Farm Hazardous Waste Collections 2013–2017

epa
Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Rialtas na hÉireann
Government of Ireland

ENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency (EPA) is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

The work of the EPA can be divided into three main areas:

Regulation: *We implement effective regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.*

Knowledge: *We provide high quality, targeted and timely environmental data, information and assessment to inform decision making at all levels.*

Advocacy: *We work with others to advocate for a clean, productive and well protected environment and for sustainable environmental behaviour.*

Our Responsibilities

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We regulate the following activities so that they do not endanger human health or harm the environment:

- waste facilities (*e.g. landfills, incinerators, waste transfer stations*);
- large scale industrial activities (*e.g. pharmaceutical, cement manufacturing, power plants*);
- intensive agriculture (*e.g. pigs, poultry*);
- the contained use and controlled release of Genetically Modified Organisms (*GMOs*);
- sources of ionising radiation (*e.g. x-ray and radiotherapy equipment, industrial sources*);
- large petrol storage facilities;
- waste water discharges;
- dumping at sea activities.

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- Conducting an annual programme of audits and inspections of EPA licensed facilities.
- Overseeing local authorities' environmental protection responsibilities.
- Supervising the supply of drinking water by public water suppliers.
- Working with local authorities and other agencies to tackle environmental crime by coordinating a national enforcement network, targeting offenders and overseeing remediation.
- Enforcing Regulations such as Waste Electrical and Electronic Equipment (WEEE), Restriction of Hazardous Substances (RoHS) and substances that deplete the ozone layer.
- Prosecuting those who flout environmental law and damage the environment.

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- Monitoring and reporting on the quality of rivers, lakes, transitional and coastal waters of Ireland and groundwaters; measuring water levels and river flows.
- National coordination and oversight of the Water Framework Directive.
- Monitoring and reporting on Bathing Water Quality.

Monitoring, Analysing and Reporting on the Environment

- Monitoring air quality and implementing the EU Clean Air for Europe (CAFÉ) Directive.
- Independent reporting to inform decision making by national and local government (*e.g. periodic reporting on the State of Ireland's Environment and Indicator Reports*).

Regulating Ireland's Greenhouse Gas Emissions

- Preparing Ireland's greenhouse gas inventories and projections.
- Implementing the Emissions Trading Directive, for over 100 of the largest producers of carbon dioxide in Ireland.

Environmental Research and Development

- Funding environmental research to identify pressures, inform policy and provide solutions in the areas of climate, water and sustainability.

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- Assessing the impact of proposed plans and programmes on the Irish environment (*e.g. major development plans*).

Radiological Protection

- Monitoring radiation levels, assessing exposure of people in Ireland to ionising radiation.
- Assisting in developing national plans for emergencies arising from nuclear accidents.
- Monitoring developments abroad relating to nuclear installations and radiological safety.
- Providing, or overseeing the provision of, specialist radiation protection services.

Guidance, Accessible Information and Education

- Providing advice and guidance to industry and the public on environmental and radiological protection topics.
- Providing timely and easily accessible environmental information to encourage public participation in environmental decision-making (*e.g. My Local Environment, Radon Maps*).
- Advising Government on matters relating to radiological safety and emergency response.
- Developing a National Hazardous Waste Management Plan to prevent and manage hazardous waste.

Awareness Raising and Behavioural Change

- Generating greater environmental awareness and influencing positive behavioural change by supporting businesses, communities and householders to become more resource efficient.
- Promoting radon testing in homes and workplaces and encouraging remediation where necessary.

Management and Structure of the EPA

The EPA is managed by a full time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:

- Office of Environmental Sustainability
- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiological Protection and Environmental Monitoring
- Office of Communications and Corporate Services

The EPA is assisted by an Advisory Committee of twelve members who meet regularly to discuss issues of concern and provide advice to the Board.

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- European Recycling Platform Ireland;
- Irish Farmers' Association;
- Bord Bia;
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Table of Contents

Executive Summary

The farm hazardous waste (FHW) collection campaign was a collaborative pilot project led by the Environmental Protection Agency (EPA) working with a cross-government team that included the Department of Communications, Climate Action and Environment (DCCAE), Teagasc, the Department of Agriculture, Food and the Marine (DAFM) and local authorities. The initiative was also supported by the Irish Farmers' Association (IFA), Bord Bia and other stakeholders. It was funded through the National Waste Prevention Programme (NWPP) and the overall aim was to investigate the feasibility of, and the logistics and demand associated with, the operation of a collection scheme for the hazardous wastes associated with farming.

This report provides a detailed summary and analysis of the FHW collections that were operated from 2013 to 2017. Forty-six 1-day collection centres were operated during October and November of each year and a collection centre was operated at least once in each county over the period.

Over 9000 farmers voluntarily participated in the collections and contributed financially towards the disposal costs. The average weight of hazardous waste presented per farmer was 81 kg of FHW and 34 kg of waste electrical and electronic equipment (WEEE) and batteries. During the campaign, over 1000 tonnes of wastes were collected and properly managed, including:

- 68 tonnes of waste pesticides:
    - *including 1.7 tonnes of persistent organic pollutants*;
- 53 tonnes of veterinary medicine waste;
- 481 tonnes of waste engine and hydraulic oil;
- 54 tonnes of waste paint;
- 46 tonnes of contaminated empty containers;
- 28 tonnes of oil filters;
- 313 tonnes of WEEE and batteries.

Significant quantities of highly toxic pollutants, including chemicals such as dichlorodiphenyltrichloroethane (DDT), gamma-hexachlorocyclohexane (gamma-HCH or lindane), mercury, cyanide, agent orange and strychnine, were presented for disposal at the centres. The corroded condition of many of the legacy waste pesticide and veterinary medicine containers is a particular concern from a health, safety and environmental point of view. The quantity of packaging waste was significant, particularly that arising from the use of pesticides, veterinary medicines and engine oil.

Based on data from the pilot scheme, a typical 1-day collection centre could expect to see 200 farmers who would present approximately 6 tonnes of hazardous wastes (including 1.5 tonnes of pesticides and approximately 1 tonne each of veterinary medicines, paint and empty plastic containers), 7 tonnes of WEEE and batteries, and 10 tonnes of waste oil.

The benefits that accrued to the State from the FHW collections include meeting the ambitions, targets and obligations set out in various national and international programmes and legislation,

including the NWPP, the National Hazardous Waste Management Plan, the Stockholm Convention on Persistent Organic Pollutants, the Water Framework Directive and Food Wise 2025. The benefits to farmers include improved health and safety on farms, environmental protection and meeting obligations such as pesticide legislation, Bord Bia quality assurance schemes and cross-compliance.

The project team also developed a national estimate of 7378 tonnes of hazardous wastes currently stockpiled on farms (excluding WEEE and batteries). At the current removal rate of approximately 200 tonnes per annum, it would take 36 years to clear the legacy waste if 10 collection centres were operated per year. In addition, based on limited research and using conservative waste factors, it is estimated that 50 tonnes of plant protection product waste and 60 tonnes of veterinary medicine waste are generated per annum on farms. It is clear, therefore, that the current collection rate will not prevent the accumulation of hazardous wastes on farms.

In order to address the issue of the correct management of FHW, the following overall recommendations are presented for consideration:

- **Minimise the generation of FHW:**

  Data collected through this pilot scheme highlight the regular waste associated with farming, some of which could be avoided through the implementation of waste prevention practices to minimise the use of hazardous substances. The agrichemical industry, government agencies and farming organisations should provide training and information on best practice to maximise efficiency in using farm chemicals. Precise and minimal application of agrichemicals presents direct savings to farmers and also offers further benefits, including preserving important pollinator species and protecting local water quality. Where effective, less-toxic alternatives exist, these products should also be identified and promoted.

  Triple-rinsing of chemical containers is an example of an effective waste prevention action that is not being widely practised. If current guidance is not sufficient in terms of content and/or engagement, this should be addressed.

- **Enhance producer responsibility:**

  In line with the principles of the circular economy, the producers of those substances and items arising as hazardous waste should bear a significant degree of responsibility for the environmental impacts of their products throughout their life cycle, including the downstream impacts from their use and disposal. In the case of FHW, pesticide and veterinary medicine producers should contribute financially and operationally to FHW collections across the country. Other industries responsible for producing high-volume hazardous wastes (e.g. oils, paints) should also be targeted for additional financial contributions.

- **Establish a national FHW collection scheme:**

  There is clear evidence from this pilot scheme that a long-term national scheme for the collection of FHW should be established. Leadership on this issue is required at government level and there is a need for one government department to assume primary responsibility.

  Given the quantity of waste that is estimated to be stockpiled on Irish farms, the number of collections needs to be increased from 10 per year. The number of collections per county per year needs to be flexible to account for the numbers and sizes of farms in each county.

Various models of operation should be considered, including the campaign approach trialled in this pilot; permanent bring centres; and direct collection from farms. An “amnesty” collection approach could be considered for a limited period whereby farmers are encouraged to bring legacy wastes for free, with minimal documentation involved. This approach has been used successfully in other countries.

Farmers have demonstrated a willingness to pay towards collections; however, affordability is a critical issue. Additional funding will be required to continue and expand the collections. Additional mechanisms, such as levies on products placed on the market (ring-fenced for FHW collections), should be considered.

If FHW collections are limited to pesticide and veterinary medicine wastes, this will not address the accumulation of other hazardous wastes generated on farms (waste oils, oil filters, corrosives, contaminated containers, etc.).

1 Introduction

The farm hazardous waste (FHW) collection campaign was initiated in 2013 and was led by the Environmental Protection Agency (EPA) working with a cross-government team that included the Department of Communications, Climate Action and Environment (DCCAE), Teagasc, the Department of Agriculture, Food and the Marine (DAFM) and local authorities. The scheme won the "Excellence through Collaboration" category of the Civil Service Excellence & Innovation Awards, which showcase examples of best practice and innovation in government departments and offices.

The objectives of the 5-year campaign were to:

- facilitate the collection, recovery and disposal of hazardous waste from farms;
- assess the types and quantities of wastes collected during this period;
- estimate the types and quantities of FHWs stockpiled on farms; and
- provide evidence to inform the establishment of a national scheme for FHW management.

2 Farm Hazardous Waste Collection Centre Operations

Over the 5-year pilot campaign, 46 collections centres were operated across the country, mostly at livestock marts. Although the layout of the sites varied from location to location, protocols and practices were developed and standardised during the pilot to optimise site operations, such as traffic management, waste off-loading, and recording and payment, while ensuring that health and safety requirements were met. Contingency planning was included to deal with issues that arose during the site operations, such as poor weather, low lighting or unexpectedly high attendances.

The locations of the FHW collection centres are shown in Figure 1. Factors considered for site selection included geographical spread, farming types, farm sizes and cropping history. Collections were mostly carried out during the week; however, some events took place on Saturdays in areas with known high numbers of part-time farmers, who might find it difficult to avail of a mid-week collection.

Figure 1. Locations of the FHW centres, 2013–2017.

Figure 2 shows a typical site layout plan for FHW collection. As a general rule, separate entrance and exit routes greatly aided the flow of traffic through the sites. There were typically three operational areas within each site. Each of the areas dealt with a specific waste stream; they included offload points for (1) waste oil; (2) waste electrical and electronic equipment (WEEE) and batteries; and (3) FHWs, including empty containers. The FHW offload area had three weighing units so that the wastes could be separated into the specific waste streams, e.g. pesticides, veterinary products and waste paints. To assist with on-site operations, farmers were asked to ensure that their waste was identifiable, pre-segregated and packaged.

