates primarily on regulatory requirement instead of overall IFM, and relies on farmers to complete electronic questionnaires on farm practices to decrease the possible need of farm inspections. However, Husband (2003) discusses the inability of the systems to decrease the need for inspection, and hence the schemes ability to encourage environmental management must be questioned.

2(vi)(c) - EurepGAP

Since 1997, the Euro-Retailer Produce Working Group (Eurep) has been developing a scheme which encourages a partnership between agricultural producers and their retail customers to ensure the global certification standard of good agricultural practice (GAP) (FoodPLUS, 2005). EurepGAP encompasses traceability, crop protection, waste, pollution, worker welfare and environmental issues (EurepGAP, 2003). The EurepGAP system entails checklists for producers and retailers in many different sectors, and through self completion and verification, certification is given. Environmental issues are included in their checklists, including specifically waste management, recycling and pollution control, alongside other environment issues such as wildlife and conservation. However, EurepGAP has been criticised in the past due to its lack of coverage of environmental
issues. (REF)

2(vi)(d) - British Standard for Farm Assurance (BFS)

Assured Farm Standards (AFS) was set up in 2000 to accompany the launch of the Little Red Tractor Logo. The AFS are an independent organisations set up to manage the Little Red Tractor mark (Assured Farm Scheme, 2005). The mark was put in place so consumers could recognise produce which came from farms which meet independently inspected standards (NFU, 2003). Within the early release of the mark it covered food safety, but has expanded to include nine individual schemes certified to use the BFS mark, inspecting welfare of animals, working conditions, and some environmental issues, such as pollution control/prevention within the production of fresh fruit, vegetables, salads, meat, poultry and dairy produce (Co-op, 2005). Like other schemes discussed, the Little Red Tractor mark has been criticised in the past, due to the lack of environmental concern within the guidelines. Relating to waste management, one question asking whether the farm had a waste management plan was all that was present in the checklist.

The introduction of farm assured schemes was no doubt a positive addition to the agricultural industry, allowing good agricultural practice to be recognised and shown to the consumer, with benefits to the farms, workers, animals and environment. However, there is a severe lack of coherent or coordinated approaches, allowing the farmer to observe an overall picture of environmental impacts, including waste management.

2(vii) - Outline of objectives and aims

The main aim of this study is to investigate the implications of the new waste regulations on farms within East Anglia. This aim was met firstly by investigating how aware farmers are of the new waste regulations, and the level of knowledge they have on the regulations. Secondly how ready farms are to apply changes and what these changes will be to ensure
compliance to the regulations when they come in sometime this year. Finally, the concerns of farmers and the possible implications of the waste management regulations were investigated.

The methods used to investigate these questions are explained in Chapter 6, followed by the results found and a discussion on the forecasted implications of the regulations, and the needs of the agricultural industry to enable a smooth introduction of these new waste management regulations.
Chapter 3 - Methodology

3(i) - Strategy

The main aims of this study were to investigate the implications of the Waste Management (England and Wales) Regulations upon farms and also to investigate the awareness of farms to the regulations. To achieve these aims a certain set of procedures were used. Firstly, a literature review was conducted investigating types of waste generated by farms, farmer’s awareness to new regulations, policy change within the agricultural industry and farmers reaction to these changes, and finally the current situation within the agricultural industry, and pressures faced by farms. A questionnaire was then developed questioning on farm size and present procedures, farms present waste streams and management methods of waste, farms awareness to the new waste management regulations and finally their concerns and believed implications of the new waste management regulations.

The questionnaire was used as structure for interviews with 40 farmers within the East Anglia area. Farms were selected partly at random and partly through local knowledge of the farming area. The East Anglian region is a highly productive, but varied, agricultural area, based on its geology, climate, rainfall and topography. For example, the region has low fenland areas, with its black highly fertile soils, to the free draining sandy soils of Breckland, both of which contrast to the much heavier clay soils of areas of Norfolk and Suffolk. The East Anglian region has sandstone in the east, chalk and limestone in the central areas and clays in the north-west (Defra, 2002a). The area has the lowest rainfall within the country, on average 600mm per annum, giving regular drought periods, during long growing season, counteracted with irrigation using water from aquifers found within the limestone, sandstone or clay bedrock (Defra, 2002a).

Due to time constraints farms were eventually selected within the counties of Norfolk and Suffolk only. Efforts were made to ensure no bias was shown towards a particular sector of agriculture, farm size or present procedures. Agricultural sectors included arable, dairy, beef, pigs, sheep and poultry. Many farms interviewed fell into the category of mixed
farming, including both arable farming and a form of livestock farming.

3(ii) - Interviews

Interviews were conducted face to face with farm managers/directors at a time of their convenience. The interviews were semi-structured, meaning that a set of open and close questions were asked controlling the flow of the interview, but the interview could still be reasonably flexible, giving the possibility for more in-depth information (Denscombe, 1998). The information extracted from the interviews was recorded using field notes. Notes were made during the interviews and improved directly after the interview to ensure maximum detail was recorded.

There were both advantages and disadvantages in conducting interviews as a research method. With completing an interview more detailed and rich data could be obtained, which could immediately be validated by the respondent (Denscombe, 1998). A face to face interview allowed complex questions to be asked and the list of responses to be long and complex themselves (Oishi, 2003). However, this method proved to be very time consuming resulting in only a small data set being collected, 40 farms, and therefore the information obtained within the interviews cannot be classed as a true representation of the agricultural industry. Questionnaires only offer a snapshot of information on opinions, procedures and trends that can easily change or fluctuated through different times of the year and states of industry.

