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CONWY
CYNGOR BWRDEISTREF SIROL
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PARTNERIAETH WLEDIG Conwy RURAL PARTNERSHIP

Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig: Ewrop yn Buddsoddi mewn Ardaloedd Gwledig
The European Agricultural Fund for Rural Development: Europe Investing in Rural Areas

LEADER

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Contents

Project Summary

- 50 farms participated in the project covering a total of over 8900 ha (22,000 acres) and 12% of the total agricultural land in Conwy.
- 82% of holdings farmed mixed beef suckler cows and sheep.
- 77% of the fields tested were below the optimum pH for pasture production and liming was recommended.
- 60% of the fields tested were below the optimum K index of fertility and this could be affecting crop response to added nitrogen.
- Slurries tested were lower in nutrients than the national standard, particularly for phosphate.
- A typical land application rate of slurry from Conwy is worth around £100 per hectare, using average nutrient values from slurry testing.
- Soil organic matter levels need to be maintained to achieve optimum returns and adding locally-sourced organic materials is a good way of doing this.
- Results from individual field soils and whole-farm nutrient balances both indicated that excessive use of fertilisers and manures/slurries was not commonplace in Conwy.

"The FUW has followed the progress of the CEFN Conwy with interest and has supported the aims of the project throughout its two-year operation. Projects like this, that set out to identify at first-hand how farmers in rural Wales manage their land with both the rural economy and care for the environment in mind, are welcomed by the FUW."

Gwyn Williams – FUW[1] Area Officer, Llanrwst.

"The NFU Cymru has been involved with CEFN Conwy since its inception and has remained proactive throughout the project, ensuring its member farmers were informed about the opportunities the project presented to them. The NFU Cymru particularly applauds the hands-on approach the project has adopted whilst working with farmers in Conwy and welcomes this pamphlet as a summary of the project and its findings."

Paul Williams – NFU Cymru[2] Senior Group Secretary, Llanrwst.

[1] *http://www.fuw.org.uk/ http://www.fuw.org.uk/*

[2] *http://www.nfu-cymru.org.uk/ http://www.nfu-cymru.org.uk/*

PROJECT CEFN CONWY

Many people within the rural communities of Conwy will already be familiar with the CEFN Conwy project. Some of them will be amongst the 70 or so farming families who gave us such a warm welcome, invited us to their farms, shared their time and wisdom with us, and who will hopefully have benefitted in return from soil and slurry analysis and recommendations or from whole farm nutrient budget evaluations. Others may have joined us at some of our evening meetings, social events and presentations or even been on a study tour with us to Ireland.

This booklet has been produced to bring together information about the objectives and planned outcomes of the project, what we did, how we did it, what we found out and the key recommendations resulting from our work. The full title of the project is 'Improving Catchment Environmental Quality through better Nutrient Management in the Farming Livestock Landscape'.

It was funded by the European and Welsh Government Rural Development Plan, and was delivered by the School of Environment, Natural Resources and Geography (SENRGY[1]), Bangor University for the Conwy Rural Partnership[2] (Cymraeg)[3].

The project ran from May 2009 until August 2011.

During this period the project received an award from the Campaign for the Protection of Rural Wales (CPRW) and was recognised as an exemplar of work promoting good environmental practice.

We would like to take this opportunity to thank all the farmers of rural Conwy whom we met during the course of our work, the team of people who contributed from SENRGY, the Farmers Unions for their support, the Rural Development Plan team and the Conwy Rural Partnership, all of whom are instrumental in the success of this project.

[1] *http://www.bangor.ac.uk/senrgy/*

[2] *http://www.ruralconwy.org.uk/en/*

[3] *http://www.ruralconwy.org.uk/cy/*

1. Project Objectives and planned Outcomes of CEFN Conwy

During the lead-in phase of the project, time was taken to discuss with a range of stakeholders including farming unions, farmers, Conwy Rural Partnership, Conwy Local Action Group, the Rural Development Plan team and Bangor University what the key objectives and planned outcomes should be. These were used throughout the project to drive it forward, maintain focus and remain on track.

1.1 Objectives

- to support the local agricultural sector in meeting requirements for the Water Framework Directive and new Glastir scheme;
- to support the efficient management of on-farm nutrients, soil and vegetation so reducing diffuse pollution.

