GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES

GLOBAL DAIRY PLATFORM

dsf Dairy Sustainability Framework

How Dairy Cattle Health Impacts Greenhouse Gas Emissions: Chile, Kenya & UK

Introduction

In 2019, the Food and Agriculture Organization and Global Dairy Platform published a report entitled, 'Climate Change and the Global Dairy Cattle Sector'. This global review identified improved cattle health as one key action to reduce Greenhouse Gas (GHG) emissions from livestock production.

http://www.fao.org/3/CA2929EN/ca2929en.pdf

The report showed that endemic cattle diseases have a negative effect on cattle production and productivity, and consequentially impacts on GHG emissions. This typically stems from:

- Increased mortality
- Depressed milk production
- Increased waste from treated milk that is discarded
- Diminished reproductive performance

This new research explores:

- The effect of proactive animal health management, using Animal Health Improvement Measures (AHIM) on GHG emissions
- The economic impact these AHIM improvements have on farmers
- How AHIM could be included in Nationally Determined Contributions (NDCs) and the necessary Measurement, Reporting and Verification to achieve this ambition.

The study applies the same methodology in the dairy sectors of Chile, Kenya and the UK.

Dairy Cattle Health and GHG emissions

The study focuses on three specific health and productivity challenges for dairy cattle, along with intervention actions in the three countries:

1. **Reproductive performance**
   Infertility/failure to conceive (non-pregnant cows): **Interventions** - Early Pregnancy diagnosis; sensors and tools for heat detection and fixed time artificial insemination programmes.
2. **Single agent infectious disease**
   Bovine Viral Diarrhoea virus (BVDv): **Interventions** - Biosecurity measures and segregation; use of vaccination; testing and removal of persistently infected (PI) animals.
3. **Multifactorial or management disease**
   Mastitis in dairy cows: **Interventions** - Teat disinfection and hygiene; dry cow therapy; milking management training.

Methodology:

The commonly used AHIM and prevalence of the three cattle health and productivity challenges and domestic climate impacts are being reviewed using a Delphi panel methodology, based on a group of expert vets and climate specialists in each country including:

the XLVet Group, including RCVS Specialists in the UK, Defra, Cranfield University.

Consorcio Lechero, Sociedad Chilena de Buiatría and Asociación Latinoamericana de Buiatría, Instituto de Investigaciones Agropecuarias (INIA),Cooprinsem, Universidad de Concepción, Servicio Agrícola y Ganadero (SAG) and independent veterinary advisors.

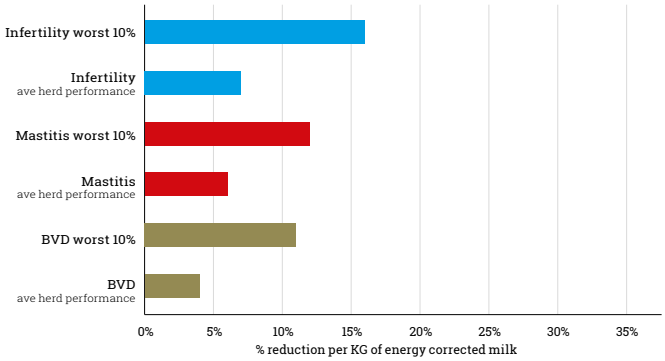
the Kenya Agricultural & Livestock Research Organization and Ministry of Agriculture, Livestock and Fisheries.

AHIM and GHG – study results

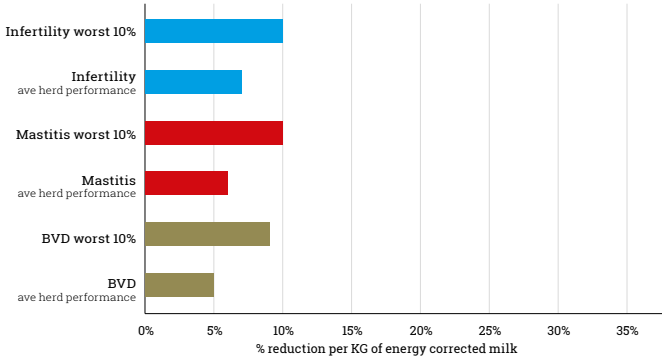
The charts overleaf present the emissions intensity reduction potential at the 'average herd level and in the worst 10% of herds in each country by implementing AHIM for each challenge.'