3(iii) - Questionnaires

The questionnaire has three main sections giving a total of 27 questions, extracting various information from the interviewee. The questions were phrased carefully so as not to offend or to influence answers. Certain questions were phrased to encourage discussion and others were simple open/close questions, for example questions with yes or no
answers. A full copy of the questionnaire used in this survey can be found in Annex 1.

The first section asked questions on the farm's size, activities, types of waste produced and its present procedures for waste management. These general questions are important to encourage a smooth start and to ease the interviewee. The questions also gave valuable information on farm alterations, farming influences and environmental awareness.

The second section asked questions on the farm's awareness of the new agricultural waste management regulations. What level of knowledge they believe they have and where they gained this knowledge. The questions allow understanding of the level of communication within the agricultural industry, highlighting any possible problems.

The third and final section investigated concerns, perceived implications and also farmers views on related issues such as cross compliance. This section provided much important information on the new waste regulations and farmer opinions. It was invaluable when discussing the affects of new regulations to have obtained the thoughts of those who will be most affected.
Chapter 4 - Results and Discussion

The interviews enabled a range of results to be collected, covering different topics as discussed within Chapter 3 - Methodology. The following chapter contains a comprehensive analysis and discussion of the results. The results discussed originate entirely from responses given to the questionnaires during interviews. All results and discussion are completely confidential and no individual farm, or their answers, are identifiable within the results or discussion.

In total, 40 individual farms were interviewed during the investigation. The analysis of results and discussion aims to show the variation of farms interviewed, sizes and strategies. The similarities and the differences of waste generation management, the awareness of farms to the new waste management regulations and the concerns and believed implications highlighted are all examined. The results collected showed significant differences between farms, as well as significant similarities, depending on the question asked. Overall, the spread of results was relatively narrow, with similarities in waste disposal, awareness of regulations, concerns and implications. Variations occurred with farm sizes, current strategies and future management options.

4(i) - Farms and current strategies

The areas farmed by the different agricultural businesses showed a range of sizes. The smallest area was a 6.5 hectare farm, with indoor pigs, with the largest area being a 2630 hectare all arable operation. The remainder of farmed areas ranged evenly within these extremes, giving a good representation of a range of farm sizes. The proportion of land farmed which was either owned, rented, contract farmed or share farmed, varied between farms also.

The majority (74% or 29) of the farmers interviewed owned more than fifty percent of the land they farmed. Tenant farmers who rent all the land they farm represented
approximately 9% of the sample. The remaining 17% owned varying levels of land, but all with less than fifty percent of the total they farm. Land which was not owned was either rented, shared farmed or contract farmed, levels of which varied. A large percentage of farms (73%), farm the area of land owned themselves, with a minority (27%) renting areas of land to tenants, at various levels ranging from 20 - 570 hectares. Farm sizes and land agreements had significantly changed, over the last five years, for a significant minority (19%) of the farmers interviewed. Some of the reasons for these changes included receiving land back from tenants, or losing land for road building.

A small majority of the farmers interviewed (54%) had any livestock. Of those that did, 30% had a dairy herd, 40% had a beef herd and 30% farmed pigs. No farms interviewed farmed either sheep or poultry. Nearly half (45% or 18) of the farms interviewed were mixed, with both arable and livestock operations, but only 9% of farms were completely livestock orientated. These levels had significantly changed for 38% of farms, ranging from, on the one hand herds having doubled in size to whole herds which had been sold. One farmer in Mid-Norfolk had recently sold off a pig herd of approximately 5000 pigs, his reasons being “a growing financial loss over recent years”.

The results show an extensive range of farm sizes with varying farm situations and different farm practices. This gave the opportunity to see how the new waste regulations affected different farm types and sizes.

4(ii) - Environmental Awareness

Stillwell, (2004) concluded that overall farmers were environmental aware, and with a mix of voluntary and subsidy incentives farmers followed pollution control and good agricultural practice with a positive attitude. The results gathered from this study show that 48% of farms interviewed were involved within agri-environmental schemes. Environmental Sensitive Areas (ESA) are voluntary, area based, schemes which were taken up by 15% of the farmers within the survey; these schemes aimed to maintain
traditional farming practices, which can involve, for example taking areas out of production to allow for the safe breeding of rare animals and birds such as the Stone Curlew (Defra, 2002b). An arable farmer in the South west of Norfolk not only enjoyed the slight financial award from the ESA on his 166 hectare farm, but was “proud to be working alongside conservation groups and aiding the conservation for a rare species, such as the Stone Curlew”. The Countryside Stewardship Scheme (CSS) (a more generic agri-environmental scheme) has been adopted by sex farmers only from this group; this scheme has financial rewards, but requires higher levels of management of the environment by farmers.

With the latest CAP reforms (see Chapter 2) farms have the option to sign up for the potentially financial rewarding Entry Level Scheme (ELS). Of the farmers interviewed 32% had signed up for the ELS, with another 30% looking to do so in the future. However, the remaining 38% did not see it as a benefit to the farm, due to lack of land, or economic inability to take land out of production. A farmer with north Suffolk stated that “after taking land out for CSS, it has shown we can not take out any extra for ELS, so we will not bother”. The results support Soderquists (2003) conclusion that farmers are willing to care for the environment, not only for financial gain, but also to protect and enhance habitats and wildlife, but due to economic pressures they can only usually afford to if the financial reward for their work is large enough, and if the menu and provisions of the agri-environmental scheme fit into their current strategy.