1.2 Outcomes

- increased profitability through the adoption of new and efficient nutrient management practices;
- improved quality of produce;
- improved water quality of Conwy rivers and bathing waters;
- an established network of 'lead' farms for championing and showcasing to others what works best in the locality.

1.3 Our 6-point Plan of Action

- host local awareness-raising events for farmers;
- survey farmer expert knowledge and current land management practices;
- identify farmers willing to trial management practices new to them;
- undertake field trials to add to knowledge of managing on-farm soil, nutrient loading and vegetation;
- provide free field soil analysis across the catchment at participating farms;
- disseminate technical guidance featuring catchment-specific findings of the project.

1.4 Strategic Links

- CEFN Conwy links up with the **European Water Framework Directive**[1] which aims to achieve good ecological and chemical status for all water bodies by 2015. Whilst Conwy currently has very few water bodies that are designated as 'poor' in status, several are classified as 'moderate' and are potentially at risk from diffuse pollution which can arise from poor soil condition, inappropriate management of slurry or excessive use of fertiliser.
- CEFN Conwy is one of the measures identified by the Environment Agency to manage the pressures on the water environment and achieve the objectives of its **River Basin Management Plan**[2] (**Cymraeg**[3]).
- Many of the issues that the project researched and discussed with farmers regarding soil and nutrient management in relation to potential pollution risks are covered in the **EU Cross Compliance**[4] standards. These are consistent with keeping land in 'good agricultural and environmental condition' and have to be met in order to receive the Single Farm Payment.

[1] *http://ec.europa.eu/environment/water/water-framework/*

[2] *http://publications.environment-agency.gov.uk/PDF/GEWA0910BSWP-E-E.pdf*

[3] *http://publications.environment-agency.gov.uk/PDF/GEWA0910BSWQ-W-E.pdf*

[4] *http://ec.europa.eu/agriculture/capreform/infosheets/crocom_en.pdf*

2. Methodology – what we did and how

The project is based on the participation of farmers so it has to generate sufficient interest from these stakeholders to achieve its aims.

2.1 Ways of engaging with the agricultural sector

From the start, one of the key things to get right is recognising the best ways of engaging with rural farming communities. Timing of events should take account of seasonal as well as daily schedules: evening events are better than daytime ones unless there is a farm visit involved; spring lambing and summertime are always busy. Contacting farmers by telephone is best done in the evening.

The CEFN Conwy approach:

- Awareness raising was done at agricultural shows, in the local press, at farming union events and at three 'farmer evenings' at local inns. All these offered opportunities for individuals to register an interest in participating in the project.

- Registered individuals were contacted by telephone and offered free soil testing of two fields of their choice and asked if they were willing to take part in a survey about on-farm practices that impact on environment, profit and people (the so-called "triple bottom line"). Dates for a face-to-face meeting were arranged, basic farm information noted and a reminder was given the evening before the meeting (by telephone).

- Soil testing and the survey of farming practices were carried simultaneously by two project officers – one sampled fields while the other sat with the farmer in the Landrover overlooking each field as it was being sampled. This proved a very successful approach because the farmer could ask questions about soil condition.

- Farmers who expressed an interest in novel approaches and products were supported in setting up their own field-based trials.

- Feedback events were held at three local inns and at farming union meetings at which the results of soil testing and farm trials were reported. Participating farmers received individual reports on fertiliser recommendations and whole-farm nutrient profiles.

- Study tours and on-farm demonstrations are very popular with farmers as approaches to gathering information. Therefore, a study tour to Ireland that focussed on catchment sensitive farming was organised for project participants.

2.2 *Soil testing – why, and how to do it yourself*

Routine management of soil nutrition status is an important component of good crop / plant production management. It allows fertiliser and manures to be targeted as required – ensuring economic efficiency and reducing the risk of environmental impact.