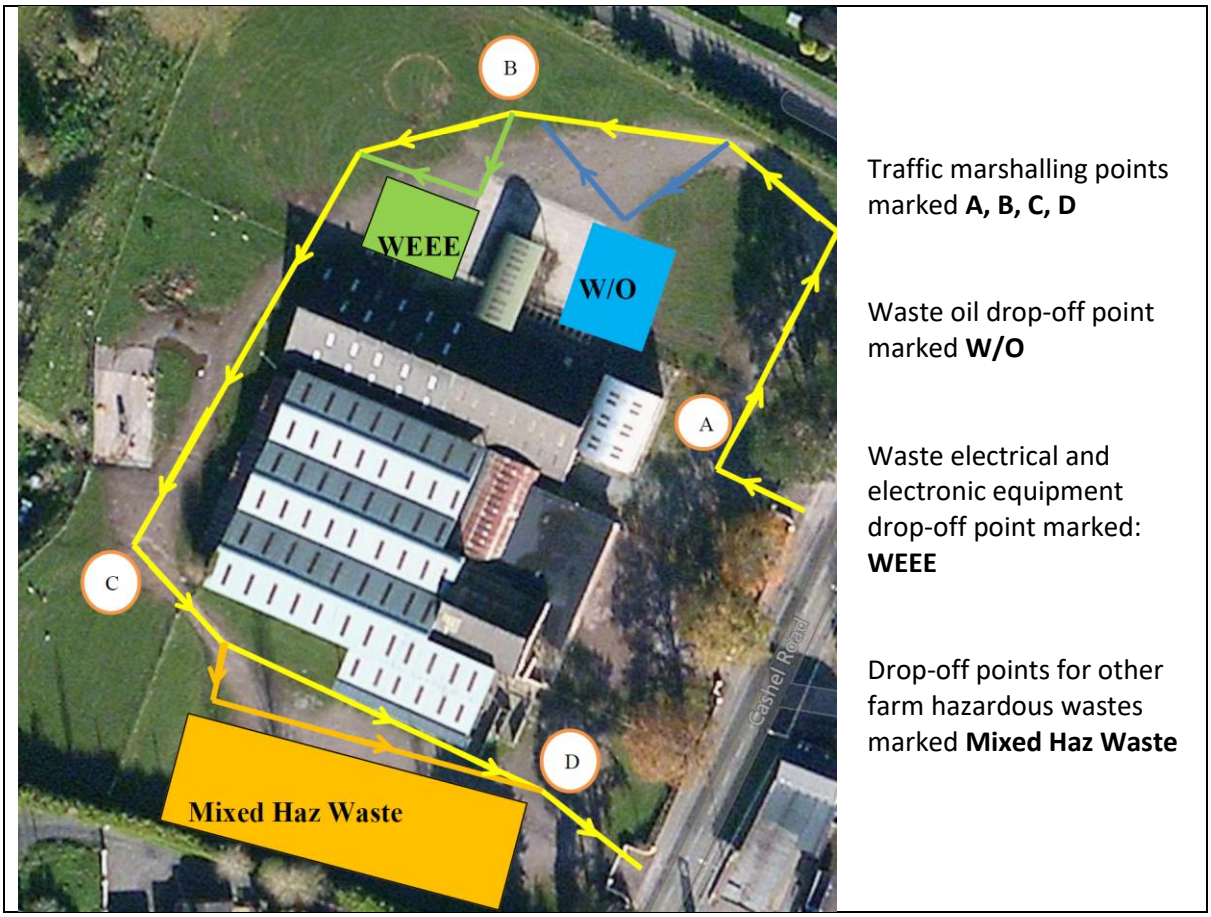

Figure 2. Typical layout of a FHW collection centre.

Promotion and advertising

The FHW collection campaign was extensively advertised and promoted at county, regional and national levels. There are around 140,000 farms in the country across a wide range of geographical and demographic contexts and so a wide range of media channels was used throughout the 5 years of collections to promote the service. The approaches used to promote the FHW collections evolved over the course of the pilot and included:

- notices in national papers (Irish *Farmers Journal*, *Farming Independent*, *Farming Examiner*);
- a digital media campaign with Agriland, which included adverts, text alerts, tweets and articles;

- distribution of information leaflets via Teagasc, DAFM inspectors and marts (see Figure 3);
- notices and articles in local and regional papers;
- dissemination through Teagasc advisory services, discussion groups and newsletters;
- notification through local authorities;
- posters placed in livestock marts and agribusiness premises;
- local radio interviews and adverts;
- targeted text alerts from the Irish Farmers' Association (IFA), Irish Farm Film Producers Group (IFFPG) and Bord Bia;
- information on the EPA website and a telephone information line.

Figure 3. Sample of guidance circulated on FHW collections.

A video demonstrating how the centres operate was also produced and can be accessed at https://www.youtube.com/watch?v=454mq-6R_e4.

Staffing of FHW collection centres

The number of staff engaged at the collection centres varied as the pilot scheme progressed. Based on experience gained through the scheme, the following was deemed to be an appropriate complement of staff:

- 19 waste contractor staff to handle the collection, sorting and recording of FHW and waste oils;
- 2 staff from WEEE compliance schemes to handle WEEE and batteries;

- 1 specialist agricultural consultant to oversee chemical identification.

In addition, there was a significant on-site presence at the centres from the EPA, Teagasc, DAFM and local authorities. This was to provide general assistance in the operation of the centres and also to engage with the farmers who were using the service.

Financial considerations

As the FHW pilot scheme developed, the financial model also evolved based on a clearer understanding in the later years of the appropriate level of staffing and input from specialist contractors needed. In total, over the 5 years of the campaign, government expenditure on the collections was approximately €430,000; there was also a significant amount of additional uncosted input from government, agency and local authority staff. During the 5-year period, farmers' contributions were over €620,000.

Based on the pilot scheme approach as presented in this report, and assuming the availability of a staff member within a public body to act as a coordinator for this work (representing one-third to one-half of a full-time equivalent), the cost to the exchequer for a campaign with 10 events per year is likely to be in the region of €120,000. Using the same charging model as in the pilot scheme, this could be expected to be matched by farmer payments over 10 events in the region of €150,000. It is noted, however, that a larger national-scale campaign is warranted. As such, overall campaign costs would increase accordingly, although some economies of scale are also likely to be seen.

3 Farmer Participation and Wastes Collected

A total of 9228 farmers used the 46 FHW collection centres over the 5 years. The number of farmers using each of the centres varied significantly and it proved difficult to predict turnout. Fewer farmers used the centres in 2016 than in 2015, but this was thought to be the result of a decision to hold at least one collection per county, which brought the campaign to "quieter" agricultural areas. The numbers of farmers using the centres and the quantities of wastes being disposed generally appear to be reflective of farm numbers per county and farm types.

The busiest centres were Listowel, County Kerry (*n* = 520); Castleisland, County Kerry (*n* = 368); and Bandon, County Cork (*n* = 366). The quietest centres were Ballymote, County Sligo (*n* = 79); Lusk, County Dublin (*n* = 85); and Mountrath, County Laois (*n* = 88). It is difficult to definitively determine the reason for this, with a combination of factors probably influencing turnout. These include the relative newness of the scheme; the reach of the promotion efforts; good weather conditions (autumn planting still being carried out); and midweek collections in areas where farmers often mainly work on a part-time basis. However, waste quantities can be high even when the number of farmers is small, e.g. the 85 farmers at Lusk deposited over 20 tonnes of waste. The collections were new and previously unknown but, over time, did appear to be becoming part of the farming calendar of events, similar to the farm plastics collection scheme operated each year. Figure 4 shows the variation in attendance across the collection events.

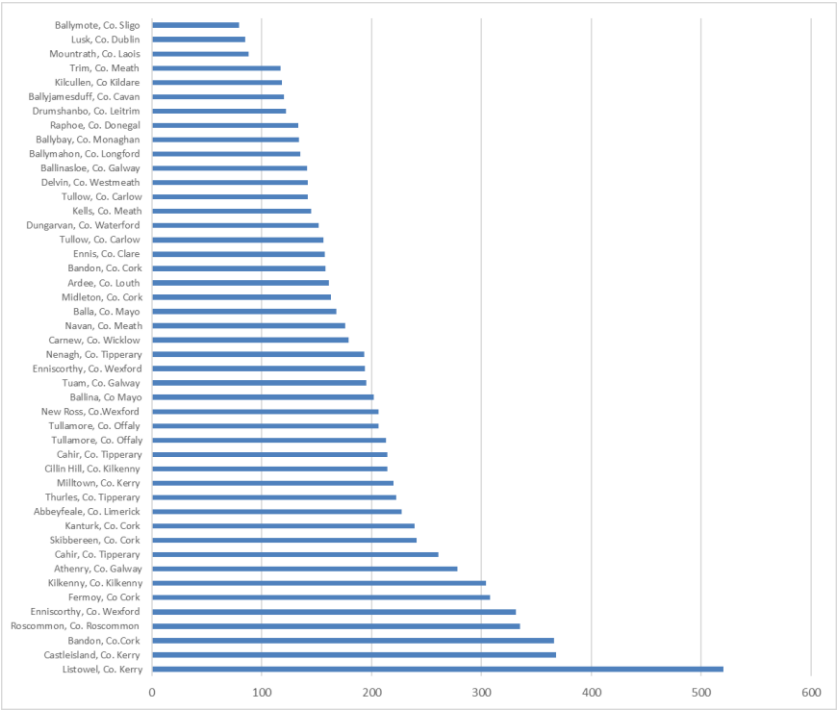

Figure 4. Number of farmers using each centre.

Quantities and types of hazardous waste collected

Over 1000 tonnes of hazardous waste were collected over the course of the pilot scheme and this provides a strong insight into the types and quantities of wastes that could be expected for future collection activities. The wastes presented by farmers at the 46 bring centres were as follows:

Pesticides **68 tonnes** ***(including 1.7 tonnes of persistent organic pollutants)***		**Veterinary medicines** **53 tonnes** ***(including 4 tonnes of syringes and needles)***
Waste oil **481 tonnes**	**Waste paint** **54 tonnes**	**Oil filters** **28 tonnes**
Empty plastics drums **46 tonnes**	**WEEE and batteries** **313 tonnes**	**Corrosives and other wastes** **19 tonnes**

The largest quantity of waste collected was at Listowel, Co. Kerry, with nearly 49 tonnes collected. This was followed by Enniscorthy, with 45 tonnes. The smallest quantities collected were at Ballymote, with 7 tonnes, and Drumshanbo, with 9 tonnes. The average weight of FHW collected per centre was 22 tonnes. Figure 5 shows the variation in the amount of waste presented across the collection events.

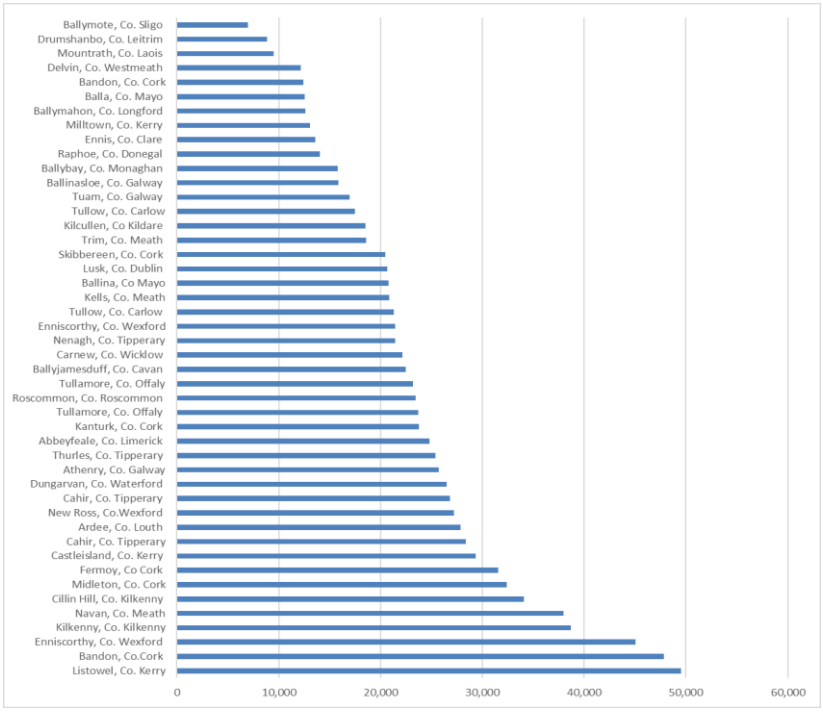

Figure 5. Total quantity (kg) of hazardous waste, WEEE and batteries collected per centre.

Based on data from the pilot scheme, an average 1-day collection centre could expect to be used by 200 farmers, who would present something in the region of 23 tonnes of wastes, as follows:

- *7 tonnes of WEEE and batteries*;
- *10 tonnes of waste oil*;
- *6 tonnes of hazardous wastes, including*:
    - *1.5 tonnes of pesticides*;
    - *1 tonne each of veterinary medicines, paint and empty plastic containers*.

The following sections provide some further information on the various waste types collected through this scheme. A table showing a breakdown of the waste arising at each collection centre is provided in Appendix 1.

