Achieving Best Nutrient Management Practices on Irish Dairy Farms

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Introduction

It is economically and environmentally critical to be efficient when managing organic and chemical nutrient applications on Irish grass-based dairy farms. This project focuses on managing nutrients at the paddock scale rather than the usual field scale. It is expected to help farmers reduce costs and nutrient losses by allowing them to be more precise in their applications. This is a precision Nutrient Management Practice (NMP).

Aims

Identify the effects of precision NMP on
• grass production and quality
• nutrient use efficiency
• economic sustainability
• environmental sustainability

Across 21 dairy farms in Ireland

Objectives

• Establish current levels of NMP on selected dairy farms
• Identify the appropriate scale to implement precision NMP
• Develop a set of nutrient use efficiency indicators for intensive grass based dairy farms
• Establish the effect of precision NMP on the levels of nutrient use efficiency on these farms

Experimental Design

21 intensive dairy farms selected for this study from the South and South-East of Ireland

Bio-geophysical characteristics of farms assessed
• Soil type & drainage characteristics
• Topography etc.

Farm management data collected
• Nutrient applications
• Stocking rates
• Grazing management

Temporal data collected at paddock scale
• Soil fertility (pH, P, K, micronutrients)
• Grass nutrients & production

Interim Results

Soil test nutrient Index system

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Extremely deficient</td>
</tr>
<tr>
<td>2</td>
<td>Deficient</td>
</tr>
<tr>
<td>3</td>
<td>Optimum</td>
</tr>
<tr>
<td>4</td>
<td>Excessive</td>
</tr>
</tbody>
</table>

Soil test P at the farm scale

Fig 2. Typical distribution of soil test Phosphorus results at the paddock scale across one dairy farm

Fig 1. Illustration of data collection at paddock scale

Fig 3. Proportion of samples from participating dairy farms (paddocks) with soil test Phosphorous (left) and Potassium (right) in each index (1-4)

Fig 4. Grass and soil test Potassium (k) concentration levels per paddock across one farm

Conclusion

• There is variability in soil nutrient content at the sub field scale
• 33% and 17% of farms sampled are sub-optimal for grass production in P and K respectively
• On average more than half of these dairy farms are low in lime i.e. below target pH of 6.3
• Preliminary results are based on first year of data collection, study will be continued until 2018

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