An Introduction to New Zealand's Agricultural Greenhouse Gas Emissions and Management

1.1 Welcome

There is increasing International, National and public pressure to reduce the greenhouse gas emissions associated with agriculture and food production at the farm level. Consumers seek premium foods with lower GHG footprints. Understanding Greenhouse Gas (GHG) emissions from pastoral production systems is therefore important as it is the first step to reduce and mitigate the emissions, and it is especially so now after the Zero Carbon Bill having recently been approved. Rural professionals with a grounding in the skills required to measure the GHG footprint are needed to guide farmers in developing emissions reduction plans for their farming business.

The course will be delivered by a science teams from AgResearch, Massey University and the New Zealand Agricultural Greenhouse Gas Research Centre and policy experts from the Ministry of Primary Industry (MPI). Course development has been partially funded by DairyNZ's Transforming the Dairy Value Chain Primary Group Partnership programme and draws on material from an earlier course funded by the Fertiliser Association of New Zealand and MPI.

1.2 Aims of this course

This course "Introduction to New Zealand's Agricultural Greenhouse Gas Emissions and Management" aims to provide the rural professional with:

1. A knowledge of the causes of global climate change, as well as impacts of a changing climate on New Zealand agriculture with the contribution of the carbon and nitrogen cycles in New Zealand's agricultural systems to global GHG emissions;

2. An introduction to current New Zealand Government policy, accounting protocols and emissions trading scheme;

3. An introduction to the skills to undertake GHG accounting for agricultural systems;

4. An introduction to the advice required by farm managers on GHG emission mitigation practices.

1.3 Course Calendar

You should read through this introductory section on administrative details, course information and details about the recommended timing of the workload before you begin to study this course.

This platform will allow you to get familiarise with the course and go through the different readings and quizzes as you progress through it. By the end of this online course, you will have a firm basis for the course content, as needed for the contact course. Overall, the distance part of the course will require a total of 65 hr, including the 2-hr exam.

1.4 Course Prescription

This course presents New Zealand's agricultural GHG emissions in the context of their contribution to global emissions and climate change. An introductory understanding of the GHG source/sink from the carbon and nitrogen cycles in NZ farming systems is developed, with an emphasis on pastoral and forestry systems. The online study material, short course presentations and use of OVERSEER Nutrient budgeting software will introduce the practitioner to the skills required to develop emissions reduction plans for actual pastoral farming enterprises.

The course will expose the rural professionals to the latest in GHG mitigation research for pastoral and arable farming.

1.5 Learning Outcomes

On completion of this course the rural professional will be able to understand the reasons for New Zealand's commitment to reduce agricultural GHG emissions and skills required for rural professionals to advise farmers of management change that will result in by GHG emissions reduction for pastoral farming systems.

1.6 Prerequisites

Participants must have completed Intermediate Sustainable Nutrient Management

or

Have in the previous 3 years passed the Massey University Paper 189.362 'Soil Fertility and Environment' or the Lincoln University Paper 'Advanced Soil Management' Code: SOSC340, with a B+ grade or higher.

Or, if you can show you are experienced OVERSEER software users + Science Qualification in Agricultural Carbon and Nitrogen Cycles, then our Head of Department would look at this for approval into the course.

If you have not done the prereqs please refer to the FLRC website where you can enrol to do the required course. http://www.massey.ac.nz/~flrc/courses.html Please contact Lance Currie to make these arrangements.

1.7 Activity program

Week	Activity (approximately 65 h work in total)
Week 1	**On-line Stream Study**: Site opened to enrolled students only. Complete lecture and readings on an Introduction to greenhouse gases Attend compulsory online lecture/tutorial
Week 2	Complete lecture and readings on (i) Policy relating to NZ's commitment to GHG reduction and (ii) NZ's GHG accounting and inventory. Attend compulsory online lecture/tutorial
Week 3	Complete lecture and readings on NZ's agricultural GHG emissions in a global and national context. NZ's GHG emissions sectors. Attend compulsory online lecture/tutorial
Week 4	Complete lecture and readings on nitrogen excretion, nitrous oxide and ammonia volatilisation. Attend compulsory online lecture/tutorial
Week 5	Complete lecture and readings on methane production by ruminants: its synthesis and ways to mitigate it.
Week 6	Complete lecture and readings on Basics of The NZ Emissions Trading Scheme for forests. Attend compulsory online lecture/tutorial
Week 7	Complete lecture and readings on OVERSEER modelling scenarios to reduce GHG emissions and Dairy Case Study. Attend compulsory online lecture/tutorial
Week 8	Complete reading and brief report writing associated with Sheep and Beef farm Case Study using OVERSEER modelling scenarios for to reduce GHG emissions. Attend compulsory online lecture/tutorial
Week 9	Complete lecture and readings on Contrasting Dairy Farm Systems Attend compulsory online lecture/tutorial Complete lecture and readings on GHG Capability Building Attend compulsory online lecture/tutorial
Week 10	Study time **Sit** examination (2 hours and 15 Minutes)

1.8 Assessment

A 2-hr written examination at the end of the contact course is worth 100% of course marks.

1.8.1 Requirements to successfully complete the paper

Complete all recommended online study and report preparation, pass a quiz after each lecture in order to go to the following lecture, and attend the Zoom meetings. Obtain a minimum of a C- grade (>50%) aggregate in the final 2-hr examination.

If you are having any problems with the course study material you should be in touch with the co-ordinators at any early stage to indicate this and allow remedial steps to be taken.

Marking Examinations:

Grades will be awarded according to the following schedule of marks:

GRADE	MARK	COMMENT
A+	90-100	Outstanding
A	85-89.99	Very good
A-	80-84.99	
B+	75-79.99	Competent
B	70-74.99	
B-	65-69.99	Acceptable
C+	60-64.99	
C	55-59.99	
C-	50-54.99	Poor effort
D	40-49.99	Unacceptable
E	0-39.99	