Waste oil

In total, 481 tonnes of waste oil were collected over the 5-year period (an average of over 10 tonnes of waste oil per centre), ranging from 27.5 tonnes in Bandon to 1.5 tonnes in Drumshanbo. Eighteen centres collected over 10 tonnes of waste oil each. The average weight of waste oil collected per farmer was approximately 52 kg; however, the quantity of waste oil per farmer varied significantly across the collection centres. In general, the quantity of waste oil per farmer probably reflects the farming type, with greater quantities generated in tillage areas.

Waste pesticides

Farmers presented 68 tonnes of waste pesticides, such as insecticides, fungicides and herbicides. This included 1700 kg of persistent organic pollutant (POPs). In general, the types of waste pesticides collected can be broken down into the following categories:

- Heritage products accounted for approximately 25% of the waste pesticides collected. These are products that have been on a farms for decades and are no longer registered as legally usable products by the Pesticide Registration and Control Division (PRCD) of the DAFM.
- De-registered products,[1] for which the Pesticide Control Services (PCS) number has been withdrawn and their use is no longer legal, accounted for approximately 40% of the waste pesticides collected.

    1. Registered products accounted for approximately 35% of the waste pesticides collected. There were various reasons for farmers wanting to dispose of these products, including

[1] A de-registered pesticide is one that is no longer approved for use and that consequently has been removed from the register of pesticides by the PRCD of the DAFM. When the reason for de-registration relates to likely deleterious health effects on consumers, users or the environment, no sell-out or use-up phase is allowed. However, most de-registered pesticides can be sold for 6 months from the de-registration date and may be used for a further 12 months by farmers. After this 18-month period, such a pesticide becomes a hazardous waste and the farmer can store it on a farm for up to 6 months, where the general duties of holding a waste apply, i.e. protection of human health and the environment, ban on mixing, correct labelling, etc.

changes in farming focus; products having gone out of date; and disposal of stored surplus chemicals for which the efficacy of the active substance is now in question.

The types of products collected varied greatly. In predominantly grassland areas many more phenoxy-based herbicides, veterinary medicines and milking parlour detergents/biocides, etc. were disposed of. In predominantly tillage areas, a wide range of current and out-dated crop protection products were collected, including triazole fungicides and triazine herbicides. Cyanides and strychnine were also recovered.

In relation to the 68 tonnes of pesticides collected, many of these substances are harmful to both human health and the environment if improperly discarded. Of the pesticides collected, 1700 kg were classified as POPs, which are chemical substances that persist in the environment, bioaccumulate through the food web and pose a risk of causing adverse effects to human health and the environment. Even low levels of these substances can prove destructive, particularly if they contaminate groundwater, and so the 1700 kg of POPs collected is very significant.

The POPs collected included dichlorodiphenyltrichloroethane (DDT), lindane (gamma-hexachlorocyclohexane or gamma-HCH), dieldrin and endosulfan, which were used as insecticides and are highly toxic. Many of the substances collected have been banned for a considerable time, e.g. the sale of mercury-based pesticides was prohibited in 1979. Removing these products from farms is very important, given the age and deteriorated condition of many of the containers that were brought to the centres, some of which had worn or missing labels. This can increase the level of danger posed by these wastes when treatment for accidental ingestion requires rapid identification. Furthermore, unsecure containers can lead to accidental human exposure and release into the environment.

Waste veterinary medicines

Over 49 tonnes of waste veterinary medicines, including four tonnes of syringes and needles, were collected. The waste materials presented included a mixture of expired and partially used medicines, such as vaccinations, antibiotics, sheep dip products and mastitis tubes, and syringes and needles.

The range in quantity of waste veterinary medicines collected per farmer was smaller than that seen for pesticides. Waste veterinary medicines are more geographically dispersed across the country, probably reflecting the broad spread of livestock farming in Ireland. A significant amount of this waste stream is actually packaging, which must be handled as hazardous waste as it is contaminated with residues and cannot be triple-rinsed because of the nature and design of the packaging. In general, the waste veterinary medicines collected can be broken down into the following categories:

- Injectable antibiotics accounted for approximately 30% of the weight of veterinary wastes collected.
- Injectable vaccines accounted for approximately 5% of the weight of veterinary wastes collected. Other injectable products accounted for a further 5%.
- Anthelmintics, which are used for the treatment of parasites in livestock, accounted for approximately 35% of the weight of veterinary wastes collected.
- Intramammary such as dry cow tubes and mastitis tubes.

Waste paint

Over 54 tonnes of waste paint were collected, which included water-based, solvent-based and lead-based paints. Although a significant quantity of the waste paints was water-based and therefore was not deemed to be hazardous waste, given the operational constraints of the bring centres, the waste paints were not divided between hazardous and non-hazardous waste. Based on an analysis of data from the 2015 and 2016 collections, it was estimated that over 50% of the waste paints were water based, with the remainder solvent based. Farmers were advised that water-based paints are non-hazardous but many decided to use the disposal service on the day in any case.

Waste empty contaminated containers

Over 46 tonnes of empty, contaminated plastic containers were brought to the bring centres for disposal. These containers had mostly been used to hold pesticides, dairy hygiene products and machine oils and it is clear that there are significant quantities of these plastic containers on farms. Because of their bulky nature, this is a difficult waste stream to manage on-farm and is also expensive to transport for onward recovery. Empty pesticide containers and dairy hygiene containers, once triple-rinsed in accordance with the EPA, DAFM and Teagasc triple rinse guide,[2] are deemed to be non-hazardous and can therefore be recycled through authorised farm plastics collection centres. Empty oil containers cannot be triple-rinsed because of the hydrophilic nature of oil; therefore, all empty oil containers are classified as hazardous waste.

The IFFPG supplied annual figures for the quantity of triple-rinsed empty containers that it has collected in recent years: 59 tonnes in 2014; 55 tonnes in 2015; and 54 tonnes in 2016. Using an estimate of 350 tonnes of containers placed on the market annually suggests a recycling rate of 15%. The IFFPG operates around 220 bring centres every year, which equates to a collection rate of around 250 kg/centre. By contrast, the FHW centres collected 35 tonnes over 5 years, with an average of 972 kg of contaminated empty containers collected per centre. From on-site observations, around

[2] www.epa.ie/pubs/advice/waste/farm/Triple_Rinse_Guide.pdf

50% of these were plant protection product (PPP) containers, 30% were dairy hygiene containers and the remaining 20% were contaminated with oil.

It is evident from the collections over the 5-year period that triple-rinsing is not being implemented extensively by farmers, probably because of a lack of awareness of the guidance and the associated message of it being much cheaper to triple-rinse and use IFFPG collections.

Oil filters

Over 28 tonnes of oil filters were brought to the bring centres for recovery/disposal. The average quantity collected per farmer at the 46 centres was 3 kg, although this varied by location. This probably reflects variations in farm type/size and usage of off-farm machinery servicing.

Corrosives

Both acid and base corrosives were collected over the 5 years, although relatively few of the FHW collection centres received corrosives. The total weight collected of around 7.5 tonnes is less than the weight of other waste types collected; however, these wastes do pose health and safety risks for farmers and their families. Historically, corrosives were used in grass silage, crimped silage, caustic treated wheat and grain preservation. The main types of corrosives encountered were sulfuric acid and propionic acid and caustic soda. Most of the corrosive compounds currently used on farms are used in dairy and animal health applications.

Other wastes

Quantities of other wastes were also collected during the FHW collection campaign. The quantities of these waste types were relatively small and therefore while, although they were collected and weighed individually, they are reported collectively. They include biocides, aerosols, adhesives, human medicines, grease cartridges, oily rags, contaminated fuels and brake fluid. The total quantity of "other wastes" collected was approximately 11.5 tonnes.

WEEE and batteries

Waste electrical and electronic equipment often contains hazardous components and substances that can be damaging to the environment and have adverse effects on human health. For example, fluorescent tubes contain mercury, and asbestos has been used in older appliances such as electric coffee pots, toasters and irons. Fluids that are typically found in heating and cooling appliances can contain ozone-depleting substances, particularly older fridges. Some appliances can contain explosive gases such as ammonia. Lead and other hazardous substances can be released from television/computer monitor screens if they are damaged or cracked. Lead acid batteries are typically used in tractors and fences and there are many documented cases of livestock deaths from lead poisoning because of the ingestion of these batteries.[3]

[3] https://www.independent.ie/business/farming/cows-die-from-lead-poisoning-on-farm-supplying-dairygold-34460871.html

In total, over 312 tonnes of WEEE and batteries were collected, of which 210 tonnes were WEEE and 102 tonnes were batteries (tractor, car, fence and portable). The WEEE collected included large household appliances; mixed WEEE such as kettles and tools such as power drills, saws and hedge trimmers; and television and information technology equipment. The batteries collected comprised 53 tonnes of car and tractor batteries, 36 tonnes of fence batteries and 13 tonnes of small portable batteries. The quantities of WEEE and waste batteries presented are remarkable considering that there is already a well-established producer responsibility initiative in Ireland for the collection and management of these wastes.

A table showing the amounts of WEEE and waste batteries arising at each collection centre is provided in Appendix 1.

4 Analysis of Farm Data

Introduction

As part of the experimental aspect of this pilot scheme, some additional analysis was undertaken using data from the 2015 and 2016 campaigns. This additional work is reported in the following sections.

From 2015, herd or farm ID information was collected from the farmers who used the centres. This enabled more analysis and will help to inform the design and implementation of a future national scheme for FHW collections. The Central Statistics Office (CSO) carried out statistical analysis on data collected from the waste collection centres in 2015 and 2016 by cross-referencing the type and quantity of waste brought by each farmer to the main farm types as used in the national Farm Structures Survey (FSS). The data set from the FHW collection centres was merged with the FSS data set for 2013. The main farming types in Ireland are specialist tillage; specialist sheep; specialist dairying; specialist beef production; mixed grazing livestock; mixed field crops; and mixed crops and livestock; and other. Table 1 summarises the number of farms in Ireland by farm type and the number of farmers from each farm type that used the centres in 2015 and 2016.

Table 1. National farm numbers and number of FHW collection users by farm type

Farm type	No. of farms (national FSS by the CSO)	%	No. of farmers/FHW centres	%
Mixed crops and livestock	2411	2	169	5
Mixed field crops	8180	6	19	1
Mixed grazing livestock	12,912	9	343	10
Specialist beef production[4]	80,059	58	1352	40
Specialist dairying	14,772	11	1167	34
Specialist sheep	14,951	11	174	5
Specialist tillage	4978	4	159	5
Total	138,263	100	3383[5]	100

Figure 6 compares the farm types that used the FHW collection centres with the national figures for different farm types. It would appear that proportionally more specialist dairy farmers used the centres: 34% of farms that used the centres were specialist dairy farms compared with a national figure of 11% for this type of farm. In addition, proportionally more specialist tillage, mixed crops and livestock, and mixed grazing livestock farms used the FHW collection centres.

[4] Farm type "other" was merged with specialist beef production as no farmers from this typology used the FHW centres.

[5] Although a total of 4068 farmers used the centres for FHW disposal in 2015 and 2016 combined, not all of the records could be used as some herd numbers were either invalid or recorded incorrectly.

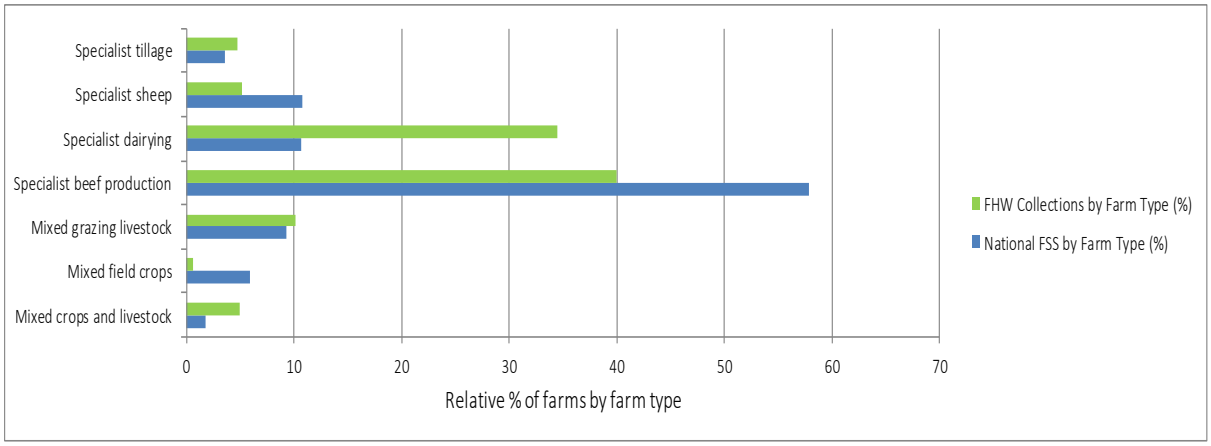

Figure 6. Relative percentages of farm types using the FHW centres.