How to do it:

- Carry out soil testing of fields, in rotation, every four years (six years for permanent pasture).
- Routine analyses include pH, available phosphorus (P), potassium (K) and magnesium (Mg).
- The best time to sample is November – February; avoid sampling for up to six months after applications of fertiliser, manure or lime.
- You will need a soil auger, plastic bucket and clean bags/boxes to send soils off to the lab. (A spade can be substituted for an auger but it takes much longer and needlessly large quantities of soil are collected.)
- For arable and cultivated soils sample to a depth of 0-15 cm (0-6") which is related to cultivation depth. For permanent grassland, sample to a depth of 0-7.5 cm (0-3") which is related to the rate of soil formation and animal hoof penetration.
- Sample each field in a W pattern consisting of 20 – 25 cores (picture below); avoid unusual patches such as gateways, headlands and near trees. Mix the soil cores in the bucket **very thoroughly**, and then take out a representative sample for sending away for analysis. The accuracy of your results will only be as good as the thoroughness of mixing.
- There are several labs that offer soil analytical services along with fertiliser recommendations, if requested; NRM[1] is an example. Results for P, K and Mg are usually given as indices and most farmers know what indices their crops require. Detailed information about this can be found in RB209[2] and there is a very easy-to-use fertiliser calculator on the Yara[3] website.
- If you would like more information on soil testing and interpretation of results, the Potash Development Association[4] (PDA) has a very useful leaflet.

With kind permission, reproduced from NRM Technical document AS04 'How to take a soil sample'.[5]

[1] *http://www.nrm.uk.com/*

[2] *http://www.defra.gov.uk/publications/files/rb209-fertiliser-manual-110412.pdf*

[3] *http://www.fertiliser-recommendations.co.uk/*

[4] *http://www.pda.org.uk/leaflets/pdf/PDA-lf24.pdf*

[5] *http://www.nrm.uk.com/data/tech_docs/AS04%20How%20to%20take%20a%20soil%20sample.pdf*

3. Results – what we found out and what it means for rural Conwy

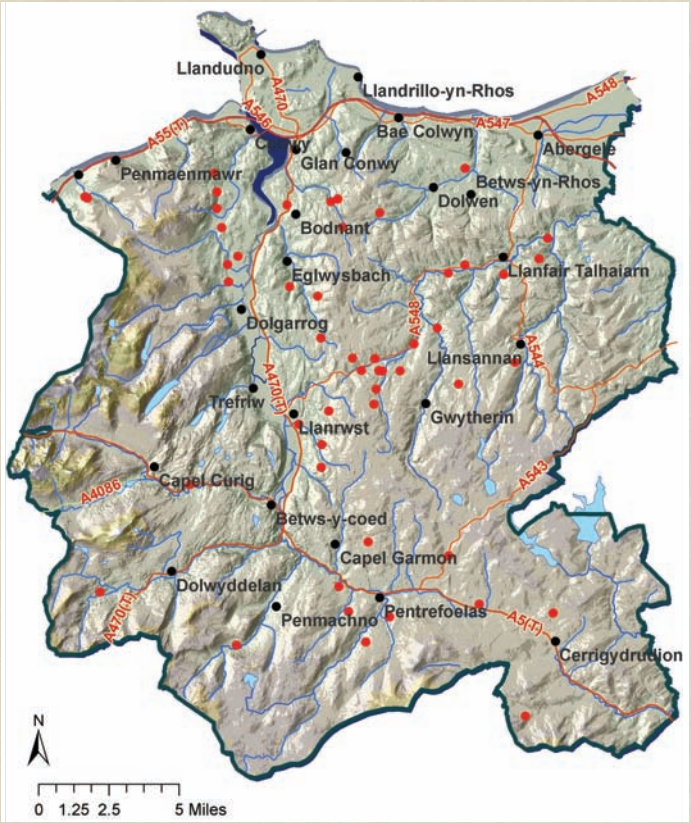
This section describes the farms registered with CEFN Conwy and covers:

- results from our soil testing campaign and general soil fertility issues in Conwy.
- results from our slurry testing campaign and the economics of using slurry effectively.
- the importance of soil organic matter and the value of locally sourced soil improvers.
- the management of nutrients on a whole-farm scale and what it means for environmental quality of the catchment.
- the farm trial case study: does the application of a nitrification inhibitor to slurry improve pasture yield?
- the farmers' study tour to demonstration catchment sensitive farms in Ireland.

3.1 Soil results and fertility status in Conwy

3.1.1 The Farms

Fifty farms in Conwy, which were quite evenly spread throughout the county, participated in the project.

