



## NRN CASE STUDY

### Changing the Attitude Towards Farm Waste





## Introduction

The brief of the National Rural Network (NRN) includes: to demonstrate the effectiveness of measures taken under the RDP on changing attitudes to various issues which affect rural Ireland and the rural economy. One of the issues identified as being of concern to the rural economy is the issue of farm waste. In the context of this programme, farm waste is the term used to describe slurries, manures and organic fertilisers produced by livestock and livestock production systems, for example, cattle slurry, farmyard manure, silage effluent and soiled water.

## Context

Since the development of Agriculture, farm waste has been an issue and its importance has ebbed and flowed during different farming eras. The first farmers had the difficulty of getting rid of farm waste accumulating around homesteads, the first modern farmers in the 18th century realised the importance of farm waste as crucial to the success of crop cultivations. These farmers developed crop rotation programmes such as the 'Norfolk 4' to maximise the number of livestock that could be carried on a holding over the winter in order to produce sufficient 'wastes' to fertilise crops that would meet the needs of the homestead whilst allowing for the sale of produce. In the middle of the 20th century, chemical fertilisers dominated agriculture and farm wastes were overtaken in their role of meeting crop nutrient requirements. In this era, farm wastes were again relegated to nuisance value in the chase for production and achieved notoriety through the negative impacts of farm wastes, being associated with water pollution, fish kills, and eutrophication of rivers, bays and estuaries. In more recent times huge investment, both public and private, has gone into managing farm waste to control pollution and farm wastes are now, in the main, controlled and separated away from potential risk. As we move to the future, the role of farm wastes are again changing, as these wastes are increasingly required for use again to manure crops to drive production in an era where terms like peak oil, control of greenhouse gas emissions and food security take centre stage.

Against this background the Rural Development Programme (RDP) 2007 to 2013 has addressed the issue of farm waste under several measures. Axis 1 (Competitiveness) targets Modernisation of Agricultural Holdings (On Farm Investment Schemes); and Modernisation of Agricultural Holdings (Targeted Agricultural Modernisation Scheme) specifically mentions higher environmental standards as part of the objectives of the measure. Axis 2 of the RDP also addresses the issue of farm wastes, targeting 'improving environment and landscape' under the Rural Environment Protection Scheme (REPS) and the Agri Environment Options Scheme (AEOS).

In October 2007, the Farm Improvement Scheme (FIS) was introduced under the current RDP, preceded in 2006 by the Scheme of Investment Aid for Farm Waste Management. This scheme grant aided a range of farm investments at a grant rate of 40% plus 10% additional grant for young farmers, to a maximum of €120,000 total investment. This scheme was closed to new entrants in October 2007.

In March 2011, the Targeted Agricultural Modernisation scheme or (TAMS) scheme was launched, which provides grant assistance to 5 targeted sectors of the industry: dairy; poultry; sheep; sow housing; and a water harvesting/conservation scheme. This scheme did not specifically address issues relating to farm waste in the context of this study, but some of the targeted developments would have the effect of reducing overall farm waste levels at production level.

Central to the participation in Axis 2 measures (Rural Environmental Protection Programme (REPS) and Agri Environment Options Scheme (AEOS)) is the control of farm wastes and the schemes provide funding to farmers to operate at higher environmental standards and indirectly encourage them to make appropriate investments to achieve these higher standards. Under REPS, farmers had to have adequate farm waste collection and storage facilities and spread them within certain periods.

\* The National Rural Network (NRN), as a component of the Rural Development programme for Ireland 2007-2013 (RDP), is being delivered by Tipperary Institute on behalf of the Department of Agriculture, Fisheries and Food (DAFF).

\*\* The Scheme of Investment Aid for Farm Waste Management (FWM) was introduced in March 2006. The level of grant ranged from 20% to 60%, with additional grant aid available for farmers located in counties Cavan, Leitrim, Donegal and Monaghan and for young farmers for certain developments. This scheme was open until Dec 2006.

## Description of Case

The example used to demonstrate the impact of the RDP on the utilisation of farm wastes is a dairy farmer located in approximately 10 km north of the town of Monaghan. He is 39 years of age, married with 3 children, a full-time farmer and his wife does not work outside the home. Their income is primarily derived from milk sales and from sales of freshly calved heifers and young cows, complemented for a short period each year working for a silage contractor. He farms approximately 80 ha, with 36 ha owned and 44 ha rented in long term and short term leases, and he has 22 ha as a grazing bank for milking cows surrounding the yard. He has currently 100 cows on farm, but is milking approximately 80, with the remainder destined for sale as soon as they calve. He rears his own replacement heifers and sells the bull calves at about 10 days old. He has a milk quota of 300,000 litres, having started out with 65,000 litres in 2000 when he took over the farm from his father and supplies Monaghan Co-op year on a year round basis, though he hasn't a formal winter milk contract.