Waste type and quantity per farm type

The CSO carried out analysis on the waste types that were presented by each farm type and farm size. Waste quantities and type by farmer, farm type and farm size were recorded to assist in estimating the amount of potentially hazardous wastes currently stockpiled on Irish farms. The analysis will also inform the establishment of a national FHW collection scheme and provides information on the waste types and quantities of FHW that could be expected at each centre depending on location, farm types and farm sizes in the various regions in Ireland. Table 2 provides a breakdown of the farmers who used the FHW centres in 2015 and 2016 according to farm type and farm size.

Table 2. Number of farmers using the FHW centres by farm type and size

Farm type	0 to < 10 ha	10 to < 20 ha	20 to < 30 ha	30 to < 50 ha	50 to < 100 ha	≥ 100 ha	All
Mixed crops and livestock	1	5	19	43	66	35	169
Mixed field crops	3	5	4	2	2	3	19
Mixed grazing livestock	5	35	58	99	118	38	353
Specialist beef production	72	235	295	408	290	52	1352
Specialist dairying	2	38	138	433	475	80	1167
Specialist sheep	11	45	36	34	34	14	174
Specialist tillage	6	11	7	21	63	51	159
Total	100	374	557	1040	1048	273	3383

For the 3383 farmers who had a valid herd or farm ID number, the quantity of each waste type disposed of at the centres in 2015 and 2016 was recorded. As there are six categories for farm size and seven categories for farm type it is not practicable in this report to provide an illustration for each farm size. Therefore, average quantities of waste type per farm type are provided in Table 3. It is important to note that much of this waste is legacy waste and the quantities per farm type do not reflect annual quantities of waste arising.

Table 3. Average quantities of waste (kg) by waste type and farm type

Waste type	Mixed crops and livestock	Mixed field crops	Mixed grazing livestock	Specialist beef production	Specialist dairying	Specialist sheep	Specialist tillage
Waste oil	49	50	38	27	49	26	75
Pesticides	8	3	2	2	4	1	19
Veterinary medicines and needles	4	1	5	4	6	5	5
Waste paint	6	3	5	5	5	5	15
Empty drums	7	3	3	3	6	3	6
Oil filters	7	2	1	2	3	1	3
Other	1	0	1	1	2	2	4
Total	81	63	54	45	75	44	128

The largest quantity of waste generated across all farm types was for waste oil. Figure 7 and 8 illustrate the quantities of wastes generated by each farm type with waste oil included and excluded, respectively, for illustration purposes. Tillage farms produced the greatest average quantity of waste per farm, at 128 kg, followed by mixed crops and livestock, with an average of 81 kg per farm. Specialist dairy farms produced an average of 75 kg per farm.

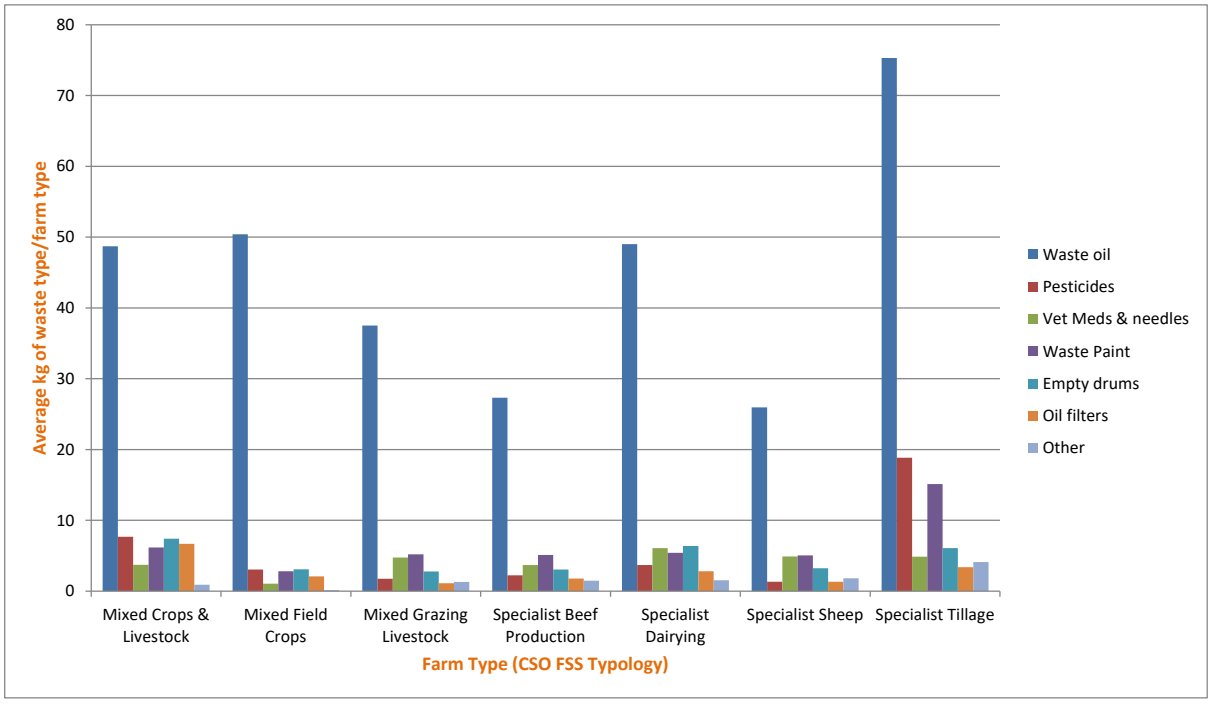

Figure 7. Average quantities of waste types (kg) per farm type (including waste oil).

The types of waste generated per farm type reflect the farming operation; however, there are some waste types that might not be expected. Tillage farms produced the greatest quantity of waste pesticides and the greatest quantity of waste paint relative to the other farm types. Specialist tillage farms also produced veterinary medicine wastes, which might be unexpected; however, as much of

the waste is legacy waste, it probably reflects changing farming practices over the years and some tillage farms do also have smaller livestock enterprises. All of the main livestock farms, i.e. dairying, sheep and beef, produced, as expected, between 4 and 6 kg of veterinary medicine waste. These farms also produced fewer waste pesticides on average than tillage farms, at 19 kg, and mixed crop and livestock farms, at 8 kg. Specialist dairy farms produced 4 kg of pesticide wastes on average, reflecting the practice of reseeding and also probably some legacy wastes arising from growing cereals for feeding purposes.

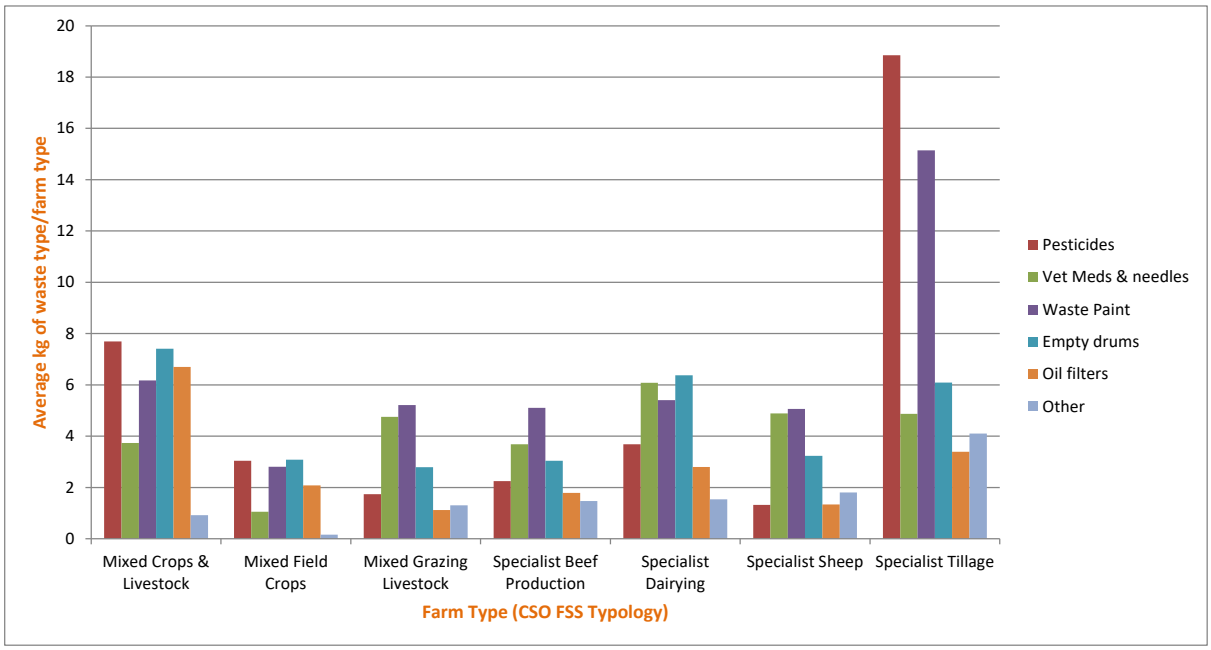

Figure 8. Average quantities of waste types (kg) per farm type (excluding waste oil).

Empty contaminated containers are generated on all farm types. Specialist dairy farms produced 6 kg on average of empty contaminated containers, which arise from the use of dairy hygiene products in the milking parlour. Specialist tillage farms generated these wastes as a result of the packaging waste arising from the use of PPPs.

Farm survey information

A farm survey/questionnaire was also carried out as part of the collections in 2014 to provide information that will assist in the design and delivery of a suitable and affordable national scheme for the collection of FHW. The questions asked about farm size, dominant farm type, distance travelled, and how often farmers would use a collection scheme if offered. Although information was collected on farm size and dominant farm type, this information was not used as the statistical analysis carried out by the CSO on the 2015 and 2016 data is more representative of actual farm type and size because of the cross-reference with herd and/or farm ID number.

Distance travelled by farmers to collection centres

In total, 1647 farmers provided information on the distance that they travelled to the bring centres, with 83% of these travelling up to 40 km one-way (Figure 9). The exception to this was for the

collection in Cavan, where 70% travelled up to 40 km, but another 20% travelled up to 60 km. This information suggests that a reasonable catchment area for any future collection centres is within 40 km one-way of the collection site.

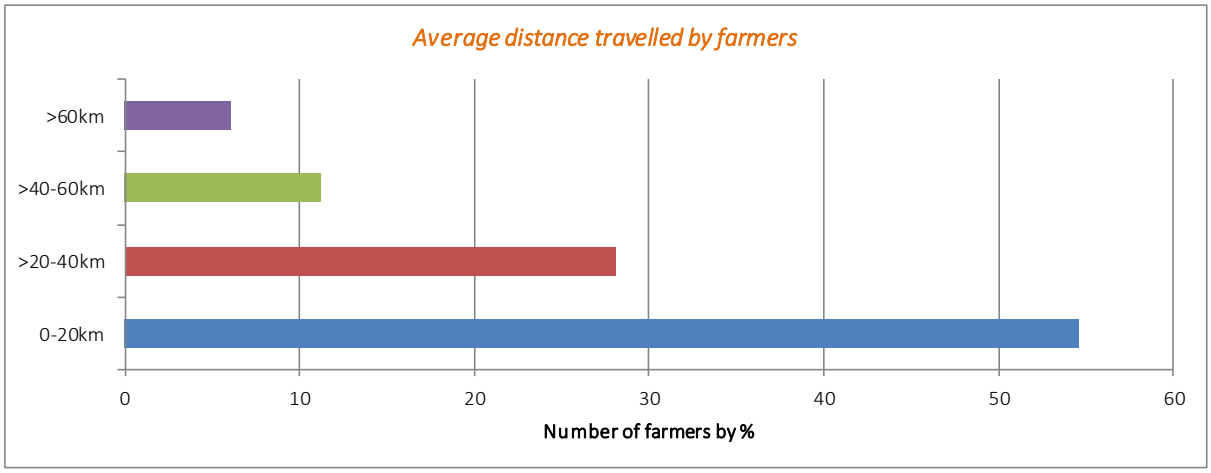

Figure 9. Average distance travelled by farmers (one-way).