4(iii) - Farm Waste Management

With the extension of waste regulations into the agricultural industry, it was important to consider the waste streams and current management methods within farming, in order to predict and understand the regulations’ impacts. Farmers were asked to indicate their present waste streams from a list of possible wastes. Figure 1 shows the frequency of certain waste streams produced on farms. This indicates that metals, tyres and plastic chemical containers were the most common, while plastic crop cover and silage plastics
were the least common waste streams arising on the surveyed farms. These results support the findings of the EA’s Agricultural waste survey 2003 (Environment Agency, 2003) which reported that waste streams vary due to different farming methods and sizes. More than 75% of the farms they surveyed had scrap metal, batteries, oils, tyres, agrochemical packs, fertilizer bags, animal health product packaging, livestock health products, silage wrap, bale twine, net wrap and building waste (Environment Agency, 2003).

As the EA survey suggested, differences in waste arisings between arable and livestock farms were indeed apparent in the survey. Livestock farms produced, in the main, animal health products and containers, manure and slurry, fallen stock and silage plastics. Arable farms on the other hand, produced waste crop cover, chemical containers and chemicals, plus they had higher levels of oils, tyres and batteries. However, as already discussed the sample comprised (48%) mixed farms; these farms generated a greater number of waste streams, than specialist arable or livestock farming. Other waste streams highlighted from this current survey included hazardous wastes, such as aerosols and fluorescent light tubes.

![Figure 1 - A graph to show the frequency of waste streams upon farms.](image-url)

Waste streams such as organic matter (for example waste vegetable matter, collected soil)
were not included in the study, as these waste streams were outside the new waste management regulations, the preferred management approach for these could be composting.

The new waste management regulations will have an impact certain methods of waste management, including open burning, incineration, burying or tipping and storage of waste (Defra, 2004c). Surveyed farms were shown to currently use at least one or more of these waste management options (see Figure 2). The results show that 100% of the farms interviewed said they used open burning to dispose of waste, with 73% (or 29) incinerating certain types of waste. Farmers had been advised to stop tipping and burying of waste within farm dumps immediately, so as to be complying with the regulations when they are finalised and introduced (Defra, 2004c). Only 35% of farms interviewed said they buried or tipped waste, many preferring to use waste contractors (53%) or re-use waste on the farm (68%) (for example using waste metal for repairs and tyres for weighing down the cover sheets on silage piles).

![Figure 2 – A graph to show disposal methods on surveyed farms.](image-url)
One current option for farmers with the new waste regulations is to store waste, in an environmentally safe way, for 12 months, if it is to be disposed of (Defra, 2004c). The study showed that 75% of farms surveyed did store waste on the farm. This waste was then disposed of, re-used or taken back by the supplier, if there was an appropriate system in place. Waste was taken back by suppliers for 35% of the surveyed farmers. Examples of take back systems include tyres which are taken by tyre fitters, at a small charge, animal health products are taken back by the veterinary companies or the vets themselves. Some chemical companies also take back plastic containers. One example used by many farmers was TEMIC. However this chemical is no longer allowed to be used in agriculture.

In practice, therefore, the potential impacts of the new waste regulations would appear to be significant, with many farmers across the survey having to reconsider their current waste management options and strategies. How aware they are of the perspective impacts resulting from the implementation of the regulations is therefore viewed important. This is considered in the next section.

4(iv) – Awareness of regulations

Farmers’ awareness of environmental issues in general has been shown to be reasonably high (Stillwell, 2004). Despite this, farmers’ awareness of the new waste regulations specifically was low: only 17% were aware of the new waste regulations in February 2004 (Environment Agency, 2004). In June 2005, 97% of the farmers interviewed in the current survey were aware of the waste regulations being introduced. The level of knowledge of the new waste regulations varied from ‘A lot’ to ‘None’. The majority of the farmers interviewed either believed they new ‘A little’ (47%) or ‘Not much’ (33%). Only, 13% (or 5) of farmers interviewed believed they knew ‘A Lot’ about the regulations with 4% believing they knew nothing at all. There has been an increase, therefore, in the awareness of the waste regulations over the last year, when compared with the EA’s report. However the depth of this knowledge is still a concern since the EA’s report stated similarly that, at
one time, 71% of farmers interviewed knew either ‘A little’ or ‘Not much’ (Environment Agency, 2004).

To investigate this worrying slow growth in awareness, the sources of information available to farmers, and more importantly, which they used were examined. With general farming advice, farmers showed a preference towards gaining information from private consultants (80%), such as agronomists, over other options such as Defra (37%) and the NFU (35%), with other knowledge from farming press, chemical companies, market groups and in house experience. Other studies such as that by Ford and Babb (1989) support these findings, concluding that consultants, advisors and word of mouth through the industry were the most important forms of media.

Information sources specifically for details on the waste management regulations ranged from popular media such as TV and radio, to Defra’s consultation paper on the waste management regulations. The most common information source was highlighted by 68% of farmers interviewed who said they had received and read the consultation paper from Defra, followed by farming press, (journals and magazines) (55% or 22). The consultation paper “can prove very helpful, however, a lot of farmers dispose of them before reading what they say” (Mid-Norfolk Beef Farmer). Again these findings supported the EA reports conclusions, which showed 55% of farmers saying farming press was their initial source of information (Environment Agency, 2004). Other sources mentioned by the survey of farmers were the NFU, word of mouth, Health and Safety Executive, various committees and food assurance schemes.

The farmers who believed to know ‘A lot’ about the new waste regulations used a much greater range of information sources, than those who knew ‘Not much’ or ‘None’. These farmers showed a greater awareness, possibly due to higher levels of investigation, using many sources of information for farming advice and waste issues. These farmers were also more active within the industry, for example being members of agricultural committees or groups. Others were members of farm assured schemes, and agri-environmental groups. This greater activity could possibly have led to increased knowledge of issues related to
farming, generally and specifically related to waste issues.