Figure 1: Cubicle Shed and Handling Facilities Funded Under FWMS

Since taking over the farm in 2000, he has focused on developing the business, particularly the dairying side. The investments have been in land purchase (6 ha in 1998 beside the farm) milk quota purchase (235,000 litres since 2000), relevant farm machinery and has a comprehensive land improvement programme in operation, by way of reseeded (8-10 ha per year), land drainage, fencing and roadways. He was a participant in REPS 3 since 2004, but his contract was completed in 2010, and he did not avail of the AEOS scheme. He has availed of various 'building grants' available to improve the standard of his animal housing facilities. The main developments were:

- Under the farm improvement programme (1989), he built a 3 bay double sided slatted shed;
- Under the Control of Farmyard Pollution Scheme (2000), he built a 30 cow cubicle house and milking parlour, plus an additional 16 cubicles at his own expense;
- Under the Farm Waste Management Scheme (2006), he built 30 cubicles, restored 26 more cubicles, and installed a silage pit, cattle handling facilities and bull handling facilities. He also constructed another silage pit which was not grant assisted. The development total was up the maximum investment level of €120,000 under the FWMS, for which he received 70% grant aid;
- Under the Farm Improvement Scheme (2010), he built a shed which contained calving facilities, straw bedded calf facilities, meal storage and sawdust storage facilities. This development total was also up the maximum investment level of €120,000, for which he is yet to receive the 40% grant.

In 2006, He also participated in a cross border pollution control research programme, the TRACE Blackwater scheme, and received grant assistance for the installation of a roof over one silage pit and he also installed a roof over the other silage pit at his own expense.



Figure 2: Bull Pen and Cubicles Funded Under FWMS

From a nutrient management perspective, the whole farm was soil sampled 4 years ago for REPS purposes and again 2 years ago. All fertiliser and farm waste application is based on soil results, to the point that he hires in an umbilical slurry spreading system to apply slurry on land that is too hilly for the large slurry tanker he normally uses, which again makes more efficient use of farm waste.

## Analysis of Outcomes

There has been a dramatic change in the farmers business since taking over in 2000. At that point, his father had 15 dairy cows and 30 suckler cows. This has grown to 80 milking cows with an additional capacity for 20 cows per year that are sold post calving. As a result of the investment he has made on farm, both grant funded and self financed, he has housing, feeding, exercise, handling and milking facilities for all cows and followers under one roof. He also has the unusual situation where all silage is under cover and one pit doubles up as a farmyard manure dungstead when not in use for silage. The net effect is that he has complete facilities for nearly 200 livestock and produces absolutely no dirty water with the exception of parlour washings. The only straw used on farm is for feeding and for 4 small pens in the calving and calf house facilities.

The farmer is essentially a one man operation, and the efficient housing has allowed for this to happen. Slurry management is not an issue that requires management on a daily basis, so there was significant labour savings from the developments in the reduced time spent managing farm wastes.



Figure 3: Calving Shed and Calf Facilities Funded Under FIS, Cubicles Funded Under CFP Scheme of 2000

However, the most tangible outcome of the development is the storage capacity of the facilities. Under the Nitrates regulations (SI 610 of 2010) the farm is located in Zone C, which requires a storage capacity requirement of livestock manure of 22 weeks. Under the regulations, there is a prohibition on the application of organic fertilisers from 15th October until the 31st January. The farmer's previous housing systems did not contain sufficient storage capacity to meet these requirements, so he would have been in breach of the regulations, resulting in his single farm payment being at significant risk. In the past farm wastes were a 'constant headache' on this farm over the winter and farm waste had to be spread in November or December and a 'dry field' was required to 'get rid' of the excess farm wastes.

Subsequent to the developments, the storage capacity, as well as meeting regulation requirements, enables him to apply his farm waste to land when the soil conditions are such to maximise utilisation of the nutrient value of farm wastes. In 2011, slurry was not applied until early March, and will be spread again in June post silage harvest, when soil conditions improve and farm wastes are utilised efficiently, maximising the benefit from the slurries and minimising the requirement for subsequent chemical fertiliser application.

More importantly from a national perspective, the developments have allowed for the manufacture of a large amount of milk and beef without any risk to the local environment in terms of loss of farm wastes to the water courses, no out-wintering of animals causing poaching and degradation of soils, efficient utilisation of slurries allowing for their application where required rather than where they could be applied and overall safe handling of wastes that otherwise would cause significant pollution risk to the local environment.