Frequency of use of the collection centres

In total, 1617 farmers responded to the question on how often they would use a FHW collection centre within their locality. Over 80% of farmers would use such a scheme twice per year or once per year if it was made available (Figure 10). Some of the farmers who availed of the scheme in 2014 also used one of the centres that operated in 2013. This indicates that the farmers are likely to use a national scheme every year if provided.

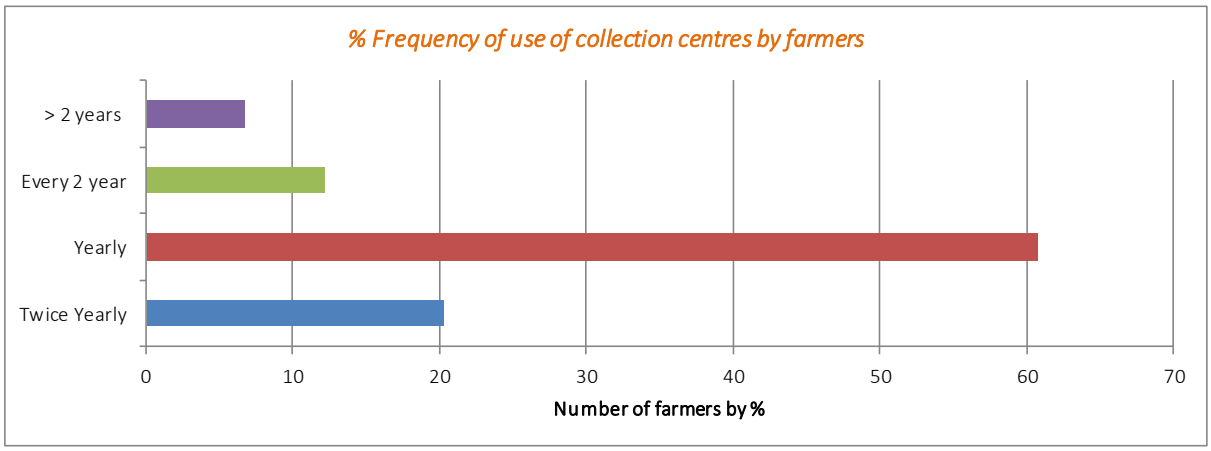

Figure 10. Indicator of frequency of use of collection centres if available.

Motivation for farmers to use the centres

The EPA and Teagasc carried out a survey at the Teagasc Beef Open Day in Grange, County Meath, in July 2016 to explore what motivates farmers to bring their hazardous wastes to the centres for disposal. A total of 48 farmers completed the survey and, for these farmers, the primary motivating factor was "*health and safety*", followed by the need to "*tidy up the yard*", "*audits and inspections*" and, lastly, "*protecting the environment*". Many farmers also expressed the need for an affordable national scheme to be established.

5 Estimates of Legacy Hazardous Wastes Currently on Farms

The CSO carried out statistical analysis of the information compiled during the FHW collections of 2015 and 2016. It added farm size and farm type variables to the data set by matching the data obtained at the collections with the FSS (2013) using the farm data shown in Table 2.

To provide estimates of the types and quantities of wastes currently held on Irish farms, weighting factors, calculated using farm size and farm type, were applied to the data to scale up to the 2013 FSS data.[6] Table 4 provides the numbers of farms nationally in the FSS by farm size and farm type.

Table 4. Numbers of farms nationally categorised by farm type and size

Farm type	0 to < 10 ha	10 to < 20 ha	20 to < 30 ha	30 to < 50 ha	50 to < 100 ha	≥ 100 ha	All
Mixed crops and livestock	92	232	349	711	846	181	2411
Mixed field crops	3984	2126	869	550	262	389	8180
Mixed grazing livestock	2417	2622	11,355	2984	2438	420	12,912
Specialist beef production	14002	23,870	16,412	16,924	7697	1154	80,059
Specialist dairying	79	727	1822	5409	6393	342	14,772
Specialist sheep	4294	3813	2323	2545	1447	529	14,951
Specialist tillage	546	809	765	1167	1262	429	4978
Total	25,414	34,199	24,571	30,290	20,345	3444	138,263

The weighting factors were calculated using farm size and farm type. They were derived by dividing the numbers of farms categorised by farm type and farm size using the centres by the number of farms in each category in the 2013 FSS. Table 5 gives the weightings that were applied to the average quantity of waste type per farmer based on farm type and farm size to derive national figures for FHW.

Table 5. Weighting factors

Farm type	0 to < 10 ha	10 to < 20 ha	20 to < 30 ha	30 to < 50 ha	50 to < 100 ha	≥ 100 ha
Mixed crops and livestock	92	46	18	17	13	5
Mixed field crops	1328	425	217	275	131	130

[6] The 0- to 2-hectare and the 2- to < 10-hectare size classes were combined because there were only a small number of farm returns in these classes. The FSS typology category “other” was combined with “specialist beef production” for the same reason.

Mixed grazing livestock	483	105	35	30	21	11
Specialist beef production	194	102	56	41	27	22
Specialist dairying	40	19	13	12	13	4
Specialist sheep	390	85	65	75	43	38
Specialist tillage	91	74	109	56	20	8

For example, a weighting factor of 41 was applied to the actual average weight of each waste stream that a "specialist beef production" farmer in the farm size category "30 to < 50 ha" disposed of at the centre. Basically, this farmer typically represents 41 other specialist beef production farmers in the country.

Using these weighting factors and knowing the average weight of the various waste types for each farmer from each farm type and farm size, an estimate of the quantity of legacy hazardous wastes that are currently stockpiled on Irish farms was made. Table 6 provides national estimates of the types and quantities of hazardous wastes that are potentially being stockpiled on Irish farms.

Table 6. National estimates of hazardous wastes currently stockpiled on Irish farms

Waste type	Tonnes
Waste oils	4687
Pesticides	414
Veterinary medicines and needles	561
Waste paint	744
Empty drums	495
Oil filters	269
Others[7]	207
Total national estimate	**7378**

Although these are estimates, it is clear that there are significant quantities of hazardous and potentially hazardous wastes on Irish farms. At the current collection rate of approximately 200 tonnes per annum during the FHW collection events, it will take 36 years to clear the legacy wastes. This does not take account of current waste generation on farms.

[7] "Other" includes 60 tonnes of aerosols, 20 tonnes of biocides, 45 tonnes of corrosives and 82 tonnes of "others", which includes smaller quantities of adhesives, human medicines, grease cartridges, oil rags, contaminated fuels, brake fluid, brake pads, creosote and crop trace elements.

6 Estimates of Pesticide and Veterinary Medicine Waste Generated Annually

The EPA also carried out research to estimate the annual quantities of pesticide and veterinary medicine wastes arising annually from product use on farms. Assistance was provided by various individuals and organisations, including private agribusinesses, farming organisations, the PRCD of the DAFM, the veterinary section of the DAFM and the Health Products Regulatory Authority (HPRA). The veterinary medicine market is thought to be valued at around €170 million per year in Ireland. The PPP market is thought to be valued at €65 million (excluding biocides).

Estimates of annual pesticide waste arising

The DAFM has provided data in relation to PPPs placed on the market in 2014 – a total of 15,625 tonnes. Of this, 5647 tonnes was for amateur use only and 41 tonnes was for amenity use. This leaves approximately 9937 tonnes of product for agricultural use; however, some of these products (e.g. glyphosate) can also be used for amenity purposes. Applying estimated typical wastage figures of 0.5% and 2% to the 9937 tonnes placed on the market results in an estimate of 50–199 tonnes of pesticide waste being generated on an annual basis.

Estimates of annual veterinary medicine waste arising

Obtaining an estimate of the quantity of veterinary medicine products placed on the Irish market annually has proved difficult. The HPRA does not collect information on the types and quantities of veterinary medicines placed on the market on an annual basis. The HPRA website lists the veterinary medicines that it authorises nationally; however, it does not have precise information on which medicines are actually marketed in this country, nor on the volumes of products sold apart from antibiotics. This is further complicated by the fact that some products are authorised in Ireland to facilitate their marketing in the Middle East and Africa. Moreover, other categories of products that are not listed on the HPRA website of authorised veterinary medicines are also marketed in this country, including:

- veterinary medicines authorised by the European Medicines Agency (i.e. the European Union Commission granted a pan-European authorisation);
- veterinary medicines authorised by the DAFM (i.e. special imports); and
- feed additives and biocides authorised by the DAFM (some of which are very similar to veterinary medicines but which have been approved under different legislation).

The veterinary section of the DAFM provided an estimate that 1500 tonnes of veterinary medicines are used in Ireland on an annual basis and that approximately 80% of this total is used in agriculture and 20% is used in the treatment of pets. This would indicate that 1200 tonnes of veterinary medicines are used annually in agriculture. Estimated typical wastage rates vary from 2% to 20% (which includes contaminated packaging), which would result in waste generation in this area of between 24 tonnes and 240 tonnes.

7 Relevance to National Policy Objectives

The FHW collections to date and the establishment of a national FHW collection scheme support the sustainability ambitions of the agri-food sector, as well as enabling farmers to meet their obligations under national and European Union legislation. These collections and any future national scheme will assist relevant stakeholders in meeting ambitions, targets and obligations set out in various national and European programmes and legislation, including:

- the National Waste Prevention Programme (NWPP);
- the National Hazardous Waste Management Plan (NHWMP);
- the Stockholm Convention on Persistent Organic Pollutants;
- the Water Framework Directive;
- Food Harvest 2020 and Food Wise 2025;
- Bord Bia quality assurance schemes;
- sustainable use of pesticide and PPP regulations; and
- producer responsibility and integrated product policy.
- Circular Economy Package

National Waste Prevention Programme

Ireland's NWPP delivers solutions to individuals and organisations that recognise the costs of waste consumption (both excess purchasing and final disposal charges), along with the critical need to manage our finite natural resources to maintain our quality of life into the future. The circular economy is a key driver for the NWPP and it includes the removal and safe management of hazardous substances. The NWPP has provided significant funding for the running costs of the collection centres since commencement of the pilot scheme in 2013.[8]

The FHW collections contribute to the ambitions of the NWPP and also deal with the legacy waste issues on farms. The information on waste types and quantities obtained and the farm survey information provide very good data on waste arising from primary producers in the agricultural sector, and this will contribute to reporting requirements under the National Waste Report and the European Waste Statistics Regulations.

National Hazardous Waste Management Plan 2014–2020

The EPA is responsible for preparing Ireland's NHWMP in accordance with Section 26 of the Waste Management Act 1996 as amended. The third plan covers the 6-year period from 2014 to 2020. Its key objectives are to:

- prevent and reduce the generation of hazardous waste by industry and society generally;
- maximise the collection of hazardous waste with a view to reducing the environmental and health impacts of any unregulated waste;

[8] Farmers being the other substantial contributor to the running costs.

- strive for self-sufficiency in the management of hazardous waste and minimise hazardous waste export;
- minimise the environmental, health, social and economic impacts of hazardous waste generation and management.

The FHW collections addressed these objectives. In addition, the NHWMP specifically mentions the issue of FHW and suggests that a producer responsibility initiative could be funded by levies on producers and/or importers of relevant products that generate the hazardous wastes and that these funds could be used to establish a national FHW collection scheme. It also suggests that expansion of the existing farm plastics recycling scheme could provide such a mechanism.

Stockholm Convention on Persistent Organic Pollutants

Significant quantities of banned pesticides that have been classified as POPs were collected over the 5 years of the pilot scheme. Although it is difficult to calculate a national figure for the quantity of POPs currently stockpiled on Irish farms, an estimate was derived using the average weight of POPs collected per farmer multiplied by the number of farmers in the CSO FSS. This gives a national estimate in the region of 31.5 tonnes of legacy POPs currently stockpiled on farms. The EPA is the designated competent authority for the purposes of POP regulations. The DAFM is designated as the public authority for POPs used or intended for use as pesticides. These regulations allow for arrangements to be established for the carrying out of monitoring, inspections, checks and investigations of POPs, which could potentially include investigations into the holding of POP pesticide stockpiles.

Circular Economy Package

Through its Circular Economy Package, the EU has committed to decreased landfilling of waste, increased recycling of materials and the realisation of a non-toxic environment. The strategy is being progressed through a combination of legislative changes and a series of sectoral measures. The non-toxic environment aspect of this work requires eliminating or reducing harmful substances within product cycles and also ensuring that hazardous substances and items contaminated by contact with hazardous substances are carefully managed to ensure that they are not allowed to enter recycling processes without adequate precautions.