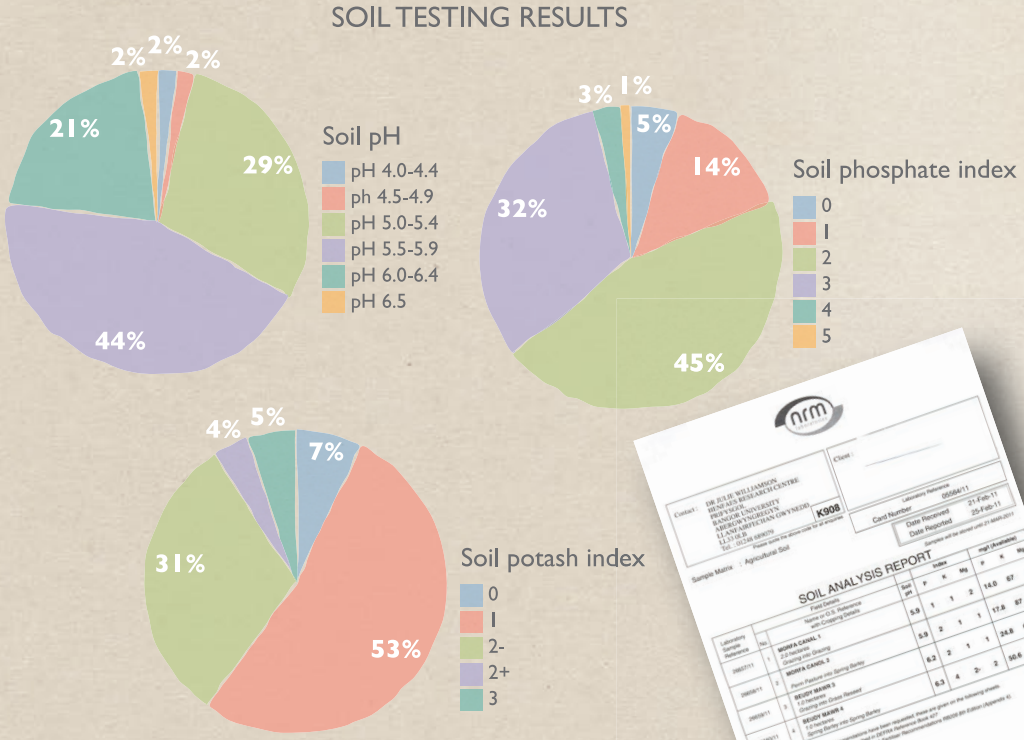


- 104 fields were sampled (a total of 400 ha (1,000 acres). Soil samples were analysed for pH, available phosphate (P_2O_5), potash (K_2O) and magnesium (MgO) and fertiliser recommendations were;
- 49 farms were surveyed about on-farm nutrient management practices – a total of over 8900 ha (22,000 acres) and 12% of the total agricultural land in Conwy.
- The average land area of farm holding surveyed was 200 ha (500 acres); 82% of holdings farmed mixed beef suckler cows and sheep. The average proportion of land area in pasture on each holding was 80%.

3.1.2 Soil fertility

Soil fertility results for 104 fields in Conwy are summarised in the figure below.

- 77% of fields were below the optimum soil pH of 6.0 (for mineral soils) for grass production. Soil acidification is a common problem in agriculture and can be corrected by the application of lime. It is important to get the pH of soil right because it affects the efficiency with which plants can take up nutrients, especially phosphate and trace elements.
- 77% of fields were either P index 2 or 3, where index 2 is the target for phosphate and index 3 requires slurry application only; phosphate is essential for seedling establishment and root development, particularly in young plants. Therefore few fields were either seriously over- or under-fertilised with phosphate.
- 35% of fields were either K index -2 or +2 (the target indices for potash), but 60% of the fields were below optimum and this is much higher than the figure for the whole of the UK of 35%. Potash is essential for good yield and high quality feed value. The growth response of grass to nitrogen (N) depends on a balanced supply of potash to assist N uptake by the roots. You can read more on nutrient management for grassland[1] and fertiliser general use[2].



[1] *http://www.pda.org.uk/leaflets/pdf/PDA-lf14.pdf*

[2] *http://www.defra.gov.uk/publications/files/rb209-fertiliser-manual-110412.pdf*

3.2 Slurry results and economics of its use in Conwy

Slurry samples were taken for analysis of nutrient content from a subset of the project farms. Knowing how much N, P (as P_2O_5) and K (as K_2O) is in the slurry helps farmers to calculate how far it is economically worthwhile to transport slurry within their holding (especially if employing a contractor) and, after slurry application, how much of a mineral fertiliser top-up of N, P and K is required for each field. Slurry is stored in many different ways prior to being applied to land and we visited as many different examples as possible, including indoor pits under slats, open clay-lined lagoons, partly covered/sheltered lagoons, open concrete-lined lagoons and open rammed-earth lagoons. Where rain is excluded, slurry will clearly have greater dry matter content and therefore a higher concentration of nutrients. When sampling slurry, it is important to mix the contents of the holding area thoroughly otherwise the results can be misleading. A lagoon can take around two hours to mix and longer if there is thick crusting.

