



Governance: good examples of crop farmers and livestock farmers working together

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Beautiful Environment

High yields

Low Carbon Footprint



Low carbon
footprint:
tillage and livestock
working together

- Organic manures sourced locally such as pig and cattle slurry.
- Continuous tillage lands with high yielding crops - huge requirement for organic matter.
- Nutrients required for the production of the growing crop
- Nutrients required for the buildup of soil fertility





Benefits of organic materials in tillage land

- Crop yields increased
 - from average of 9.4 tonnes/Ha to 12 tonnes/Ha in two row winter barley ~ 25%
 - Organic matter in soil releasing tiny amounts of nitrogen to growing winter barley plant over winter period.
 - This source of nitrogen encouraged and maintained plant tillers in late winter/early spring laying foundation for a high yielding crop.
- Healthy crops
 - required lower levels of protection from fungicides.
- Eliminated need for application of trace elements - present in imported slurries.
- Better physical structure to soil
 - High organic matter
 - Improved soil tilth

Reducing carbon emissions – mutual benefit to livestock and crop farmers

- The reduction in carbon footprint by using increased organic material on our tillage farms are impressive and immediate.
 - Correct application of these organic slurries has reduced our bagged fertilizer requirement on spring barley by 50% and by 33% on winter crops.
 - Considering that approximately 70% of the carbon footprint of tillage is due to artificial fertilizer use our increased precise application of organic materials is very beneficial to our environment without sacrificing yield potential.
- If proper mechanisms are put in place to move the excess nutrients from our dairy and pig units to the continuous tillage lands then we can solve the problem excess animal slurries on livestock farms and reduce the carbon footprint of our tillage production
- Reception tanks for slurry on tillage farms
 - different slurry types mixed to get a suitable blend.
 - reduce logistical pressure on lorries / dairy farmers to deliver slurry on day of application.



Application of slurries

- Traditionally in tillage slurries applied haphazardly, exclusively on stubble post harvest in August/September.
 - Huge loss of nutrients – no growing crop
- Application of organic material needs to be multi annual
- Application to winter vs spring crops
 - Applied to growing winter crop at grass corn stage before stem extension.
 - Applied to spring crops by incorporation in seed bed

Winter vs Spring crops: Maximising nutrient value of slurries

- Choosing Winter vs Spring crops - factor to consider in reducing use of artificial nitrogen and reducing our carbon footprint.
- Spring barley: 4,000 gallons per acre (18 m³) pig slurry + 75 Kg/Ha artificial nitrogen
→ yield of 9 tonnes / Ha.
- Winter barley: 4,000 gallons per acre (18 m³) pig slurry + 150 Kg/Ha artificial nitrogen
→ yield of 12 tonnes / Ha crop.

This equates to 100 % increase in use of artificial nitrogen for a 33% increase in yield.

- Increasing spring cropping better for our carbon footprint but challenging
 - require greater harvesting capacity - reduced time window
 - winter crop harvest starts three weeks earlier than spring crops
 - Increased risks – weather events & later harvesting time

Carbon budget - Agriculture one entity with many sectors

- All sectors of agriculture contribute to a single carbon budget
- Tillage farming holds the key to maintaining our dairy and pig herds in Ireland.
- Tillage and livestock need stronger linkages
 - Tillage – immediate reduction in Carbon possible
 - Benefits agriculture as a whole
- How?
 - Increased use of Slurries
 - Decreased use of artificial fertilisers
 - Winter beans in crop rotation
 - Forestry on wet and hilly tillage land





Winter beans : protein and more

- Winter beans in crop rotation - Advantages:
 - supply protein demand to livestock
 - require no artificial fertilizer (nitrogen fixator)
 - livestock slurries provide its phosphate and potash
 - Require no herbicide application
- Winter bean straw – biomass; burns cleanly with no clinker issues.
- We installed 1.4 MW biomass boiler on our farm in 2016.
 - linked to our grain drier
 - 50% reduction in fossil fuel usage
- Protein aid from EU essential

Challenges ahead

- Research budget required to evaluate different soil types
 - Slurry nutrient retention
 - Carbon buildup in soil
 - Carbon footprint for each farm
- In Ireland, increase in tillage lands required
 - tillage industry declined by 42% since 1980 and 15% in the past decade.
- EU supports for tillage farming
 - Slurry storage on tillage farms
 - Coupled financial supports for tillage farmers embracing efficient slurry use with accompanying reduction in artificial fertilisers



Carbon and Nutrient cycle

Crop farmers and livestock farmers working together

