Whole-farm carbon emissions

UWA Future Farm Field Day
Australia’s Farming Future
Climate Change Research Program

Objectives of the day

• Introduce you to:
  • ‘Climate Change Reduction Program’
  • ‘Reducing Emissions from Livestock Research Program’
  • The demonstration sites
• Overview of projects we’ve initiated on-farm
• Plan for the day
• Provide an opportunity for discussion
Climate Change Research Program

$46.2M

• Nitrous Oxide Research Program
• Soil Carbon Research Program
• Reducing Emissions from Livestock Program
• Adaptation to Climate Change
Climate Change Research Program

$46.2M

• Nitrous Oxide Research Program
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• Reducing Emissions from Livestock Program
• Adaptation to Climate Change
Reducing Emissions from Livestock Program
DAFF/MLA

• Joint government ($11.25 M) / industry ($4.25 M)
• Collaborative program with 18 projects
• Partners and contributors include
  - Department of Agriculture, Fisheries and Forests
  - R&D – MLA, AWI, Dairy Australia
  - CSIRO
  - State Departments of Agriculture
  - Universities
  - CRCs – Sheep, Beef, FFI
Technologies to reduce enteric methane emissions

- Manipulate the animal
  - Breeding
  - Management

- Manipulate the diet
  - Forage
  - Plant breeding
  - Dietary supplements
  - Secondary compounds

- Manipulate the rumen
  - Biological control
  - Vaccination
  - Chemical control
Theme 2. Enteric methane measurement
Methane from herds in the field - Open Path Laser & FTIR

Griffiths et al. 2007
REL RP program structure

- **Project coordination**

  - **Theme 2**
    - Quantifying Emissions
    - 1 Project
  
  - **Theme 3**
    - Genetic approaches
    - 2 Projects
  
  - **Theme 4**
    - Manipulating the rumen
    - 15 Projects
  
  - **Theme 5**
    - Management of waste
    - 1 Project
  
  - **Theme 6**
    - Farm systems
    - Demo and Comm
    - 4 Projects
Demonstration projects for on-farm practical methane management strategies
Demonstration sites

- **Establish** a range of demonstration sites in association with industry and MLA – ensure engagement across different regions

- Assist in facilitating **adoption and commercialisation** of strategies to reduce methane emissions

- Improve **uptake** of management practices demonstrated to reduce emissions and improve productivity.

- Build national capacity and capability for **measurement of GHG emissions**
National Demonstration Sites

- **QLD: CSIRO Townsville**
  - extensive beef production (tropics)

- **NSW: UNE Armidale**
  - sheep systems in northern NSW Tablelands (links to temperate beef systems)

- **VIC: DPI Hamilton/Terang**
  - sheep and beef (Hamilton), dairy (Terang)

- **SA: SARDI Struan Research Centre**
  - Beef (Struan)

- **WA: UWA FF Ridgefield**
  - sheep in wheat belt systems in WA
What does it look like

Boyagin Reserve

1,588 ha
3,924 acres
35 soaks, dams
425 mm rainfall
UWA ‘Future Farm’ Ridgefield

Overview of projects we’ve initiated
Projects and links

Ridgefield Demonstration site (RELRP)
- Breeding for low CH$_4$
  - Daniel Murphy

Bioactive plants
- Modelling farm C
  - Ross Kingwell

Breeding for low CH$_4$
- Open path
  - Frances Phillips

DAFF CCRP

- Drought-hardy, C-conscious grazing systems (DAFF/FFI)
  - Dean Revell

- National Adaptation and Mitigation Initiative (DAFF/GRDC)
  - Ken Flower

- WA Soil Carbon (DAFF/GRDC)
  - Daniel Murphy

- N$_2$O – Fertiliser management strategies for reducing GHG emissions (DAFF)
  - Louise Barton
Projects and links

Ridgefield Demonstration site (RELRP)

- Modelling farm C
  Ross Kingwell

- Breeding for low CH₄

- Bioactive plants

- Open path
  Frances Phillips

DAFF CCRP

- Drought-hardy, C-conscious grazing systems (DAFF/FFI)
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  Ken Flower

- WA Soil Carbon (DAFF/GRDC)
  Daniel Murphy

- N₂O – Fertiliser management strategies for reducing GHG emissions (DAFF)
  Louise Barton
Projects and links

**Ridgefield Demonstration site (RELRP)**
- Modelling farm C
  - Ross Kingwell
- Bioactive plants
- Breeding for low CH$_4$
  - Open path
  - Frances Phillips

**Other**

- Resilient sheep and maternal efficiency – adaptation to CC (DAFWA)
  - Andrew Thompson
- Innovative, energy efficient infrastructure (ALVA)
  - Prof. Patrick Beale
- Local Carbon Neutral Initiative (Men of the Trees/UWA)
  - Rachel Standish
- Climate change and herbicide resistance in ryegrass (AHRI)
  - Stephen Powles
Projects and links

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- **Modelling farm C**
  - Ross Kingwell

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**Other**

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‘Whole-farm carbon emissions’

‘The economics of farm-level emissions’
Prof. Ross Kingwell (Chief Economist, DAFWA & UWA)

‘Drought-hardy, carbon-conscious, grazing systems’
Dr Dean Revell (Senior Research Scientist, CSIRO-Floreat)

‘Are we carbon emitters or carbon storers? A producer’s perspective on a whole farm audit’
David Cattanach (Farmer from Darlington Point, NSW)

Avery’s Shed - Marquee 1
‘Improving efficiency and resilience of our sheep’
Assoc Prof Andrew Thompson (DAFWA & Murdoch Uni.)

‘In-field methane measurement using Open Path System’
Dr Frances Phillips (Uni. Of Woolongong)

Road Site – Marquee 2
‘Soil, water and nitrous oxide after different crop sequences’
Asst Prof Ken Flower (No-till project, UWA)

‘(Re-) Storing C and other ecosystem services through planting native species’
Dr Michael Perring (Ecosystem restoration group, UWA)

‘Integrated pest management in Australian grains’
Mrs Laura Fagan (IPMS group, UWA)
Objectives of the day

Provide an opportunity for discussion and involvement
RELRP Demo Site

‘Whole-farm carbon emissions’ field day

UWA ‘Future Farm’ Ridgefield