Although the majority of farmers believed their knowledge to be limited, knowledge on whether or not the regulations were to affect typical waste management methods on farms such as open burning and burying, was high. When asked whether they were aware that open burning was to be affected, 98% of farmers interviewed said ‘yes’: 94% knew incineration was to be affected, 90% were aware of changes to burying and tipping, while 74% of farmers knew about changes to storage and disposal off farm. Within the EA’s report, only 28% of farmers mentioned open burning, and 20% knew about disposal off farm (Environment Agency, 2004). A reassuring increase, therefore, in farmers’ knowledge of the more direct impacts of the emerging waste regulations, especially in terms of what is current common practice, was apparent from the later research.

Overall, therefore, farmers’ awareness on the new waste regulations was shown to have increased in the last year. This was accompanied by an increase in basic knowledge of the regulations, more especially on the changes to the most frequently used waste management methods such as open burning. With this added knowledge farmers can relate the regulations better to their own farm operation, and could see what implications this would have on the farm. Their concerns are discussed in the next sector

4(v) - Farmers concerns

Exactly half (50%) of the farmers interviewed were very concerned about the new waste regulations, with 39% seeing the regulations as a purely negative addition to agricultural practice. However, regulations must be a part of any industry in order to add any sort of value (Policy Commission on the Future of Farming and Food, 2002), and agriculture is long over due in coming in line with requirements of the EU Waste Framework Directive (ENDS, 2004). Not all farmers interviewed were against the waste management regulations, 19% regarded the regulations as a positive addition to the industry. A significant minority (42%) saw the regulations as positive for the environment, but also
negative for the industry. A few farmers mentioned the possibility of it being a negative addition due to the impact it would have on the environment, with disposal into landfill, and transport emissions.

Farmers within the survey showed they were aware of the need of waste regulations for the protection of the environment - 63% of farmers said they would strive to be compliant with the new waste management regulations. The regulations are set to come into force sometime in 2005. Certain requirements will be given a 12 month transitional period to allow farmers to come into line with the regulations or to apply for exemption licenses to continue to dispose and reuse waste on the farm (Defra, 2004d). The 12 month transitional period was seen to be ‘just about long enough’ by 43% of the farmers surveyed with a further 22% believing it was easily sufficient. However, 35% of farmers believed that they would need more time and believed it to be highly unlikely that they would be complying with the regulations. Farmers showed they needed more time to make changes; they highlighted the need for further consultation and the need for available options for waste disposal.

A certain number of farmers will not comply with the waste regulations. As one surveyed farmer remarked: “it must be stressed the need for sensible implementation and efficient policing, if the regulations are to be successful in protecting the environment and human health” (Mixed farmer in North West Norfolk). Policing will be the responsibility of the EA, their job being to assess farmers waste management methods, ensuring compliance with the regulations (Defra, 2004d). In terms of their existing relationship with the regulator for the majority of the farmers surveyed (75% or 30) contact with the EA was on an annual basis, mainly for irrigation licenses; 20% had their last contact with the EA between 1 and 2 years, with the remaining 5% never having contact. The main impression from their experiences with the EA was helpful, with 64% of farmers saying that the relationship between themselves and the EA was ‘good’. A large scale pig farmer in South-East Norfolk exemplified this, describing a visit from the EA as “helpful, and informative, assisting his farm operations”. However, 24% (or 10) said it was ‘uncomfortable’ or ‘bad’. An arable farmer within North-West Norfolk said the EA were
“unhelpful and trying to find faults, instead of further educating farmers in good practice”.

Unsurprisingly, therefore, the surveyed farmers were apprehensive about the incoming regulatory regime for waste, even those who saw this development as positive for the industry. In addition to their own personal relationships with the regulators (EA), which is probably a cause of anxiety, to many, the core concerns were also governed by the perceived implications for the business.

4(vi) – Implications of waste management regulations.

With the implementation of management systems in small to medium sized enterprises (SME’s) many find this causes a strain on resources in terms of costs, time and/or skills (Hillary, 2000). An SME is classified as a business with no more than 250 employees and whose annual turnover is no greater than 50 million euros (CORDIS, 2005). SME’s as individual companies, like farmers, may believe that they do not have a large negative impact on the environment. However, in the case of farming, the impacts of 180,000 farms within England and Wales, leads to a cumulative impact which can be very damaging to the environment. With legislation being introduced, the change in environmental awareness and performance can not be underestimated (Welford, 1994). The majority of farms within England and Wales fall into the category of SME’s and many of the implications of the new waste management regulations given in this survey were typical of SME’s.

The most common fear resulting from change in environmental policy is that the cost it entails decreases the ability for competitiveness and productivity within businesses (Triebswetter and Hitchens, 2005). Within the survey, 90% (or 36) of the farmers believed financial implications to be the main impacts of the new waste management regulations. A beef farmer in Mid-Norfolk highlighted that “the regulations were more costs, added to an industry where costs continue to increase, while profits continue to decrease”. Therefore, in the opinion of some, it is the government’s responsibility that these regulations do not
Farmers within the survey suggested a range of unavoidable changes, in connection with the waste management regulations, that would lead to increased costs. Possible changes were categorised as either ‘minor’ or ‘major’ changes. For example a minor change would be a change in supplier, or disposal technique, and a major change being for example, the abandonment of an agri-environmental scheme. A large majority (84%) of farmers surveyed described minor changes. “With our current practice because of the standard we are currently working to managing waste only a few minor changes will have to be completed” (Arable Farmer, 300 hectares, South Norfolk) but with 9% suggesting they would have to make major changes while only 7% envisaged no changes at all. However, many farmers perceived changes both minor and major to be, in effect, major changes. An example is the current disposal methods on farms, a change to which could cause an increase in costs. Farmers have been able to burn or incinerate a large percentage of their farm waste (at no cost), but under the waste management regulations they will have to dispose of certain waste, such as chemical containers, by paying a licensed waste contractor to remove the waste, or by transporting the waste to a landfill site themselves. Along with fuel costs farmers will have to pay a gate fee per tonne of waste at the landfill site (Defra, 2004b). A mixed farmer in Mid-West Norfolk suggested that “each change is minor, but when change in storage, plus time, resources, and then training and staff and understanding the regulations are all put together, the overall change is significantly major”.