## Critical Success Factors and Barriers

Many factors were involved in the success of the developments in this study. The schemes operated by the Department of Agriculture, Fisheries and Food (DAFF) were highly instrumental in the success of the developments from many perspectives. The design of the storage and housing facilities according to DAFF specification is one issue critical to the success. DAFF building specifications bring together the sometimes conflicting requirements of the livestock being housed, the operator, the funding agency, the planning authorities, the farmer and the environment, including issues like pollution prevention, visual and smell impacts. Implementation by DAFF of the Nitrates programme, REPS scheme and implementation of cross compliance under the Single Payment Scheme also acted as an impetus for change on the farm. In order to meet the requirements of REPS, adequate slurry storage had to be provided on the farm and restricted spreading dates had to be adhered to.

The local authorities granting planning permission to the developments were also critical to the success. Monaghan County Council are faced with significant issues regarding farm derived pollution and also pressures from non farming rural dwellers requiring reduced impact of intensive agriculture in the county. They marry these issues with the requirements to develop agriculture at farm level and allow developments that meet, as far as possible, the requirements of all sectors of society in the county. There are several extraneous factors critical to the success of the developments. At the time that the decision to develop the farm was taken, milk prices were encouraging farmers to invest in on-farm dairying facilities, interest rates were low and money was readily available to fund developments. Fertiliser prices were also rising, signalling the requirement to maximise the benefit from farm slurries and to minimise the requirement for chemical fertiliser purchase. The Agricultural media and Agricultural extension services gave particular attention to the issues surrounding on farm pollution and ways to successfully mitigate the risk of on farm pollution and these also had an impact on the decision processes.

The most important critical success factor in this development was from the farmer himself. Since taking over the farm in 2000, the farmer has focussed on the development of his business and had to pursue development on a number of fronts, from the securing of leased land, purchase of land, purchase of quota, purchase of machinery and building of housing and storage facilities. The farmer was in the frame of mind, coupled with a desire to provide a sustainable income for his family, to maximise the usefulness of the available grant schemes to make his own money go further. Whilst it could be argued that to increase productivity of the farm, he would have had to build housing and storage anyway. However, the availability of development grants allowed for higher specification buildings to be built over a shorter timescale and at a significantly lower debt burden to the farm, so the grants have improved markedly the sustainability of the enterprise, while at the same time ensuring that environmental standards were achieved.

When the Farm Waste Management Scheme was launched, there was a tight time frame for the operation of the scheme. The construction boom was also still in evidence at the time and as a result, there was extreme pressure on building materials and suitably qualified personnel to build the facilities. This resulted in a huge price inflation occurring, which reduced the impact of the funding available. The time frame also caused intense pressure on other service providers to the scheme, such as Agricultural advisors, planning personnel in the local authorities and DAFF staff administering the applications and payments, carrying out inspections and dealing with building specifications. However, the measure was successful in improving the standard and capacity of farm waste storage facilities.



## Links to Rural Development Programme

The manner in which the developments in this case study meet the policy objectives of the RDP is critical to assess the success of the scheme and establish the payback to society of the investment of public money in a private business. The Farm Improvement Scheme was funded under Axis 1 of the RDP. The objectives of Modernisation of Agricultural Holdings (on farm investments schemes) are to:

- i. Ensure that the agriculture sector becomes more competitive and market-oriented;
- ii. Promote higher quality and greater efficiency in production on Irish farms;
- iii. Promote diversification of activities on Irish farms;
- iv. Promote higher standards of animal welfare and protection of health and safety on Irish farms; and
- v. Ensure higher environmental standards on Irish farms and reduce overall greenhouse and transboundary gas emissions from the agriculture sector.

From the perspective of this case study, the developments occurred in a dairying facility which meets objective (i) particularly in relation to the Food Harvest 2020 objectives of a 50 per cent increase in milk production by 2020. The development has allowed for the management of 100 cows primarily by 1 labour unit with some part time help, meeting objective (ii) of the measure. The new handling and bull facilities funded under the programme address measure (iv) of the scheme. The objective relating to trans-boundary gases is also met as the efficiency that the developments allow for will allow for more milk produced per cow, reducing the emissions generated per unit of milk produced (v). Overall the farm is now more *environmentally friendly* as a result of the investment supported under the RDP. The additional revenue available from REPS over the period he was a participant allowed him meet the environmental and welfare targets specified in REPS and therefore hastened the developments of the farm over that timeframe.

The objectives of the Farm Improvement Scheme were to improve the working and production conditions on farms, to assist competitiveness, and to contribute to the improvement of agricultural incomes. Again, this case study demonstrated that these objectives were met with the development of the calving facilities, calf house facilities, and feed/sawdust storage facilities funded under this scheme.





## Assessment of Replication Potential

The developments came at a particular time in the history of Irish Agriculture that experienced a confluence of policy changes. On foot of the introduction of the Nitrates Regulations, there was a recognised deficit in on-farm storage facilities which provided an impetus for a significant investment programme to be initiated. There was a positive frame of mind among farmers which generated an appetite for long term on-farm investment. Finance was readily available at a low interest rate which facilitated this appetite and public finances were such to allow for significant support.