- Infertility measures represent the greatest opportunity with a potential across all countries of c.40% in GHG intensity in the worst 10% of herds,
- Single agent infectious and multifactorial/management diseases should not be overlooked as they too can contribute substantially to GHG emissions reductions.

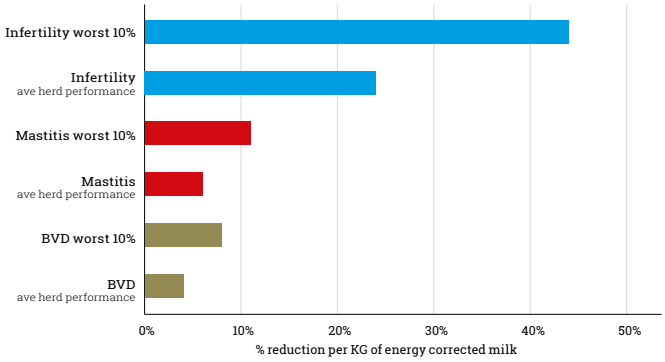
Potential reductions in GHG intensity of milk production in the UK



Potential reductions in GHG intensity of milk production in Chile



Potential reductions in GHG intensity of milk production in Kenya



Cattle health potential for reducing GHG intensity

The data are for three conditions with the average herd level potential for each and the potential for the worst 10% of herds.

Condition	Potential reductions in GHG intensity		
	UK	Chile	Kenya
BVD	4%	5%	4%
BVD worst 10%	11%	9%	8%
Mastitis	6%	6%	6%
Mastitis worst 10%	12%	10%	11%
Infertility	7%	7%	24%
Infertility worst 10%	16%	10%	44%

Economics

The range in costs and benefits across the three geographies*.

AHIM	Action – Cost range in the 3 Geographies - $US	Benefit $US
Fertility –Reducing CI by 10 days	2-15/cow/year	20-25/cow/year
BVD	2-6/cow/year	Circa 68/cow/year
Mastitis	4-12/cow/year	200-670/case/cow/year

• Further detail on the economics is provided in the report.

The table highlights a potential return on investment in the three AHIM's returning GHG emission and economic benefits to the individual operation.

Data was accessed where available and assumptions introduced for geographies where evidence was limited. The study also recognized the variables involved when quantifying the financial implications of proactive cattle health management.

Cattle Health and Nationally Determined Contributions (NDCs)

The measurement, reporting and verification (MRV) implications of different AHIMs can be significant. Verified data will be required, and this may only really be achieved by national co-ordination of the collection of targeted key performance indicators.

To effectively and explicitly include AHIMs into countries' NDC's it is necessary that;

- GHG inventories are at least Tier 2, in order to capture the impacts of any AHIM interventions focusing on animal/herd performance;
- baselines of GHG emissions are established before any AHIM are introduced, to enable the quantification of GHG impact of AHIM; and
- to attribute any change in GHG emissions to specific AHIM's, verified data sets of the AHIM are essential, especially if the AHIM is to be funded for mitigation benefits.

This study shows considerable potential for long-term and lasting cost-effective mitigation of GHG emissions in three different geographies through the implementation of key animal health improvement measures. The potential to include these improvements in a country's NDC will be influenced by the design of its Monitoring Recording and Verification system including its GHG inventory. This pilot provides a stepping-stone to further, more complex studies that will enable the cattle sector and governments to make increasingly well-informed management and policy decisions related to livestock health and GHG emissions reductions.

To download a copy of the full report –
http://www.dairysustainabilityframework.org or **http://www.globalresearchalliance.org**

Project delivered by RAFT Solutions and Cranfield University

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