Water Framework Directive

The Water Framework Directive is a key European legislative instrument aimed at improving water quality throughout the EU and it applies to rivers, lakes, groundwater and coastal waters. The Directive requires an integrated approach to managing water quality, and it, along with national regulations, sets out environmental quality objectives and standards that are required to be met for parameters in water. National regulations set out environmental quality objectives and threshold values for pollutants or indicators of pollutants in water, and many of the hazardous substances found in FHW that could cause environmental pollution are listed in the schedules to these regulations. These include heavy metals such as lead, mercury and cadmium, cyanide, and pesticides such as DDT, 2-methyl-4-chlorophenoxyacetic acid (MCPA), lindane, aldrin, dieldrin, chlorpyrifos and diazinon. For example, under the European Communities Environmental Objectives (Groundwater) Regulations (S.I. No. 9 of 2010), for a groundwater body to achieve good groundwater chemical status, the concentration of active substances in pesticides (PPPs and biocides) in groundwater must not be greater than 0.5 µg/l in total.

The continuation of the FHW collections through the establishment of a long-term scheme would clearly contribute to achieving the objectives of the Water Framework Directive and associated national regulations by providing a mechanism whereby hazardous wastes are removed from farms and recovered or disposed of in an environmentally sound manner, thereby eliminating the risk of these substances leaking into water bodies.

Food Wise 2025

Food Wise 2025 sets out a framework plan for the development of the agri-food, fisheries and forestry sector in Ireland to support a dynamic, forward-looking agri-food sector. Building on the previous plan (Food Harvest 2020), Food Wise 2025 sets out a 10-year plan to expand the sector with a stated vision for this industry to continue to grow sustainably. Ireland's agri-food sector manages the vast majority of the natural resources in the country and therefore plays a vital role in the enhancement of Ireland's landscapes, waterways, biodiversity and air quality.

Food Wise 2025 emphasises that productivity gains in this sector must not be made at the expense of the environment.[9] Farmers therefore need to be able to demonstrate their green credentials, e.g. as primary producers. Farmers play a valuable role as guardians of the rural environment and, by increasing efficiency per unit of production, reduce the inputs required for their operations while protecting the environment. The FHW collections clearly contribute to the ambitions of Food Wise 2025 by providing farmers with a means of disposing of these wastes in an appropriate manner.

Bord Bia quality assurance schemes

Bord Bia provides quality assurance schemes for the beef, lamb, dairy, pig, poultry and horticulture sectors. Although the schemes' objectives differ somewhat depending on the farm type and the produce, the main goals are common to them all and include:

- Farmers can demonstrate that their produce is produced in a sustainable manner under an accredited scheme.
- A uniform mechanism is available for recording and monitoring the sustainability of the production system on farms.
- Best farming practice criteria are set out for farmers to implement on their farms to ensure that they continue to produce milk, meat, eggs, vegetables, etc. in a sustainable manner and that their performance can be measured.

It was evident during the operation of the 2013–2017 collections that many of the farmers who used the centres were Bord Bia quality assured and that there is a strong need and demand for a national scheme to be established to assist Bord Bia farmers and others in maintaining their quality assurance standard and delivering sustainable agriculture in practice.

Pesticide legislation

"Pesticide" is a generic term used to reference "plant protection products" and "biocidal products". The DAFM is responsible for implementation of the regulatory system for PPPs in Ireland, which is

[9] Food Wise 2025.

designed to ensure a very high level of protection for humans, animals and the environment. It has four main elements:

1. the regulatory (licensing) system for PPPs and biocides;
2. the national monitoring programme for pesticide residues in food;
3. the collection of statistics on pesticide use; and
4. the sustainable use of pesticides (national action plan, user training, testing of sprayers, etc.).

It is an offence to store a PPP that is no longer registered for some reason, e.g. it is no longer effective or the active substance is banned from use. Once a pesticide is de-registered, a farmer has 18 months to use up the product. After this period, the pesticide is designated as hazardous waste and the farmer can store it for an additional 6 months. The establishment of an effective FHW collection regime is critical for facilitating compliance with this requirement.

Producer responsibility and integrated product policy

Producer responsibility is based on the principle that producers of products take financial responsibility for the collection and management of their products at end-of-life. Ireland has a very well-developed policy with regard to producer responsibility. This concept allows producers to devise schemes that can fulfil the objectives of waste management legislation without resort to control by a direct, often cumbersome approach. An example of such a scheme in Ireland is the IFFPG, which is the sole compliance scheme for farm plastics. The IFFPG operates bring centres each year across the country for the recovery and recycling of farm plastic, and recycles more than 25,000 tonnes of farm plastic annually, which represents a national recycling rate of 70%. Any future FHW collection scheme should consider using its expertise, skills and agricultural knowledge.

It is clear from FHW collections to date and from farmer feedback that one of the main attractions of collections is that they allow a “one-off” clear-out of all hazardous wastes from farmyards. Given the mixed types of hazardous wastes generated on farms, identifying producers and apportioning the quantities used to each producer may be very difficult. The aim should be to secure voluntary participation and funding from pesticide and veterinary medicine producers based on their reported market share to manage the wastes generated by the use of their products. These contributions would help towards the establishment of a long-term sustainable national scheme for FHW collection and adhere to guiding principles of corporate social responsibility.

8 International Collection Schemes

Overview of international schemes

Research was also undertaken on similar schemes operating in other countries. This work identified some similarities with what has been achieved in Ireland to date. However, the Irish FHW collection scheme appears to be the only scheme that offers farmers a complete solution to FHW management by accepting the full range of hazardous wastes that are generated during normal farming practices. All schemes appear to provide farmers with the opportunity to bring certain wastes that are generated on their farms to a centralised 1-day collection centre, apart from the pilot Welsh scheme. The following observations are worth noting in the context of the design and implementation of a permanent and sustainable national scheme for Ireland.

- The agrichemical industry is very involved in supporting FHW collection, both financially and in the use of its premises as collection centres. Central and local government and an environmental agency assisted the agrichemical industry in establishing a national scheme by contributing both resources and finances, particularly in the early years of each scheme.
- A voluntary producer responsibility initiative (PRI) seems to be the preferred model adopted in each country.
- Most schemes focus on a limited number and limited types of waste streams. The wastes collected are primarily clean packaging, contaminated packaging (pesticides and dairy hygiene), obsolete pesticides, and obsolete and unused veterinary medicines.
- The collection of legacy pesticide wastes to ensure that these highly toxic and persistent chemicals are removed from farms has been subsidised by a combination of government and agrichemical industry funding. This allows for the stockpiles of pesticides to be removed, with new wastes arising dealt with through established national schemes.
- A partnership and collaborative approach has been adopted to establish a permanent national scheme, with agri-industry taking the main operational role by establishing an organisation with responsibility for the scheme.
- Collections occur at the same locations and at certain intervals to ensure that farmers become familiar with these events. The frequency of collections varies from once per year to once every second or third year.
- Packaging waste and plastic films are managed by the same companies/organisations that offer collection services for obsolete pesticide and veterinary medicine wastes.

An outline of schemes operating in other countries is presented in the following sections.

Canada

In Canada a voluntary PRI called CleanFARMS, which has the support of the government and industry, collects farm plastic, pesticide and veterinary wastes. Stakeholders have worked together for over 20 years, including farmers, manufacturers, distributors, agri-retailers, municipal collection sites, contractors, customers, government and the public. Representatives of industry are on the board of management. The current board members are Dow AgroSciences Canada Inc., Syngenta Canada Inc.,

ADAMA Agricultural Solutions, CropLife Canada, the Bodtker Group of Companies, Bayer CropScience Inc., Bio Agri Mix, IPCO (Interprovincial Cooperative Ltd), Nufarm Agriculture Inc., Richardson International Ltd, BASF Canada and La Coop Fédérée. Over 55 companies are members of CleanFARMS from across all sectors of the agricultural industry. CleanFARMS is a not-for-profit industry stewardship organisation committed to environmental responsibility through the proper management of agricultural waste. Permanent and some pilot programmes are being offered on a collaborative basis for the recycling and/or disposal of the following waste types:

- Empty container recycling – CleanFARMS partners with agri-retailers and municipalities to collect empty commercial pesticide and fertiliser containers from farmers across the country. Over 2.5 million empty containers were returned by farmers to collection sites throughout Canada in 2013. A similar programme is being developed for empty pesticide bags.
- Obsolete pesticides – CleanFARMS is delivering a programme that allows farmers in each province to dispose of obsolete pesticides, which are sent for high temperature incineration. In 2013, 151 tonnes were collected and incinerated.
- Obsolete livestock/equine medications – CleanFARMS, in partnership with the Canadian Animal Health Institute, is taking a lead role in providing a service to farmers for the safe disposal of expired or unneeded veterinary medicines.
- Agricultural film, silage cover, silage and grain bags, bale wrap and empty seed bags, and twine – CleanFARMS is running pilot programmes for the recycling of agri-waste plastic and packaging with the support of various partners.

The scheme collects obsolete or unwanted agricultural pesticides (identified with a Pest Control Product number on the label) and livestock medications that are used by primary producers in the rearing of animals in an agricultural context (identified with a DIN number, serial number or Pest Control Product number on the label).

In the case of pesticide wastes, initially the government and industry shared the cost of dealing with legacy wastes; thereafter, manufacturers have paid 7.4 cents per 10 litres of product that they place on the market. The main drivers for the widespread cooperation of industry have been the threat of more onerous legislation and positive publicity associated with the initiative.

Regarding veterinary wastes, a representative body for animal health product manufacturers (Canadian Animal Health Institute) pays CleanFARMS every year for the full recovery costs of the service, as well as a management fee. This service was established more recently and is in the early stages of development.

Waste is collected from farmers through a contracted hazardous waste company. Typically, each region in Canada receives the service once every 3 years. The collections are 1-day events and are held at retail outlets, involving three to four staff. All collected waste is thermally treated. The service is promoted through local newspapers, representative bodies and advertisements in retailer stores. It is free to farmers.

CleanFARMS collected 223 tonnes of pesticide wastes and 5 tonnes of veterinary wastes in 2014. Although CleanFARMS has data on the amounts of pesticide and veterinary products entering the

market annually, it has no data on the percentages of these products that typically become waste. See www.CleanFARMS.ca for further information.

Germany

RIGK is a voluntary recovery compliance scheme in Germany that provides compliance for a range of commercial and agricultural sectors (six recovery services) through different companies. RIGK was originally established to deal with the management of waste arising from the use of hazardous products by trade and industry.

In 1997, the company was asked to facilitate the collection and management of triple-rinsed pesticide containers from the agricultural sector, which it did through a company called PAMIRA-SYSTEM. In 2006, central government and the pesticide industry collaborated to remove legacy pesticide wastes from German farms. The government subsidised the waste collection, which was carried out using mobile chemical units placed in retail outlets across the country. Over 510 tonnes of obsolete pesticides were removed during this one-off clear-out. Since 2006, the pesticide industry has undertaken various campaigns to facilitate the removal of unused pesticides from farms. Industry producers now pay for a mobile chemical unit to be present on their site, regardless of the number of farmers who use it. The pesticide wastes are weighed and sent for disposal. The amount paid by each producer is determined by its percentage share of the market. Farmers also contribute towards the costs of disposal and are charged a fee of €2.95/kg. See www.pre-service.de for further information.

In addition to the services offered for unused or obsolete pesticides, RIGK and its sister companies offer the following services for the agricultural sector:

- PAMIRA-SYSTEM – A company called Pamira Seed Treatment offers a nationwide bring system for empty seed dressing containers on fixed dates at agricultural retail outlets that is fully financed by the producers and distributors of the pesticide industry. This service is offered free of charge to the final customer. Thirty-five bring centres are operated annually and approximately 60 tonnes of waste are collected each year, mostly at retail outlets. This represents a 100% recovery rate. See www.pamira.de for further information.
- ERDE – Silo and silage stretch films through a nationwide bring system on fixed dates at collection points across the country. This is funded by the producers of the silage plastic and farmers. See www.erde-recycling.de for further information.
- FOLIO and NETTI – Crop establishment films, non-wovens and netting plastics from the agricultural sector are collected nationwide throughout the year. The final consumer, i.e. the farmer, pays the recovery/disposal costs. See www.folio-netti.de for further information.

