

Project number: **RMIS 5518**Date of publication: **August, 2010**

Grass based milk production systems for regions of high rainfall and heavy clay soil types.

Key external stakeholders:

Dairy farmers on heavy soils

Local milk processors – Kerry, Dairygold, Arrabawn, Lakeland dairies and Connacht Gold

Consultancy agencies

Practical implications for stakeholders:

In all livestock systems the ability to achieve high levels of grass utilisation is influenced by climatic and soil conditions. In wetland regions grass utilization is difficult in periods of high rainfall and is major constraint. The findings of this research project based at Kilmaley research farm indicate that

- Dairying on heavy clay soils is challenging but potential exists to increase animal productivity from grass (with the use of on/off grazing) in periods of marginal grazing conditions
- Stocking rates used in wetland regions must be appropriate to minimise the importation of bought in feed. The economically optimum system of milk production in this study did not vary depending on milk price, the lower stocking rate system are less exposed to the cost of imported feed, higher stocking rate systems are exposed irrespective of milk price to high feed costs.

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Industrial collaborators:	Mr John O'Callaghan, Kerry Co-op
Funding source:	Teagasc Core funding, National Development Plan, Dairy Levy.
Start date:	January, 2006
Completion date:	December, 2009
Key Impact Indicator:	Investigate the effects (animal output and profitability) by increasing stocking rate on dairy farms with heavy clay soils in high rainfall regions

1. Project background:

There is a large variation in the cost of milk production in specialised dairy farms in Ireland. Some of the variation in cost may be associated with variation in soil type and climatic conditions. Previous work at the Kilmaley Research Farm indicate that the most profitable spring milk production system is based on a feed budget of 2.1 tonnes of grass silage, 2.8 tonnes of grazed grass and 0.5 tonnes of concentrates per cow at a stocking rate of 2.0 cows per hectare with a nitrogen input of 210 kg per hectare. An alternative system of milk production for high rainfall heavy clay soils is a higher concentrate feeding system allowing for higher animal performance per unit area. This system will be less dependent on achieving high animal performance from grass silage, while at the same time lowering fixed costs per unit of output. If concentrate supplementation could be used efficiently, allowing a higher stocking rate to be carried, this may potentially result in profits similar to pasture-based systems in free draining soils with low rainfall.

2. Questions addressed by the project:

Survey information compiled by Creighton et al (2010 in press) shows that dairying farms in wetland regions have low stocking rate (1.83 LU/ha), low output per cow (310kg milk solids/cow) with 674kg concentrate input per cow and grazing season length of on average 238 days. The question addressed in this project was to determine the biological efficiency of two different production systems on a high rainfall heavy clay soil based on differences in concentrate supplementation level and stocking rate. A main aspect of the study was to examine whether stocking rate could be increased on heavy soils and what impact this would have on the dynamics of the system relative to a low stocking rate system.

3. The experimental studies:

The objective of this study is to compare the biological and financial efficiency of two pasture-based production systems, the blueprint system adapted from Kilmaley previous research program, the second based on increasing stocking rate. Sixty two spring calving dairy cows were randomised and assigned to a two treatment (n = 29) feeding system study, 24% of the herd were primiparous. Mean lactation number was 2.8 (s.d. 1.6), mean calving date 23 February (s.d. 25 days), respectively. The two treatments were, Blueprint (Blu), low stocking rate (2.18 cows/ha), 220 kg N/ha, target 500 kg concentrate, 2 main silage cuts. A high concentrate system (HC) had a stocking rate of 2.87 cows/ha, target concentrate input (1.3t/cow), 240 kg N/ha, one main silage cut. Separate farmlets, each of 19 individual paddocks were in operation for both systems. In both systems from turnout the objective was to minimize grass silage feeding. Once grass supply was sufficient the both herds were managed on a grass only diet, the HC herd were supplemented to a higher level in both early and late lactation.

4. Main results:

- Grazing season length was on average 180 days (2006-2009)
- On/off grazing can successfully be used to increase grazing days.
- Milk solids production was 378kg/cow (832kg/ha) for the blueprint system and 402kg/cow (1166kg/ha) for the HC system.
- Milk fat and protein content were unaffected by production system
- There was no significant influence of production system on cow reproductive performance
- Concentrate input was 681kg (blueprint) and 1356kg (HC) on average over the four years.
- The optimum system of production did not vary with milk price. Higher profit was realised with the blueprint system at low, med and high milk prices.
- The HC system was too reliant on imported feed, decreasing the competitiveness of the system.
- This study shows that dairy milk production systems with low stocking rates can be viable in regions with high rainfall and heavy clay soils. Key aspects to profitable milk production are compact calving

with a high EBI herd, targeting high grass utilization with the use of on/off grazing, strategic concentrate supplementation and minimizing the purchase of imported feed.

5. Technology transfer:

A main open day took place in Kilmaley in 2006. The farm catered for on average 20 discussion groups annually, these groups originate from Kilkenny, Tipperary, Clare, Cork, Galway, Limerick and Kerry. The farm was used routinely for education purposes, with courses given on grassland measurement, grass utilization been run by the local B and T advisors and the farm manager James O'Loughlin. Weekly during the grazing season, the weekly results of the blueprint system was texted to 300-400 farms (this was communicated by John Maher and Ger Courtney). This was a major information source for many farmers during the challenging summers of 2008 and 09.

Dissemination through Teagasc Advisory

In addition to open day events, individual discussion groups frequently visited the experiment during the project. Topics covered at these events by research and advisory staff included grassland management best practice advice, animal breeding and health recommendations and economic implications of research results.

Main publications:

O'Donovan M., O'Loughlin, J., and Kelly, F. (2007) Milk production systems to increase competitiveness in regions of high rainfall and heavy clay soil types. Grassland Science in Europe, Vol 13, Biodiversity and Animal Feed, pp 840-842.

O'Loughlin, J. O'Donovan M and Kelly, F. Grass based milk production systems for regions of high rainfall and heavy clay soil types. Agricultural Research Forum, Tullamore (2007). P108.

O'Loughlin J and O'Donovan M (2006) Increasing the competitiveness of milk production in areas with high rainfall and heavy clay soils. Moorepark Dairy Levy Research Update pp 37.

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