

Annex A: On-Farm Actions to Reduce Emissions

In order to encourage the continued reduction of GHG emissions from agriculture, it is important to achieve clarity about the on-farm practices that can increase production efficiency and realise GHG emissions reductions per unit production. Experts in the industry partnership organisations have identified a suite of actions to achieve such efficiencies, which are largely based on high-lighting key existing best practice guidance.

Actions for all farm types

1. **Skills, training and advice** - seek appropriate training in land management and the application of crop inputs. If professional advice is sought, use only professionally qualified individuals
2. **Soil management** - follow good practice: avoid and rectify soil structural problems (e.g. by reducing wheelings and poaching, by sub-soiling, mole draining, adding organic matter). Use soil cultivations appropriate for the soil type and cropping situation without restricting crop growth and nutrient uptake. Monitor and amend soil nutrient status and pH following regular soil sampling and analysis
3. **Land management risk assessment** - grow crops and locate high output grazing livestock systems on land with characteristics capable of supporting sustainable production (e.g. based on soil type and depth, droughtiness, slope). Review enterprises and cropping that may not be suited to the land (e.g. intensity of dairy stocking; fields for growing milling wheat, potatoes, and vegetables)
4. **Optimise crop and livestock performance** - select varieties and breeds suited to local conditions and market requirements, using the natural environment to best effect, taking a whole farm approach (integrated farm management)
 - **Consider selection of crop and animal breeds** which favour production efficiency and GHG mitigation
5. **Crop nutrition (underpinned by crop health)**
 - Plan fertiliser and manure applications to each crop to optimise the supply of all nutrients from all sources. Use standard recommendations, and prepare a nutrient and manure application plan for each crop in each year, allowing for nutrient balances within the rotation:
 - Make the most of the nutrient resources already available - account for the nutrients supplied from soils and manures.
 - Optimise the quantity of nitrogen that is applied as fertiliser and manure N - ensure that all other crop inputs (including other nutrients, lime and crop protection products etc.) are optimised so that unrestricted crop growth is achieved with a high efficiency of nitrogen utilisation. This will reduce the risk of using unnecessarily high nitrogen application rates.

- Apply nitrogen from manufactured fertilisers and organic manures at times that match the crop uptake of nitrogen - avoid applying nitrogen when the soil is waterlogged, frozen or when the crop/grass is not growing. (Precise timings and recommended rates will be crop specific)
 - Apply nitrogen and other nutrients at the optimum rate and evenly to the target area. Check and calibrate each fertiliser spreader/sprayer annually before fertiliser is applied and use headland devices. (Consider benefits of GPS technologies, if appropriate). Estimate the weight/volume and rate of application of each type of manure applied to each field
- 6. Maximise marketable produce** – harvest/slaughter at optimum times. Handle livestock and crops to minimise losses and damage during transit, storage and processing
- 7. Consider opportunities for energy efficiency and renewable energy generation** - in the efficient use and potential for on-site supply of electricity, heat and vehicle and heating fuels
- 8. Adopt land management practices/stewardship options** which maximise environmental value, resource protection and carbon storage, e.g. buffer strips on compacted wet headlands offer potential GHG mitigation and carbon sinks

Livestock-specific actions

- 9. Skills, training and advice** - consider additional benefit of using a ration formulation programme or nutritional advice from an expert when planning the feeding regime for your livestock
- 10. Manure treatment, storage and spreading** - implement manure management practices that will reduce atmospheric emissions and water pollution during manure collection, storage and spreading. Use facilities and techniques which result in the best possible use of nutrients by a growing crop, including adequate slurry and dirty water storage capacity, slurry separation, anaerobic digestion, covered storage, low emission slurry spreading techniques and nutrient management planning
- 11. Housing** - provide suitable housing and shelter for livestock appropriate to their needs and those of workers, including welfare, freedom from stress, minimising aerial and atmospheric pollutants, minimising disease pressures, providing optimum access to feed, water, light, shelter and warmth (where appropriate). Utilise materials which will withstand hard use but also do not harbour disease organisms and pathogens
- 12. Livestock nutrition** - plan diets and feeding regimes to achieve desired productivity, efficiently making use of resources available including home grown crops and food industry origin co-products, carefully matching nutrient content and availability to animal requirements. Consider using feed technology and additives to improve feed use efficiency

13. Livestock health - maintain optimum health status of all livestock through proactive health planning and close monitoring of performance e.g. through weighing of stock to identify need for interventions. Consider the benefit of expert veterinary advice in health planning linked with the appropriate diet, feeding regime and housing for the breed

- consider vaccinations and anti-parasitics where appropriate (participation in health schemes may raise the value of breeding stock)
- prioritise health and welfare issues, and implement testing for diseases if advised
- implement biosecurity measures

14. Genetics and breeding policy - select for traits which will benefit the farming system. Target efficient production and satisfy market needs with respect to products and product quality:

- Use bulls with a high PLI or Profitable Lifetime Index when breeding dairy cows
- Use bulls/rams with a high EBV or Estimated Breeding Value when breeding beef cattle/lamb

15. Plan grassland management (and forage management) to meet production objectives - use clover mixes to reduce the need for nitrogen application, high sugar grasses where appropriate, and utilise forage production efficiently