The results of cattle slurry testing (table below) show that dry matter contents were variable between farms and this is explained by the different storage facilities sampled. Even allowing for the difference in dry matter content, Conwy slurries are lower in nutrients than the national RB209 standard, particularly for phosphate. A typical application rate of slurry from Conwy (average nutrient values are given in the table below) is worth around £100 per hectare. The nitrogen and potash components of slurry have an equal economic value, whilst the value of the phosphate component is less, at only 14% of total value.

Nutrient content (in kg per fresh m^3)# of cattle slurry from 28 samples taken in Conwy (compared with the RB209 standard) with potential economic value and the proportion attributable to each nutrient.

	Dry Matter	N	P_2O_5	K_2O	Total
Average	51	1.8	0.5	2.4	
Range (min-max)	21 - 86	1.0 - 2.6	0.3 - 0.7	1.4 - 4.0	
[1] RB209 standard	60	2.6	1.2	3.2	
*Average value per m^3	-	£1.30	£0.41	£1.32	£3.03
Average value per 1000 gal	-	£5.85	£1.85	£5.94	£13.64
% of total value	-	43	14	43	100

to convert kg/m^3 to units/1000 gal, multiply by 9.
* AN @ £250/t (72p/kg); TSP @ £380/t (82p/kg); MoP @ £330/t (55p/kg) (ADAS, Feb 2011).

[1] *http://www.defra.gov.uk/publications/files/rb209-fertiliser-manual-110412.pdf*

3.3 Soil organic matter and how to increase it

The organic component of soil is equally as important as mineral fertiliser additions for productivity and yet it rarely receives the same attention. Soil organic matter includes all living soil organisms, decomposing plant and animal material and humus (decomposed material). In addition to providing nutrients and habitat to organisms living in the soil, organic matter also binds soil particles into aggregates which improves structure, drainage and aeration; it also improves the water holding capacity of soil, soil fertility, microbial function and carbon sequestration. Most UK soils contain 2 –10% organic matter. The level of organic matter is influenced by many factors and represents a balance between gains from fresh residues and losses from decomposition and erosion. Building up soil organic matter (SOM) levels requires decades so it is better to prevent its loss: applying slurry, farm yard manures and other locally available organic materials helps maintain SOM.

As well as adding organic matter to soil, organic materials can provide a valuable source of nutrients. Therefore, CEFN Conwy sourced local organic materials and measured their nutrient contents which are given in the table below. Broiler litter and poultry layer manure are both excellent sources of N, P and K. The application of sewage cake (high in both N and P) complements that of cattle slurry which is relatively higher in K. Green waste compost has a nutrient content at least as high as farm yard manures and can be used in a similar way.

Comparative nutrient content of locally sourced organic materials in Conwy.

	Amount in kg per fresh tonne		
	N	P_2O_5	K_2O
Broiler litter	19	11.6	11.4
Poultry layer manure	15.3	9.5	10.3
Digested sewage cake	13.8	5.8	0.64
Cattle FYM	5.6	3.2	3.5
Sheep FYM (aged)	5.4	3.4	2.3
Green waste compost	7.8	3.1	4.0

Soils that receive regular applications of organic material are less likely to compact and are quicker to recover from poaching; they are also better able to buffer against soil acidification from mineral fertiliser doses. Organic material feeds soil invertebrates and microbes, and their active healthy biomass ensures a slow and sustainable supply of nutrients for plant productivity.

3.4 Whole farm nutrient balances and what it means for environmental quality of the catchment

The Conwy farmers participating in the project completed a survey about on-farm practices that have an impact on the economic, social and environmental well-being of the river catchment. Some of the data collected was used to produce individual nutrient budgets for each farm. A farm nutrient budget estimates the annual difference between nutrients imported into and exported from a farm in goods and livestock. If imports exceed exports at levels greater than the capacity of the soil to store nutrients then this suggests that nutrients are being lost (for instance in soil erosion, leaching or as nitrous oxide gas). However, if exports exceed imports then this suggests that soil nutrient resources are being depleted. Important imports and exports for the calculation are shown in the table below.