France

A comprehensive collection, recovery and disposal scheme is operated in France that facilitates the removal of agricultural packaging waste, which includes silage and film plastics, empty clean and/or contaminated pesticide and dairy hygiene containers, and obsolete pesticides from farms. This scheme is industry led through a stakeholder company called ADIVALOR. Collections are carried out in partnership with the manufacturers and distributors of pesticides and occur mostly at retail premises. The stakeholders include the Permanent Assembly of Chambers of Agriculture (APCA); the Association for the Recovery of Seed Packaging (ARES); Coop de France, which has 200 cooperative

members that supply agricultural inputs such as seeds, pesticides and hygiene products to farmers; the French Agricultural Plastics Committee (CPA); the French agricultural trading business supplies of fertilisers, feeds, PPPs and seeds (FNA); the French National Union of Farmers (FNSEA); InVivo, an organisation representing 223 cooperatives; SEPH, established by union members working in the dairy hygiene sector, which finances the collection scheme for empty dairy hygiene containers; SOVEEA, the society for the recovery of fertiliser and soil enrichment product packaging; UIPP, the French union for the crop protection industry; and UPJ, the French union for businesses and enterprises for the protection of gardens and green spaces. In total, 51 companies were reported to be actively involved in the organisation. These companies finance ADIVALOR's activities and take full responsibility for the safe disposal of wastes arising from their products. The companies represent more than 90% of the crop protection products commercially placed on the market.

The members of ADIVALOR are charged around 1c/kg of product placed on the market to fund the collection service for packaging from pesticides and dairy hygiene products and some residues. The scheme for these wastes has been 100% self-funded since 2008. All products are branded with an ADIVALOR logo so that they are identifiable at each collection point. Obsolete pesticides and containers with the logo are accepted free of charge from farmers. When there is no logo on a container, farmers are charged a fee of between €5/kg and €10/kg.

In relation to dealing with legacy wastes, from 2001 to 2018 the French Environment and Energy Management Agency (ADEME), in partnership with agri-industry, offered a subsidised service to French farmers to clean out old legacy pesticide wastes. The subsidy was split 50 : 50 between industry and the State. The collections were offered free of charge to farmers and held in agri-premises across the country. Over 9600 tonnes of obsolete pesticides, including POPs, were removed during this campaign. A subsequent free collection scheme was offered to farmers in 2013–2014. During this campaign, 220 tonnes of obsolete pesticides were collected, resulting in a total of 9820 tonnes removed from farms. As a result of this previous free scheme for farmers, the collection centres do offer a service to farmers to take obsolete pesticides; however, they are charged between €5/kg and €10/kg for disposal at collection centres, up to a maximum of 100 kg. See www.adivalor.fr for further information.

New Zealand

In New Zealand a voluntary scheme called Agrecovery collects agrichemical wastes (crop protection, animal health and dairy hygiene products), as well as triple-rinsed containers (non-hazardous). The scheme is not for profit and is primarily funded by producer fees (70% of agrichemical waste recovery is funded by producers), with the majority of producers participating in the scheme.

The scheme collects wastes at bring centres (mainly retail outlets), with collections held on a 12- to 18-month cycle. Some wastes are collected free of charge from farmers, with a charge applying to other wastes.

Since 2009 the scheme has collected over 70 tonnes of agrichemical waste for recovery. However, the current non-participation of some producers, as well as widespread burning and burying of farm waste in New Zealand (legal in some regions), is inhibiting the further growth of recycling.

Wales

PestSmart was launched in Wales in April 2017. It is a collaborative initiative between Welsh Water and Natural Resources Wales and is supported by the Welsh government and the agriculture and environment sectors. It encourages land managers and farmers to consider their pest control practices to protect people, water and wildlife. The main driver for the scheme is the protection of drinking water. Welsh Water's routine raw water monitoring programme has detected increasing traces of pesticides in areas where pesticides have not been previously detected and drinking water standards have been exceeded.

As part of this initiative, farmers, growers, foresters and land managers in six water catchments have been offered a free, confidential and "no questions asked" disposal scheme for out-of-date, unwanted or now unlicensed pesticides and herbicides. Chemicals must be presented for collection in their original containers. There is a limit of 30 litres per eligible farmer in each catchment. Any amount greater than 30 litres is charged at £2.35/litre.

This scheme allows for pesticides, herbicides, slug pellets and sheep dip to be collected and disposed of safely and confidentially for a limited time on a first-come, first-served basis. A hazardous waste contractor has been employed to provide the service to land managers/farmers within each catchment. See www.dwrcymru.com for further information.

9 Operational Observations

Following the operation of 46 collection centres (with at least one in every county), the pilot programme has demonstrated that it is logistically possible to operate FHW collection centres that accept a comprehensive range of hazardous wastes for disposal/recovery.

Based on the experience gained by the EPA and its project partners over the course of this pilot scheme, a number of specific observations are presented below to inform considerations on the future management of this waste stream.

FHW collections

- Over 1000 tonnes of FHW for disposal/recovery was collected from over 9000 farmers. The most significant waste streams were pesticides, veterinary products, waste oil and oil filters, and WEEE and batteries.

- Significant quantities of legacy agrichemicals such as DDT, lindane, cyanide, agent orange and strychnine were presented for disposal at the centres. The poor condition of some containers holding these highly toxic substances is a particular concern.

- A total of 46 tonnes of contaminated empty containers were collected over the 5-year period of the pilot scheme, which indicates that farmers are not engaging with triple-rinsing of containers on farms and depositing at IFFPG bring events.

- The inter-agency and cross-department collaborative model worked well, assisted by other key stakeholders, including local authorities, the IFA, Bord Bia and local agribusinesses.

Drivers and demand

- The FHW collections underpin many national legislative priorities and policy ambitions relating to the agricultural industry and environmental protection (such as Origin Green, Food Wise 2025, the NHWMP, the National Implementation Plan on POPs and the Water Framework Directive).

- The current estimate for the amount of hazardous waste stockpiled on farms across Ireland is 7378 tonnes. Often, these substances are highly toxic (with many now banned) and are stored in deteriorating containers. There is a clear need to tackle this issue – for both environmental and farm-safety reasons.

- In terms of ongoing waste arising, it is estimated that at least 50 tonnes of waste pesticides and 24 tonnes of veterinary medicine waste are generated annually. These figures include waste packaging, which is significant, particularly for biocides and veterinary medicine waste.

- There is strong farmer demand for an annual collection scheme. Farmers participated in the pilot scheme for several reasons, including to improve farm safety; for compliance with legislation; to protect the environment; and for good housekeeping purposes.

- Over 80% of the farmers surveyed would use a FHW collection centre on an annual basis, if made available, with 83% willing to travel up to 40 km one-way to such a collection point.

Logistics and finance

- Additional funding will be required to continue and expand the collections. Additional mechanisms such as levies on products placed on the market (ring-fenced for FHW collections) could be considered.

- In the review of other countries regarding FHW collection approaches, the agrichemical industry was shown to support the collection of FHW arising from the use of its products. These companies, some of which are already operating in Ireland, contribute financially to the collections and make premises available as collection centres.

- Waste oil is generally a revenue generator for the waste management contractor. However, the volatility of oil prices makes this difficult to factor accurately into financial planning.

- Considerable quantities of hazardous packaging waste are generated from the use of products such as pesticides, veterinary medicines and oil, indicating a role for a national packaging compliance scheme.

- Although the amounts charged at collection sites were at a subsidised rate, the farming community also contributed significantly to operating costs.

10 Concluding Remarks

The pilot programme demonstrated that there is an interest and demand from the farming community for appropriate FHW disposal routes and that it is logistically possible to operate FHW collection centres that accept a comprehensive range of hazardous wastes for disposal/recovery.

In general, there are limited options available to Irish farmers for the safe and responsible disposal of the hazardous wastes produced as part of the routine business of agricultural production and so the problem of dealing with FHW has two distinct components. Hazardous wastes are generated every day through agricultural activity and will continue to arise, at some rate, into the future. Waste prevention campaigns, producer take-back schemes and the introduction of more environmental friendly agrichemicals may assist in reducing this issue somewhat. In addition, as a result of the lack of practical options for disposal, significant amounts of "legacy" wastes are being stockpiled in farmyards, often for decades. These represent a pressing environmental threat and require urgent removal from the rural environment.

Based on the experiences from this pilot project, it is clear that there is a need to effectively address this issue. This should be advanced without delay through a combination of waste prevention and waste management approaches, with appropriate leadership from sectoral and government bodies. The following recommendations are presented for consideration:

- **Minimise the generation of FHW:**

  Data collected through this pilot scheme highlight the regular waste associated with farming, some of which could be avoided through the implementation of waste prevention practices to minimise the use of hazardous substances. The agrochemical industry, government agencies and farming organisations should provide training and information on best practice to maximise efficiency in using farm chemicals. Precise and minimal application of agrichemicals presents direct savings to farmers and also offers further benefits, including preserving important pollinator species and protecting local water quality. Where effective, less-toxic alternatives exist, these products should also be identified and promoted.

  Triple-rinsing of chemical containers is an example of an effective waste prevention action that is not being widely practised. If current guidance is not sufficient in terms of content and/or engagement, this should be addressed.

- **Enhance producer responsibility:**

  In line with the principles of the circular economy, the producers of those substances and items arising as hazardous waste should bear a significant degree of responsibility for the environmental impacts of their products throughout their life cycle, including the downstream impacts from their use and disposal. In the case of FHW, pesticide and veterinary medicine producers should contribute financially and operationally to FHW collections across the country. Other industries responsible for producing high-volume hazardous wastes (e.g. oils, paints) should also be targeted for additional financial contributions.

- **Establish a national FHW collection scheme:**

  There is clear evidence from this pilot scheme that a long-term national scheme for the collection of FHW should be established. Leadership on this issue is required at government level and there is a need for one government department to assume primary responsibility.

  Given the quantity of waste that is estimated to be stockpiled on Irish farms, the number of collections needs to be increased from 10 per year. The number of collections per county per year needs to be flexible to account for the numbers and sizes of farms in each county.

  Various models of operation should be considered, including the campaign approach trialled in this pilot; permanent bring centres; and direct collection from farms. An "amnesty" collection approach could be considered for a limited period whereby farmers are encouraged to bring legacy wastes for free, with minimal documentation involved. This approach has been used successfully in other countries.

  Farmers have demonstrated a willingness to pay towards collections; however, affordability is a critical issue. Additional funding will be required to continue and expand the collections. Additional mechanisms, such as levies on products placed on the market (ring-fenced for FHW collections), should be considered.

  If FHW collections are limited to pesticide and veterinary medicine wastes, this will not address the accumulation of other hazardous wastes generated on farms (waste oils, oil filters, corrosives, contaminated containers, etc.).

Appendix 1 Detailed breakdown of hazardous wastes and WEEE and batteries presented at FHW collections (2013–2017)

Type and quantity (kg) of FHW/centre	No. of farmers	Pesticides	Veterinary medicines	Paints	Empty containers	Oil filters	Corrosives	Needles and syringes	Others	Total: hazardous wastes	Waste oil	WEEE and batteries	Total hazardous wastes + oil + WEEE and batteries	POPs
2013														
Ballinasloe, Co. Galway	141	441	591	1852	116	332	32	20	218	**3602**	7171	5062	**15,835**	10
Tullow, Co. Carlow	142	2898	511	867	120	791	–	38	216	**5441**	8869	3167	**17,477**	70
Ballymote, Co. Sligo	79	205	204	822	54	20	–	20	72	**1397**	4197	1407	**7001**	–
Trim, Co. Meath	117	4078	554	708	89	391	149	146	639	**6754**	10,270	1580	**18,604**	140
Midleton, Co. Cork	163	3658	1533	1094	130	854	88	38	349	**7744**	20,603	4073	**32,420**	30
Thurles, Co. Tipperary	222	2806	1360	1815	190	529	327	49	431	**7507**	10,917	6999	**25,423**	50
2014														
Cillin Hill, Co. Kilkenny	214	2754	1350	1645	1268	1116	621	104	325	**9183**	12,785	12,104	**34,072**	55
Tullamore, Co. Offaly	206	2255	1427	1394	496	565	56	58	514	**6765**	11,324	5646	**23,735**	25
Lusk, Co. Dublin	85	1900	230	439	523	273	38	14	591	**4008**	13,005	3672	**20,685**	25
Ballyjamesduff, Co. Cavan	120	223	884	854	974	256	106	40	294	**3631**	6382	12,449	**22,462**	–
Raphoe, Co. Donegal	133	265	659	348	741	189	22	28	163	**2415**	6081	5564	**14,060**	10
Balla, Co. Mayo	168	160	437	799	709	141	5	65	287	**2603**	3110	6851	**12,564**	–
Dungarvan, Co. Waterford	152	2238	827	1056	1791	836	2142	21	461	**9372**	14,282	2859	**26,513**	37
Kanturk, Co. Cork	239	1414	1766	633	2125	815	165	74	722	**7714**	9078	6954	**23,746**	7
Abbeyfeale, Co. Limerick	227	334	1293	1113	1980	443	215	36	355	**5769**	6450	12,565	**24,784**	1
Enniscorthy, Co. Wexford	331	6002	1723	2915	2639	1856	536	114	1081	**16,866**	19,092	9114	**45,072**	200
2015														
Mountrath, Co. Laois	88	616	347	948	617	123	11	34	104	**2800**	3750	2926	**9476**	–
Ballymahon, Co. Longford	135	383	845	1564	474	184	3	138	117	**3708**	3250	5677	**12,635**	3
Ennis, Co. Clare	157	661	670	1117	357	169	6	45	499	**3524**	3750	6328	**13,602**	18
Tuam, Co. Galway	195	496	787	1299	400	171	71	108	168	**3500**	7000	6450	**16,950**	30
Tullow, Co. Carlow	156	1733	985	1261	560	697	124	130	276	**5766**	12,000	3526	**21,292**	23