The storage and housing facilities are a long term investment that will last for a minimum of 30 years, with shed design and specifications that DAFF feel will last for considerably longer. Given the amount of money that has been invested under the farm investment schemes and the relatively stable livestock numbers in Ireland, there may not be a requirement for significant investment in farm waste storage in the future. In the broader context of replicating the mechanics of these schemes, they operated efficiently, in that they targeted the improvement of livestock housing and farm waste storage facilities, and these facilities dramatically improved as a result. The RDP on-farm investment measures have operated under a model of providing a level of funding, towards a targeted group for a specified range of developments with clear specification guidelines. This model is very effective and an efficient form of providing funding and moving an industry towards a clearly defined target and the model could be replicated for other grant schemes in the future.



## Lessons Learned and Conclusion

The implementation of the RDP has had a profound effect on the agricultural sector in Ireland. The direct funding of storage facilities for farm waste, under the FWMS and FIS schemes, has directly supported farmers in the development of suitable storage facilities for farm wastes and ensured that these facilities are of an appropriate standard to protect the environment from the risk of pollution from farm wastes in the long term.

While some farmers viewed investment in slurry storage as a necessary (or even forced) evil in order to comply with regulations, often the true benefit of the facilities was only realised by farmers at a later stage. Good slurry management and storage facilities provided farmers with an opportunity to assess the value of slurry and to realise the full nutrient potential. It was evident in this case study that the investments supported by the Farm Investment Scheme and previous farm waste schemes were significantly responsible for the shift in attitude towards slurry from being a 'constant headache' which had to be 'got rid of' to currently where slurry is applied in March and June when the nutrient value can be maximised. The fact that fertiliser prices increased significantly in recent years also contributed to the change in attitude, however, farmers could not have capitalised on the use of slurry without proper storage facilities.

Schemes which focused on farm waste management, such as FWMS and FIS have been shown to be very effective in terms of their outcome, but the issue of their overall cost arises. It is difficult to decide on a level of funding that will be attractive enough to farmers to participate, but the 40-70% rate available under the FWMS would appear to have been overly generous and the 40% rate which applied under the current RDP may have been more appropriate than its predecessor. The high level of funding may encourage development in excess of actual needs and also promotes inflation of building materials, builders, other service providers etc.

The REPS scheme complemented the farm waste measures as it was based on a whole farm plan approach, and focussed on nutrient management planning, maintenance and improvement of biodiversity and protection of water courses from pollution. Maximising the benefit of slurry and minimising the run-off were key element of management under REPS. Adequate slurry storage was critical to achieving this level of nutrient efficiency. While not specifically the case on this farm, on many other farms, investments in slurry storage were funded by the relevant grant assistance and the annual REPS payment. In the absence of the REPS payment, the grant alone may have not been sufficient to encourage farmers to invest in waste storage facilities (or make it feasible to meet the investment costs).

With regard to the AEOS which has succeeded REPS, the move away from a whole farm approach may be a retrograde step. The strength of REPS was that farmers had to implement changes/adhere to requirements over the whole farm. AEOS could be an ideal base for which to bring in other environmental objectives such as the reduction of transboundary gases (this would need to be on a whole farm basis).

Looking to the future, developing technologies such as anaerobic digestion are put forward as a potential use for farm wastes in the production of energy. In relation to the use of AD plants in Ireland for bovine livestock, there are significant operational difficulties to overcome as the most efficient beef and milk systems in Ireland are based on grass production in the spring, summer and autumn (slurry is only produced for 16-20 weeks). Inconsistent diets of livestock also lead to inconsistent quality of slurry, again reducing the efficiency of AD plants. In the Irish grass-based production systems where the nutrient value of farm waste is being maximised for grass growth, anaerobic digestion could upset the efficiency of the natural recycling of nutrients and increase the need for chemical fertilisers. These and other issues need to be considered in assessing the role of anaerobic digestors.

Based on the example of this Monaghan farmer, the RDP (and previous measures) have encouraged investment in farm waste storage facilities. In addition to the grant aid received, this farmer invested significant amounts of his own resources. As a result, he has an efficient management system in place, a comfortable working environment for himself and his livestock and he has safe storage facilities that allow farm wastes to be collected (without dilution by rainwater) and the wastes returned efficiently back onto the soil from which the feed was initially grown. Such use of waste allows for the operation of an efficient recycling system on the farm minimising the amount of chemical fertiliser input required, to maintain output and reducing the negative impacts on the environment. Therefore the Rural Development Programme measures/schemes have contributed to changing the attitudes of farmers to the management, control, utilisation and value of farm wastes, which directly benefits farmers (reduced costs) and indirectly benefits the wider population by way of an improved natural environment.