Important farm imports and exports for calculating a nutrient budget.

Imported to farm	*Exported from farm*
Livestock bought in	Livestock sold
Feed bought in	
	Crops and products sold
Fertiliser	
Imported manures and slurry	Exported manures and slurry
Bedding	

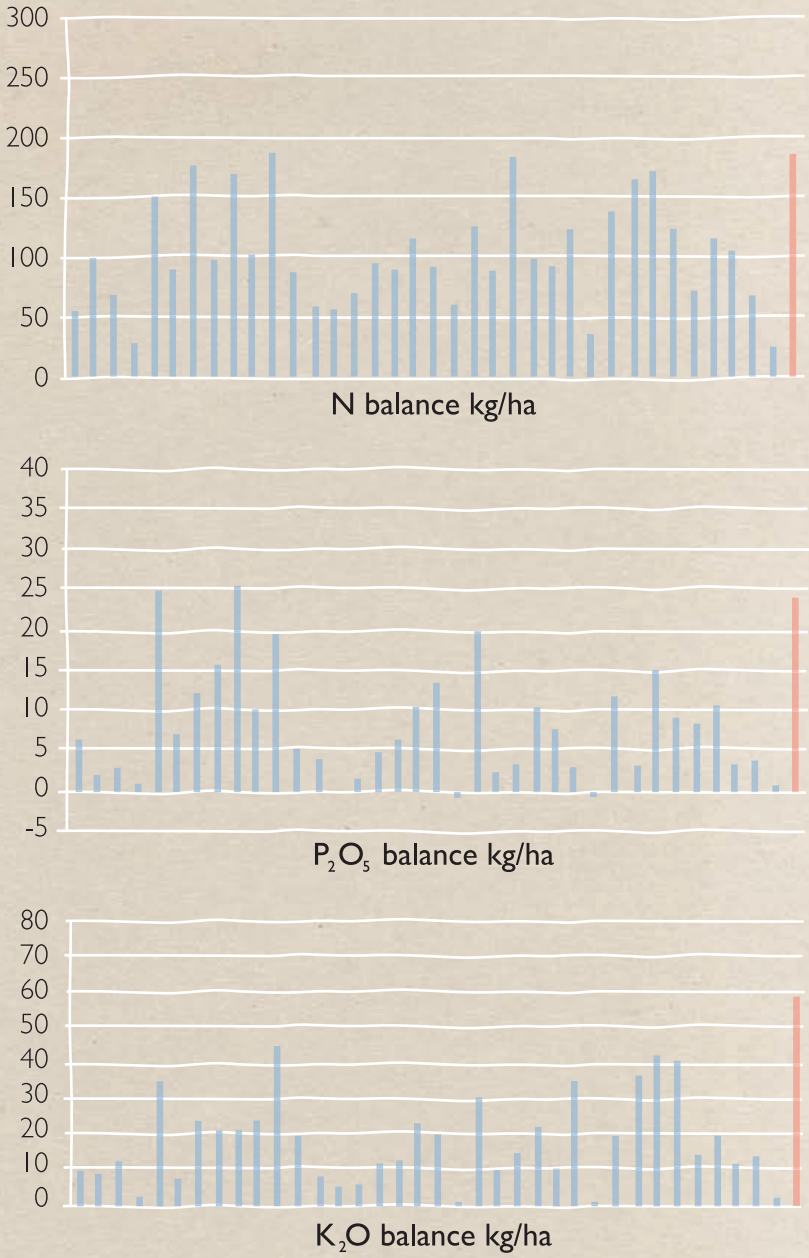
For each import and export, we calculated the N, phosphate and potash content using the same information used by PLANET (available with free registration from http://www.planet4farmers.co.uk/). PLANET is used by farmers, agronomists and FACTS advisers to guide food production without the wasteful use of nutrients. An example of the calculation is that 1 kg of live weight sheep contains 25 g of N, 12 g of phosphate and 2 g of potash. For the CEFN Conwy nutrient budgets we calculated and added together the individual nutrient contents for all imports and exports for each farm, then we subtracted the outputs from inputs to give a N, phosphate and potash balance for the whole farm. We also added 40 kg N per ha for N-fixation by clover in improved pasture and 25 kg N per ha for inputs dissolved in rainfall.