Castleisland, Co. Kerry	368	569	1185	1342	1467	746	142	191	227	**5869**	11,000	12,509	**29,378**	24
Cahir, Co. Tipperary	261	977	1534	2317	1887	852	435	128	477	**8607**	10,500	7718	**26,825**	252
Ardee, Co. Louth	161	1641	677	706	1334	621	33	75	166	**5253**	19,000	3580	**27,833**	132
New Ross, Co. Wexford	206	2242	1367	2006	1850	932	31	103	148	**8679**	14,000	4541	**27,220**	18
Bandon, Co. Cork	366	5462	2877	1114	2599	1445	108	215	952	**14,772**	27,500	5590	**47,862**	60
2016														
Carnew, Co. Wicklow	179	829	640	910	872	981	–	94	49	**4373**	11,520	6242	**22,135**	93
Skibbereen, Co. Cork	241	575	861	1228	837	379	–	92	8	**3979**	12,600	3865	**20,444**	10
Fermoy, Co. Cork	308	1478	1795	1644	1361	685	21	175	37	**7195**	12,150	12,181	**31,526**	38
Kilcullen, Co. Kildare	118	1623	712	833	620	471	–	48	61	**4368**	9090	5063	**18,521**	65
Milltown, Co. Kerry	220	195	1000	889	699	388	–	101	15	**3286**	6300	3466	**13,052**	10
Drumshanbo, Co. Leitrim	122	270	501	796	283	200	13	43	62	**2167**	1530	5181	**8878**	9
Roscommon, Co. Roscommon	335	642	1259	1477	1241	286	–	195	68	**5167**	8370	9932	**23,469**	8
Delvin, Co. Westmeath	142	853	1259	847	321	102	–	123	57	**3560**	2520	6055	**12,135**	–
Ballybay, Co. Monaghan	134	154	486	562	422	594	447	49	20	**2732**	5400	7656	**15,788**	3
Navan, Co. Meath	176	5965	1923	1942	3002	2031	965	198	552	**16,578**	13,680	7745	**38,003**	80
2017														
Bandon, Co. Cork	158	940	1251	370	798	382	11	126	132	**4010**	6200	2230	**12,440**	17
Nenagh, Co. Tipperary	193	412	1132	1015	1353	803	102	135	58	**5008**	11,800	4606	**21,414**	12
Enniscorthy, Co. Wexford	194	1095	1230	1023	1155	819	1	102	104	**5529**	11,250	4628	**21,407**	33
Listowel, Co. Kerry	520	602	1746	1792	1332	1160	–	124	242	**6997**	19,145	23,364	**49,506**	12
Kilkenny, Co. Kilkenny	304	1737	1967	2050	1849	1130	274	191	61	**9257**	17,080	12,328	**38,665**	13
Cahir, Co. Tipperary	214	1611	1149	733	1037	790	11	150	62	**5541**	17,600	5207	**28,348**	11
Ballina, Co. Mayo	202	425	732	1107	667	150	10	104	12	**3207**	8100	9478	**20,785**	5
Tullamore, Co. Offaly	213	1278	1150	887	1357	776	169	133	79	**5828**	11,000	6388	**23,216**	43
Athenry, Co. Galway	278	234	794	1489	1043	392	44	159	52	**4206**	7400	14,121	**25,727**	8
Kells, Co. Meath	145	745	800	833	822	434	1	110	61	**3804**	13,100	3918	**20,822**	10
Totals for 2013–2017	**9228**	**68,069**	**49,004**	**54,452**	**46,558**	**28,295**	**7535**	**4480**	**11,643**	**270,036**	**481,201**	**312,565**	**1,063,802**	**1700**

Note: The quantities given for POPs are extracted and shown separately for emphasis, but are included in the total quantities reported under "Pesticides".

Type and quantity (kg) of WEEE and batteries/centre	FL tubes	Large appliances	Mixed WEEE	TVs and monitors	Automotive	Fences	Portable batteries	Total
2013								
Ballinasloe Mart, Co. Galway	54	936	1218	1549	958	76	271	**5062**
Tullow Mart, Co. Carlow	20	991	348	386	772	574	76	**3167**
Ballymote Mart, Co. Sligo	13	295	304	402	245	80	68	**1407**
Royal Town & Country, Trim, Co. Meath	15	195	190	260	680	238	2	**1580**
McDonnells Grain Store, Midleton, Co. Cork	38	1368	1061	803	199	210	394	**4073**
Thurles Mart, Co. Tipperary	37	2038	1960	1524	635	729	76	**6999**
2014								
Cillin Hill Mart, Co. Kilkenny	38	2819	2598	1430	3164	2001	54	**12,104**
Tullamore Mart, Co. Offaly	39	1249	1594	735	923	1026	80	**5646**
Whites Agri, Lusk, Co. Dublin	–	760	470	752	371	788	531	**3672**
Ballyjamesduff Mart, Co. Cavan	20	4240	3230	3500	325	680	454	**12,449**
Raphoe Mart, Co. Donegal	44	1056	905	1917	626	1010	6	**5564**
Balla Mart, Co. Mayo	24	1286	1596	1384	1819	650	92	**6851**
Dungarvan Mart, Co. Waterford	18	413	938	680	200	560	50	**2859**
Kanturk Mart, Co. Cork	53	1743	1903	1340	1394	429	92	**6954**
Abbeyfeale Mart, Co. Limerick	105	5050	2085	3715	324	686	600	**12,565**
Enniscorthy Mart, Co. Wexford	38	2084	1980	1470	2139	1288	115	**9114**
2015								
Mountrath Mart, Co. Laois	27	978	738	345	631	159	48	**2926**
Ballymahon Mart, Co. Longford	17	1580	1620	671	801	838	150	**5677**
Ennis Mart, Co. Clare	80	990	1420	854	1269	543	1172	**6328**
Tuam Mart, Co. Galway	–	1715	1407	1064	1037	1128	99	**6450**
Tullow Mart, Co. Carlow	8	1286	827	580	591	206	28	**3526**
Castleisland Mart, Co. Kerry	3	2680	3450	2701	1486	681	1508	**12,509**
Cahir Mart, Co. Tipperary	55	2659	1608	1182	1106	1050	58	**7718**
Deeside Agri Store, Ardee, Co. Louth	51	820	730	433	490	412	644	**3580**
New Ross Mart, Co. Wexford	40	981	1470	823	511	631	85	**4541**
Bandon Mart, Co. Cork	40	1750	1563	1075	258	834	70	**5590**
2016								
Carnew Mart (Wicklow)	66	1386	965	572	2247	926	80	**6242**
Skibbereen Mart (West Cork)	16	475	987	202	860	1228	97	**3865**
Fermoy (North Cork)	75	4910	2919	1445	1060	1686	86	**12,181**
Kilcullen (Kildare)	–	956	815	1187	1489	553	63	**5063**
Miltown (Kerry)	19	360	1428	339	249	529	542	**3466**
Drumshanbo (Leitrim)	–	1267	1403	1262	774	475	–	**5181**
Roscommon	–	2983	2210	1189	2505	980	65	**9932**
Delvin (Westmeath)	28	1927	1367	778	1207	708	40	**6055**
Ballybay (Monaghan)	20	1180	1435	815	615	1307	2284	**7656**
Navan (Meath) Drummonds Yard	14	1230	888	2845	673	1431	664	**7745**

2017								
Bandon, Co. Cork	27	597	584	197	530	237	58	**2230**
Nenagh, Co. Tipperary	15	1324	926	373	740	1193	35	**4606**
Enniscorthy, Co. Wexford	17	640	1470	592	991	873	45	**4628**
Listowel, Co. Kerry	80	5520	9471	4903	2206	–	1184	**23,364**
Kilkenny, Co. Kilkenny	119	2975	2338	994	3830	2034	38	**12,328**
Cahir, Co. Tipperary	15	859	1126	591	1751	825	40	**5207**
Ballina, Co. Mayo	31	1598	1447	1038	4055	1259	50	**9478**
Tullamore, Co. Offaly	230	519	1383	697	1012	1028	519	**6388**
Athenry, Co. Galway	24	3886	4682	2176	2090	1143	120	**14,121**
Kells, Co. Meath	80	1012	717	601	1104	–	404	**3918**
Totals for 2013–2017	**1753**	**78,566**	**75,774**	**54,371**	**52,942**	**35,922**	**13,237**	**312,565**

AN GHNÍOMHAIREACHT UM CHAOMHNÚ COMHSHAOIL

Tá an Ghníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaol a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ó éifeachtaí díobhálacha na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialú: *Déanaimid córais éifeachtacha rialaithe agus comhlíonta comhshaoil a chur i bhfeidhm chun torthaí maithe comhshaoil a sholáthar agus chun díriú orthu siúd nach gcloíonn leis na córais sin.*

Eolas: *Soláthraímid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírithe agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.*

Tacaíocht: Bímid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaol atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaol inbhuanaithe.

Ár bhFreagrachtaí

Ceadúnú

- Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaol:
- saoráidí dramhaíola (*m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistrithe dramhaíola*);
- gníomhaíochtaí tionsclaíocha ar scála mór (*m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta*);
- an diantalmhaíocht (*m.sh. muca, éanlaith*);
- úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe (*OGM*);
- foinsí radaíochta ianúcháin (*m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíocha*);
- áiseanna móra stórála peitril;
- scardadh dramhuisce;
- gníomhaíochtaí dumpála ar farraige.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil

- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdaráis áitiúla agus le gníomhaireachtaí eile chun dul i ngleic le coireanna comhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, trí dhíriú ar chiontóirí, agus trí mhaoirsiú a dhéanamh ar leasúchán.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (DTLL), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídíonn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

Bainistíocht Uisce

- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uiscí idirchriosacha agus cósta na hÉireann, agus screamhuiscí; leibhéil uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

Monatóireacht, Anailís agus Tuairisciú ar an gComhshaol

- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus na n-údarás áitiúil (*m.sh. tuairisciú tréimhsiúil ar staid Chomhshaol na hÉireann agus Tuarascálacha ar Tháscairí*).

Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn

- Fardail agus réamh-mheastacháin na hÉireann maidir le gáis cheaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhair breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn

Taighde agus Forbairt Comhshaoil

- Taighde comhshaoil a chistiú chun brúnna a shainaithint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

Measúnacht Straitéiseach Timpeallachta

- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaol in Éirinn (*m.sh. mórphleananna forbartha*).

Cosaint Raideolaíoch

- Monatóireacht a dhéanamh ar leibhéil radaíochta, measúnacht a dhéanamh ar nochtadh mhuintir na hÉireann don radaíocht ianúcháin.
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha.
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta.
- Sainseirbhísí cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Faisnéis Inrochtana agus Oideachas

- Comhairle agus treoir a chur ar fáil d'earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaol ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaol (*m.sh. Timpeall an Tí, léarscáileanna radóin*).
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhaíl ghuaiseach a chosc agus a bhainistiú.

Múscailt Feasachta agus Athrú Iompraíochta

- Feasacht chomhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlaigh a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil

Tá an ghníomhaíocht á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóirí. Déantar an obair ar fud cúig cinn d'Oifigí:

- An Oifig um Inmharthanacht Comhshaoil
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Fianaise is Measúnú
- Oifig um Chosaint Radaíochta agus Monatóireachta Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltaí air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

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An Ghníomhaireacht um Chaomhnú Comhshaoil

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