An option available under the waste regulations is to store waste upon the farm for up to 12 months prior to disposal or three years prior to re-use (Defra, 2004d). The costs of proposed storage, for example the renovation or building of suitable storage areas, in order to meet the requirements of the regulations, will vary between farms, but could cost a significant amount. A farmer within Mid-Norfolk put forward the example of having to provide a properly bunded tank for waste oil prior to collection, an indirect cost of the regulations. Defra have estimated that the new regulations will cost the industry around 65
million pounds (Defra, 2004d), with EA’s estimates in the range of £169-403 per farmer/per year (Farmers Weekly, 2004). Costs could vary depending on farm size and existing waste management procedures. A surveyed beef farmer with 100 hectares in West Norfolk pointed out how little waste the farm generates, due to the size of the operation. He believes waste contractors would be needed as little as once a year, “no great added cost”.

Time is another resource which is found lacking with SME’s (Hillary, 2000). More than half (53% or 21) of the surveyed farmers said that another implication of the waste management regulations would be the increased demand on their time. A mixed farmer in South-East Norfolk highlighted the time needed for training staff members on the new regulations, to separate out wastes, and to re-use and use materials more efficiently. “Overall there will be less time to carry out farm work”. In addition stress, nuisance factor and increases in paperwork were all further examples of perceived implications of the new waste management regulations.

Other implications highlighted by surveyed farmers include the worry over bio-security. “With waste contractors visiting numerous farms within a month, like the fallen stock systems, there must be a much higher chance for spread of disease or infection” (Pig Farmer South-West Norfolk).

The anxiety within the farming industry is heightened by the news of increased costs and hence continued loss of profits. With the introduction of the waste management regulations the industry must view this as an opportunity for cost savings; however, future changes must be made to allow for farmers to participate in this scheme successfully.
4(vii) – Future proposals

The introduction of the new waste regulations will pose problems to many in the farming industry, and the expressed concerns of, and implications for the surveyed farmers have been highlighted and discussed. To cope with these potential expected impacts, the agricultural industry needs to address several issues. The critical question is whether farmers have the ability and capacity to comply with the regulations, and what, if any, preparations can be made to ensure compliance.

4(vii)(a) Financial Support

Financial support within farming is constantly being scrutinised, with subsidies within agriculture historically being related to over production, reliance on chemicals and ecological decline (Liberal Party, 2001). However, Welford (1994) concluded that to increase the environmental performance of SME’s incentives must be given, especially for them to undertake environmental change. Surprisingly, the large majority of farmers interviewed (84% or 34) believed that there should be preliminary financial support given to farmers needing to make changes to ensure the farms comply with the new waste management regulations. A livestock farmer in West Norfolk highlighted the problems the farm experiences with fly tipping, occurring in his opinion, because of the cost of waste disposal. “With costs being added to farm waste disposal, this could lead to an increase in fly-tipping, with farmers dumping waste on neighbouring farms and even on their own doorsteps”. However, a small proportion (16%) believed that financial assistance would lead to an imbalance in funds across the industry. “It would be far too difficult to decide who gets how much” (South-East Norfolk Arable Farmer)
4(vii)(b) - Cross Compliance

At present, compliance with the waste management regulation does not form part of cross compliance within the Single Farm Payment scheme (see Chapter 3) (Defra, 2004d). Farmers within the survey were asked if they believed that the regulations should be included in cross compliance. The majority (69%) believed that the waste management regulations should not be a part of cross compliance. Farmers stated that the two issues were separate, one involved agriculture and the other involved environment, and some believed this to be two separate issues. “Auditing for cross compliance will need completely different expertise when it comes to auditing waste management” (Mid-Norfolk beef farmer). Farmers also stated that it was unnecessary to amalgamate all regulations under a single title of cross compliance, making it more difficult for farmers to understand and hence comply with the various regulations. Compulsory action which results from legislation and policy change needs to applied sympathetically; it may cause hindrance to change, and eventually subvert policy’s aims (Walford, 2002). Despite these misgivings of the majority, a significant minority (31%) believed that the waste management regulations needed to be included in cross compliance mainly to ensure the provision guide requirements are met. If farmers were not to comply, then subsidies would not be received, a good deterrent for non compliance. A mixed farmer from North Suffolk put the same viewpoint in a more direct way, saying “as farmers are benefiting from public funding, they should strive to comply with environmental legislation”.

4(vii)(c) - Recovery Schemes

The results have shown that the majority of farmers will be striving to comply with the waste regulations. Farmers may receive financial incentives; they may be forced to comply through cross compliance, however, “if farmers are given available options to dispose of waste, then farmers will manage their waste correctly” (Pig farmer in Mid-Norfolk). Many farmers involved in the survey believed that financial funding, if any, should be put into schemes such as recycling systems or collection service for farms. But
see the discussion below for the drawbacks and failures of such systems in the past.