The nutrient balances for 36 Conwy farms are shown in the figure on the following page. ADAS has calculated UK benchmark nutrient balances using average characteristics for a range of farm types following good practice. The benchmark we used for comparison (the red bars in the figure) is for beef suckler cow farms as this is the closest applicable farm type to the beef and sheep farms participating in CEFN Conwy.

- All the farms showed a surplus N balance (imports exceeding exports). While none exceeded the benchmark surplus - a few farms came close - the majority were significantly lower.
- Most farms showed a low phosphate surplus relative to the benchmark, with a few farms even showing a small deficit (exports exceeding imports).
- Whilst all farms showed a potash surplus, the majority were, again, significantly lower than the benchmark value.

These results indicate that, on a whole farm scale, there is little scope for reducing nutrient losses to the wider catchment environment. However, it is important to recognise that over-fertilisation of individual fields, and inappropriate timing of slurry applications can still lead to nutrient run off. There is a delicate balance between excessive use of nutrients and running the risk of depleting soil resources.

WHOLE FARM NUTRIENT BALANCES



Whole-farm nutrient balances for 36 individual Conwy farms (each shown by a blue bar). Red bars represent the benchmark farm balance for beef suckler cow farms following good practice.

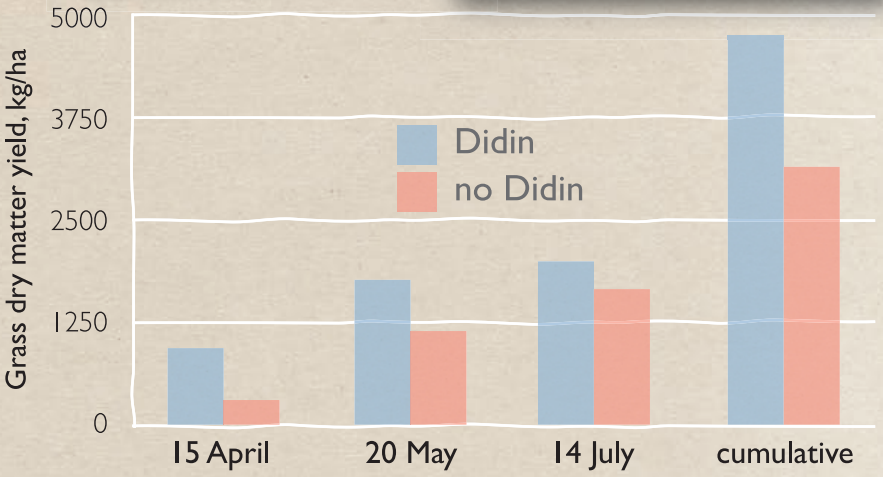
(Source: DEFRA report ES0124SID5, 2005.)

3.5 Nitrification inhibitor on-farm trial in Conwy

Applying slurry in early winter, even if the ground is sufficiently dry, is not regarded as best practice because of the amount of N that is at risk of being lost in runoff, leaching or as nitrous oxide gas through the winter when plant demand is low. However, if slurry is mixed with a nitrification inhibitor, this loss can be greatly reduced and better crop yields expected as a result. This then frees up storage for slurry over winter and increases the period in which slurry can be spread on land without risk of environmental pollution. The main inhibitor used in the UK is [1] Didin (Omex, Norfolk) with the active ingredient dicyandiamide (DCD). DCD acts by slowing down the soil biological activity that leads to the process of nitrification, the conversion of slurry N to nitrate N, which is readily leached out of the soil rooting zone. DCD is completely biodegradable and as soil temperatures warm up in spring (and crop demand for N increases) the inhibitor breaks down slowly to carbon and N, allowing nitrification to proceed to match the demand of root uptake.

We were interested in testing whether pasture yields would be increased in Conwy if we used the inhibitor mixed with slurry applied in winter (under real farm conditions). A dairy farm was chosen with a reception pit in which Didin could be thoroughly mixed with the slurry prior to land application. The volume of the pit was calibrated to 6,750 litres (1500 gallons), the volume of slurry to be applied to 0.20 ha, providing 62 kg N/ha. Didin is applied according to the receiving land area (not volume of slurry) so 2.5 litres of Didin was added to 6,750 litres of slurry. A propeller (from a tractor PTO) was used to mix the Didin into the slurry for approximately 15 minutes. The slurry was applied to the surface of pasture using a conventional spreader in mid-February. The permanent pasture was used for grazing only, had not been reseeded for 20 years and contained many grass and herb species with a reasonable rooting depth on a medium-textured soil. The field was divided into two parts: slurry with added Didin was applied to one, and slurry without Didin was applied at the same rate to the other. We measured grass production throughout the following summer in small enclosure cages to keep cows out.

