

What's Happening in Carbon Farming?

Keeping you up-to-date with Royalties for Regions carbon farming projects across WA



Fighting the war against nitrous oxide

The Fitzgerald Biosphere Group's (FBG) *Managing Soil Carbon and Nitrogen in Kikuyu Pastures in the Fitzgerald Biosphere* project has been funded through the Australian Government's Action on the Ground initiative.

The project is worked in partnership with the Department of Agriculture and Food WA (DAFWA) and UWA CENRM to trial and demonstrate on-farm practices to reduce nitrous oxide (N₂O) emissions while increasing the sequestration of carbon in soils. This on-ground demonstration, developed by the FBG, has received support from South Coast NRM and the State Government's Royalties for Regions *Carbon Awareness Program (CAP)* which is administered by DAFWA.

"This project has been a great collaborative effort between farmers and researchers to achieve agricultural and environmental sustainability for our future livestock producers and consumers", FBG CEO Anne Sparrow said.

BACKGROUND

Increasing the amount of stored soil carbon has many positive benefits. On soils with poor to moderate fertility, soil carbon can help to improve fertility, nutrient and moisture retention and also store carbon from the atmosphere.

Perennial grasses have been regarded as a potential mechanism for increasing stored soil carbon to depth and as a result, several projects have looked at the ability of a range of perennials to store carbon. Of these kikuyu showed potential due, in part, to its deep fibrous root system and dense mat of roots in the top 30cm. However, projects have showed great variability in the ability of the South Coast soils to store carbon.

Also known as *laughing gas*, N₂O is colourless and non-inflammable and has nearly 300 times more impact on greenhouse emissions than carbon dioxide. Atmospheric N₂O is created when bacteria decomposes nitrogen-based fertilisers. Although N₂O is naturally occurring, its production from agricultural activities and waste water management accounts for one third of global N₂O emissions. N₂O remains in the atmosphere for 110 years and the process to remove it also depletes ozone.

PROJECT OUTCOMES

The project's outcome is to trial and demonstrate on-farm practices using current technologies to reduce agricultural N₂O emissions and increase sequestration of carbon in soil. FBG is investigating the potential to reduce use of nitrogen based fertilisers and raise productivity in kikuyu stands by demonstrating potential companion legumes. Trial sites have been implemented on five participating properties in the Fitzgerald Biosphere region. A database of pasture performance and impact on soil carbon storage throughout the landscape, has been created and focuses on four sites; from the high rainfall coastal zone to the low rainfall cropping zone. All sites had perennial grasses or pastures with kikuyu the main

focus. Production data shows that while growth rates have decreased away from the coast, the lower rainfall areas still produced substantial amounts of dry matter, with the lowest rainfall site (400mm) producing a similar amount of feed as the medium rainfall site for much of the year.

Case studies will be produced on the trial sites highlighting the results of data collected. The on-farm practices trialled, the project methodology used, results and outcomes, including a database of pasture performance and impact on soil carbon storage from each of the trial sites will be recorded in a peer reviewed report by the end of April 2015.

ON GROUND ACTION

Since 2011 five trial sites have been monitored for pasture production (biomass), soil nutritional status and soil carbon sequestration, while investigating the impact of perennial farming systems. The results are being compared to an annual/cropping paddock with the paddock history recorded back 10 years. Encouraging the growth of annual legumes in kikuyu can provide economic and environmental benefits, however the persistence of legumes in kikuyu stands can be highly variable.

In 2012, the project began to monitor N₂O emissions from soils through the use of companion legumes with kikuyu grasses to reduce the need for nitrogen based fertilisers. Livestock producers have been engaged throughout the project in field tours, reference group meetings, newsletters and in establishing 10 satellite sites for future monitoring.

PARTNERSHIP LINKAGES

This project facilitated collaborations to share resources and manpower with the Meat and Livestock Australia funded *Increase feed based production and Quality value of Sub Tropical grass based Pastures* project and South Coast NRM's *Action on the Ground* project. South Coast NRM's regional landcare facilitators who deliver CAP have joined the project to assist with extending the great work being done by the FBG.

THE FUTURE

This project has demonstrated subtropical grasses can produce significant amounts of out of season feed, even in lower rainfall areas and on soils which were proven to be unsustainable and unprofitable for cropping or annual pastures. It has also shown that pastures like kikuyu can fix significant amounts of soil carbon. What remains to be seen is whether other subtropical grasses like Gatton panic can produce similar or better results. Nitrogen Use Efficiency (NUE) is a future key component for sustainable agriculture, providing an opportunity to increase profitability, environmental stability and productivity to meet global demands for protein.

For more about the FBG, please go to: www.fbg.org.au.