The problematic waste stream from the survey results seems to be waste ‘packaging’ plastic - chemical containers, feed bags and waste ‘non-packaging’ plastic - “plastics that are used in agriculture which are not packaging, for example silage wrap, crop sheeting, tunnel covers” (Envirowise, 2000). Both categories of waste plastics are, more often than not, burnt on farms for their disposal, or placed in farm dumps. Both methods of disposal pose damage to the environment. Burning releases significant emissions to the atmosphere and dumping can cause both visual pollution and a threat to wildlife (Defra, 2001a).

The disposal of waste ‘packaging’ plastic is subject to Producer Responsibility Obligations (packaging Waste) Regulations 1997 (as amended). These regulations pronounce a list of objectives including, reduce over packaging, provide stakeholders with information and to increase the collection and recycling of waste plastics (Environment Agency, 2005b). As agriculture comes into line with the Waste Framework Directive a greater incentive arises to increase the level of recycling of packaging plastics (Defra, 2004a). Such wastes as chemical containers are considered as hazardous waste, due to the residue left within the containers. Containers must be triple washed, before being disposed as non-hazardous wastes (Envirowise, 2000). There are no such recycling obligations for waste ‘non packaging’ plastics. However, the government are looking at creating a scheme for collection and recycling for both forms of plastic waste (Defra, 2004c).

The first option is a voluntary producer responsibility scheme (PRS), where by suppliers, manufacturers, importers, and retailers are involved in a scheme whereby they would be under obligations to collect and recycling waste plastics (Defra, 2004a). A voluntary PRS under the name of Farms Films Producer Group (FFPG) was established by British Polythene Industries (BPI) in 1994. This scheme charged farm plastic producers a fixed levy, to fund a nationwide collection and recycling scheme. Farmers were given financial incentives to store waste plastics ready for collection (Defra, 2004a). However, the scheme was only voluntary and two importers of plastics refused to pay a levy and continued to undercut those who were having to budget a hundred pound levy, causing the
scheme to collapse (Defra, 2004a).

To avoid a repeat of this unfortunate event, a second option involves a **statutory PRS** (Defra, 2004b). A set of regulations which obliged all producers, retailers and importers wishing to operate in the UK to be under the obligation to collect and recycle waste plastics from farms (Defra, 2004a). As farmers are not producers of plastics they would not be under any obligation to collect and recycle, apart from being environmentally aware, however Defra has warned that a PRS would involve a certain proportion of the costs to be passed on to farmers and growers (Defra, 2004c). The amount that will be charged to farmers for collection of their waste plastic is so far unannounced or undecided, however, it is possible it could range from anywhere between £25/tonne to over £100/tonne (Defra, 2004c).

However, this scheme is not accredited by all those involved. The plastic supply industry themselves do not believe their involvement in a scheme such as this will see cost benefits for either themselves or for farmers (Environment Agency, 2005b). Supply companies would need to come into line with waste carriers licences and storage regulations for the waste collected, and therefore it is believed, by some, that the present waste collections services would be the most suited to handle farm waste (Environment Agency, 2005b).

The development and implementation of such PRS’s dealing with scrap agricultural chemical containers has been shown to be successful. The Taiwan government set up several scrap management foundations, for several different types of waste, one being the scrap agriculture chemical containers management foundations (Lee *et al.*, 1998). Recycling rates and targets have been set for the recovery of wastes, and scrap handling fees vary depending on the levels collected, for example if the upper target for recycling is met then the processing fee falls, a good incentive for waste producers and collectors (Lee *et al.*, 1998).
4(viii) – Future in waste management for farming

The implications of the waste management regulations are apparent and have been discussed. Defra, the government ministry in charge of implementing the new waste management regulations, should be aware of these implications and take them into consideration when formatting the new regime, since they have direct contact with many farming groups and consultants. Waste management regulations within agriculture, however severe the implications, are well over due, and can benefit the environment as well as the farming businesses (BusinessLink, 2005). The regulations pose an opportunity to look at resource use and waste management within agriculture highlighting possibilities of saving the individual farmer money (Defra, 2001a).

Waste minimisation is “the systematic reduction at source of all forms of waste, to conserve resources” (NetRegs, 2004). Waste minimisation within farm operations can involve several key steps:

- **Review of current operations** – farmers should begin by reviewing those costs related to their present waste management techniques, current disposal methods and the costs related to these disposal and current significant waste streams.

- **Reduce raw material use** - investigating the use of alternative technology, methods and materials can aid in reducing waste, or even preventing waste.

- **Reduce waste** – constant reviews of practices, staff training, and uses of materials could reveal ways of minimising waste levels.

- **Increase re-use** – farmers could identify ways of re-using wastes upon the farm.

- **Increase recycling** – many waste materials can be recycled.

- **Take action** - constantly highlighting areas for improvement and take action.

**Source:** (Defra, 2001b)(p.5):
The survey highlighted farmers’ recommendations for waste arisings which could be prevented and changes in waste management, which could be enhanced to decrease the use of resource and final waste levels. Examples included a mixed farmer, farming 728 hectares, in North-West Norfolk who recommended “that products such as batteries and tyres be produced with longer lifespan, this being the producers responsibility”. Other recommendations from arable farmers included storage units for seeds and chemicals, meaning that these products can then be delivered in bulk, without the need for packaging. “These design features rely heavily on the producer or retailer of these products to generate the change needed” (Arable farmer, of 800 hectares, Mid Norfolk).