[1] *http://www.omex.co.uk/agriculture/ProductItem.aspx?id=331*



Pasture dry matter yield of plots in a field of permanent pasture in Conwy receiving a winter application of slurry, with and without the nitrification inhibitor, Didin.

The results indicate that the overall effect of the use of Didin on this field was to increase dry matter yield of pasture by 50%, i.e. 1580 kg DM/ha (figure above). The largest difference in yield between the areas treated with Didin and no Didin was seen early in the season, in April and May. With the cost of Didin at the time of application (February 2010) being £30 per ha, its use would be both economically viable for the farmer and also reduce the amount of N lost to the wider environment (including streams and rivers). However, the success of using Didin proved variable. The trial was repeated on another dairy farm but using Didin there showed no effect on dry matter yield. The second trial differed from the first in several ways:

- Didin was mixed with slurry during filling the tanker via an external siphon and it was not possible to see how well it had been mixed;
- the pasture was an 8-year, ryegrass-dominated ley with shallow rooting depth and compaction;
- the slurry was injected on 4 March, providing 100 kg N/ha.

Taken together these two trials have shown that nitrification inhibitors do have a potential use under normal farm working conditions but a larger study involving several farms at once is necessary before the actual benefits can be reliably assessed.

3.6 Study tour on catchment sensitive farming to Ireland

Teagasc is the Agriculture and Food Development Authority in Ireland. Its mission statement is to support science based innovation in the agri-food sector and the broader bio economy that will underpin profitability, competitiveness and sustainability. In December 2010, a group of Conwy farmers accompanied CEFN Conwy officers to visit the Teagasc centre for Soils and Environmental Research and Development in Johnstown Castle, Wexford. The group heard from researchers and farm advisers about the centre's [1]Agricultural Catchments programme which had been running for six years. This programme is based on a partnership with farmers and other stakeholders that, like CEFN Conwy, aims to support productive agriculture while protecting water quality. The programme operates in six small river catchments across Ireland with a total of over 300 participating farms.

The study tour provided us with the opportunity to see the benefits of projects similar to CEFN Conwy that had been operating for longer. We were also able to talk with participating farmers, visit catchments and see how automated river water quality monitoring stations function in the field.

"I thought the visit was very worthwhile: it was interesting to hear how much importance the Irish put on their grass-based economy and like CEFN Conwy, they were raising awareness amongst farmers about protecting water quality by using fertiliser and manure efficiently," Mr Gareth Hughes of Blaenddol Farm, Tal y Bont

[1] *http://www.teagasc.ie/agcatchments*

4. Recommendations and Take-Home Messages

- maintain soil fertility and productivity by testing fields in rotation every four to six years.
- maintain optimum soil pH for grassland at 6.0 and 6.5 for arable crops. Soil acidity results in loss of yield and is corrected by regular liming. Ground limestone can remain active for up to five years.
- maintain soil P and K indices to achieve optimum response to N fertiliser applications. It is best to build the P and K status of soils through the regular application of fertilisers and organic manures but be aware that overuse of P leads to increased P losses in land runoff and can cause deterioration in water quality.
- take into account the nutrients in slurry and manure applied to fields to avoid over-fertilising and economic inefficiencies.
- make good use of slurry and manure over as many fields as possible, bearing in mind the Code of Good Agricultural Practice and closed periods, when applying.
- get the most out of slurry applications by injecting rather than spraying and get the most out of manures by surface incorporation instead of spreading.
- preserve soil organic matter (SOM) – it is essential for improving productivity. Adding organic materials such as manure, compost, sewage cake and ploughing in crop residues increases SOM whereas deep ploughing and ploughing up old grassland for arable use reduces SOM.
- results from individual field soil tests (104 fields) and whole-farm nutrient balances (49 farms, amounting to 12% of Conwy's agricultural land area) both indicated that excessive use of fertilisers and manures/slurries was not commonplace. Therefore, most farm practices in Conwy are likely to contribute positively towards the Water Framework Directive's aim of achieving good ecological and chemical status for all water bodies by 2015.

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