There has been much emphasis on the importance of markets for recycled or recovered waste materials, for example within the Waste Strategy 2000 (Watts et al., 2001). This also relates to the waste arisings from the agricultural industry. One example of a market for farm waste is the energy sector in Europe. Companies are anaerobically digesting agricultural waste, specifically animal manure and slurry, to produce energy from the gases given off (Van De Broek and Tijmensen, 2004). This type of energy production has its advantages. Firstly, the levels of methane (a potent greenhouse gas) released into the atmosphere due to this sector of farming will be rapidly decreased, and secondly it produces clean energy (Van De Broek and Tijmensen, 2004). The strengthening of markets for agricultural waste could reduce the problem of cost for farmers, by minimising the collection costs, if there is a high demand for it. However, there are very few anaerobic digestion plants in the UK, due to the lack of financial attractiveness for investors. There would need to be a shift in the economics of energy production to make this viable, with realistic financial incentives (Van De Broek and Tijmensen, 2004).

Waste management will soon be a large part of farm operations, and hence must be observed in the same way, as industrial or municipal waste is. Waste markets could decrease costs of disposal for farmers, and hence could encourage continuation of waste management into the long term future.
4(ix) - EMS on farms

An EMS identifies a company’s environmental policy, the environmental aspect of the companies operations, legal and other requirements, a set of clearly defined objectives and targets for environmental improvements, and an environmental program, or a set of programs (Morrow and Rondinelli, 2002). An EMS can pose both costs and benefits for a company – and these costs and benefits could apply to the agricultural industry (see Chapter 4).

Farmers who were surveyed were asked whether they believed an EMS on their farm would aid in better waste management. The level of understanding for this question, because of the very low take up of management systems in farming, was poor. However, having been given a brief description and explanation of EMSs, farmers were still undecided as to whether they thought it would be beneficially in aiding waste management or not. The marginal majority of 53% thought that EMS’s would not help in waste management and “would be more paper work and another system to consider and manage” (North-Norfolk Arable Farmer).

However, EMS’s could be the system that farmers and growers need to consider, if they are going to make a significant stride towards increased environmental performance (Castelnuovo, 1999). If as a result, farmers increased their environmental performance and compliance with new regulations, this could reduce regulation pressure from the government upon individual farms and the whole industry, plus it could also improve their image and reputation with the wider stakeholder community (Wall et al., 2001). If EMS is to become common in agriculture, there needs to be the internal structure to support the systems. Relevant guidelines for agriculture and EMS, similar to BS8555, or the ISO 14001 certification guidelines are needed to encourage and to direct the industry into a more environmentally active industry (Castelnuovo, 1999). Another encouraging factor could be that of supply-chain pressure. As consumer knowledge and awareness of environmental practice continues to increase, retailer such as supermarkets may start demanding environmental assurance, in the form of certification schemes such as ISO 14000 or EMAS.
Chapter 5 – Conclusions and Recommendations

The main aim of this study was to investigate the expected implications of the Waste Management (England and Wales) Regulations 2005 on farms within East Anglia. A survey was carried out to investigate several significant areas. Firstly, current farm practices and waste management methods were investigated on a range of farm types and sizes. Farmers were interviewed to ascertain the level of awareness farmers had of the new waste regulations, for example the impacts the regulations would have on certain common disposal methods. Finally, farmers concerns arising from the new waste regulations and the perceived implications of the regulations on farms and throughout the whole farming industry was investigated.

The research did highlight common concerns and expected implications, coupled with a varied level of awareness amongst the farmers surveyed. Although the study explored a data set and results from a reasonably wide range of farmers, it cannot be classed as a representative sample of the agricultural industry, due to several limiting factors. One of the largest restrictions was the time constraints for interviewing farmers. With a larger time frame for interviews, a greater number of farmers would have been surveyed giving a larger sample and a more realistic view of the agricultural industry. Sample size was also restrained due to the fact that the period for interviewing unavoidably occurred during a period of good weather, and a proportion of farmers were unavailable to be interviewed, due to lack of available time.

The survey has shown that there will be several significant implications affecting the agricultural industry with the introduction of the waste management regulations. The introduction of the waste regulations must be accompanied by changes (such as disposal options), to ensure a legal waste disposal approach. The regulations could also bring positive changes to the industry, possibly helping agriculture to become more sustainable, if the waste awareness-building programme is effective in promoting waste prevention.

The general awareness of farmers to the new waste management regulations was high, and
was shown to have risen since previous surveys carried out by the Environment Agency in 2004. However, farmers’ levels of understanding of the waste regulations had not increased by any significant amount since earlier studies, with up to 80% of the farmers surveyed still believing they understood ‘A little’ or ‘Not much’ about the regulations, compared with 71% in 2004 (Environment Agency, 2004). The majority of farmer surveyed proved that they knew the main impacts of the regulations on common disposal methods, such as open burning and storage.

The results of this survey showed that farmers were concerned about the introduction of the waste management regulations. Concerned about being able to comply, within given time limits, the implications and what changes were needed to ensure compliance. The majority of farmers had mixed views on the waste management regulations, with 42% believing that the implications were both a positive and negative addition to the industry. Farmers viewed the regulations as a positive addition for the environment, but overall negative for the farming industry due to the implications the regulations would bring.

The survey highlighted several expected implications of the waste management regulations. Farmers surveyed expressed the concern that cost would be the main direct impact of the regulations, due to the change in disposal methods of waste streams. Either farmers themselves would have to take waste to waste collection points, costing fuel and time, or they will have to pay licensed waste contractors to take away the waste generated. Costs also arise with the development of storage areas which would meet regulatory requirements to store waste pending disposal or re-use. The second foreseeable implication was time. Although the majority of farmers surveyed believed that the 12 month settling period was sufficient, time needed to train staff members and actually continue with proposed changes in every day business would imply less time for daily running of the farm business.

The survey exposed possible proposals for the future of farming if the waste management regulations are to be successful in fulfilling their aim of protecting the environment and human health. Farmers must have available waste disposal options in the form of local or
nationwide collection systems to aid in waste disposal, this could be a PRS, depending on the viability of the proposed scheme. Alternative technologies and uses of resources could be investigated by retailers and producers, to aid in waste minimisation (Defra, 2001a).

The introduction of the Waste Management (England and Wales) Regulations 2005 will have implications on the agricultural industry. The government, when issuing these regulations, must ensure that continued assessment is carried out to ensure that new information on the implications is taken into account (Policy Commission on the Future of Farming and Food, 2002). Although the study has shown mainly the negative sides of the waste management regulations, the regulations will definitely bring benefits for the environment, and also for the farmers, addressing issues that could lead to cost savings, something that the industry must strive to achieve. However, these positive benefits will only arise, if farmers themselves adopt a forward looking approach to waste management, ideally in the context of a wider environmental management system.

5(i) – Recommendations

The timing of this survey prior to the finalisation of the regulations, has posed limitations. Therefore the following recommendations for future research are made.

The real implications, as opposed to the believed implications, could be fully investigated, either during or after the settling period of the regulations. Investigation into the options which become available to farmers could also be carried out.

The benefits of the waste management regulations for farms within England and Wales could be another possible research topic. Investigating whether environmental management can lead to cost saving in the farming industry, like many other industries, where environmental management has be tried and tested.
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Draft Questionnaire discussing Implications of Waste Management Regulations on farms within East Anglia

I must first of all stress that anything that is said will be kept strictly confidential. No individual farmers, or their answers, will be identifiable from any of my written work.

The first set of questions are about your farm and current procedures.

1. What is the total acreage you farm?

2. Has there been any significant change in acreage in the last five years?

3. Of the total acreage you farm what proportion is:
   - Owned
   - Rented
   - Contract farmed
   - Share farmed

4. Of the total owned what proportion is:
   - Rented to tenants
   - Contract farmed
   - Share farmed
5. Of the total acreage how much is:
   
   Arable (including short term leys)
   
   Grassland (permanent or semi permanent)

6. Has there been any significant change in the split between arable and grassland use in the last five years?

7. What headage of animals do you have on your farm?
   
   Dairy
   
   Beef
   
   Pigs
   
   Sheep
   
   Poultry
   
   Other, please specify

8. Have there been any major changes to these levels in the last 5 years?

9. Does your farm participate in any agri-environment schemes?
   
   Yes          No

   If yes, which?

10. How frequent is the contact with the Environment Agency?
11. How would you describe the relationship with the Environment Agency?

Very Good          Good           Uncomfortable          Bad     Don’t know

12. Who do you rely on for farming advice?

DEFRA

Environment Agency

NFU

Private Consultants

Other, please specify

Don’t know

13. What present waste management procedures do you have on the farm?

Yes                     No

Open burning

Incineration

Burying/ tipping

Storage

Waste contractors

Re-use

Take back by suppliers

Other, please specify

Don’t know
14. What present waste streams are present on your farm?

Metals
Batteries
Tyres
Plastic packaging
Plastic crop cover
Plastic chemical containers
Silage plastics
Bale twine
Net wrap
Cardboard and Paper
Chemicals
Animal health products
Fallen stock
Oils
Building waste
(Inc. asbestos)

The following set of questions investigates your awareness of the new waste regulations.

15. Are you aware of the new waste regulations aimed at regulating agricultural waste management?

Yes
No
16. From which source did you gain information on the waste regulations?

- Newspaper
- Farming journal/magazine
- Leaflet/Brochure
- Letter
- Word of mouth
- Radio
- Television
- Environment Agency
- DEFRA
- Other, please specify

17. How much do you believe you know or understand about the new waste regulations?

- A lot
- A little
- Not much
- None
- Don’t know

18. Are you aware that the new waste regulations will affect the following typical waste management methods of agricultural waste?

- Yes
- No
- Don’t know

- Open burning
- Incineration
- Burial or tipping
- Disposal off farm
- Storage
The following set of questions investigates the possible implications and your concerns.

19. How concerned are you about the new waste regulations?
   Very       A little       Not much       Not at all       Don’t know

20. Do you see the new waste regulations as a positive or negative addition to agricultural practices? Please state reasons.
   Positive       Negative

21. Do you believe that the 12 month settling period will be sufficient for changes to be made, if needed?
   Yes - easily sufficient       Yes- about enough
   No - need more time           No - need a lot more time

22. What do you believe will be the main implications of the new waste regulations upon your farm?
   Financial
   Time
   Workforce
   Other, please specify
23. What changes, if any, do you think will have to occur on your farm to meet the requirements of the new waste regulations?

   Minor changes– e.g. change of suppliers

   Major changes – e.g. changes in farming strategy, abandonment of agri-environment schemes

   None

   Don’t know

24. Do you believe that your farm will be fully complying with the new waste regulations within 12 months time?

   Yes           No

   If your answer is no, what would be the reason for non-compliance?

25. Do you believe that there should be preliminary financial support for farms to be able to prepare themselves to comply with the new regulations?

   Yes           No

26. Do you believe that conformity with the new waste management regulations should be included within the Single Farm Payment scheme (e.g. cross compliance)?

   Yes           No

27. Do you believe environmental management systems could aid in better waste management for farming?

   Yes           No