



The opportunities, barriers and risks for soil Carbon Credits

Tim Wiley, Tierra Australia
twiley@tierraaustralia.com.au
0488 195 921





- Aim of this seminar

- To inform land owners of the background, issues, opportunities, barriers and risks of Carbon Credits from land based CFI projects

- Outcome

- Land managers are better informed to make decisions, or ask better questions, regarding Carbon Credit projects



Information context

1. Facts
 2. Uncertainties
 3. Opinions
- The Climate Science debate is NOT the focus of this seminar
 - This is not legal or financial advice
 - Carbon Credits are financial instruments
 - Before entering into a CFI Carbon Offset project get professional legal and financial advice!!!!
 - Data is presented only to help illustrate some of the key issues



Agenda



- UNFCCC and Kyoto Protocol
- Emissions by sector
- Carbon Farming Initiative (CFI)
- Carbon project “Methodologies”
- Carbon price and government policies
- Economics of Carbon offsets
- Nation Capital credits



Background

UNFCCC and Kyoto Protocol

- United Nations Framework Convention on Climate Change (UNFCCC) signed in 1993
- Aim was for nations to work together to address climate change
- Kyoto Protocol signed in 1997 under UNFCCC
- Inter-nation 'Cap & Trade' scheme
- Accounting rules for Kyoto Protocol set out by the IPCC (Inter-governmental Panel on Climate Change)
- Kyoto Protocol ratified by Australia in 2007
- Kyoto Protocol commitment period is from 1 Jan 2008 to 31 Dec 2012
- Paris Agreement is non binding national targets



Carbon Farming Initiative 2011 (CFI) legislation

- CFI legislation passed in August 2011
- The CFI creates a process for Carbon Credits to be generated from land based activities
- Sets rules for offset 'Methodologies' and 'Projects'
- Administered by Dept Environment & Energy (DEE)
- 'Methodologies' approved for offset projects
- Carbon Credit Projects are activities to generate offsets from specific areas of land
- Land tenure and Carbon Rights




Green House Gas accounting

- ▶ Accounting rules were endorsed by 192 nations as part of the Kyoto Protocol in 1997
- ▶ Accounting rules set out by the Inter governmental Panel on Climate Change (IPCC)
- ▶ Greenhouse gas emissions are calculated in CO₂ equivalents (CO₂e)
 - ▶ 1 tonne Carbon = 3.67 tonnes of CO₂
 - ▶ 1 tonne Methane = 23 tonnes of CO₂e
- ▶ Total emissions (t) = Emission factor (t per unit) X Number of Units
- ▶ There are detailed accounting rules for each sector of the economy
- ▶ Nations submit their National Carbon Accounts each year
- ▶ CFI is based on the IPCC accounting rules

IPCC Green House Gas accounting factors

- ▶ Emissions measured in Carbon Dioxide Equivalents CO₂e
 - ▶ E.g. 1 kg methane = 23 kg CO₂e
- ▶ E.g. Kg CO₂e from Diesel = Litres of diesel x 2.672 Kg CO₂/l Diesel
- ▶ 1.0 l diesel => 2.672 kg CO₂e
- ▶ => 4.0 c/l Carbon tax at \$15 t CO₂
- ▶ Petrol Emission Factor is 2.322, or 3.4 c/l at \$15 t CO₂



Kyoto Protocol accounting rules relating to agricultural sequestration

- ▶ Article 3.3 refers to forest activities
 - ▶ Woody vegetation
 - ▶ 0.2 hectare minimum
 - ▶ Mature trees minimum of 2 m height
 - ▶ Crown cover of 20% minimum

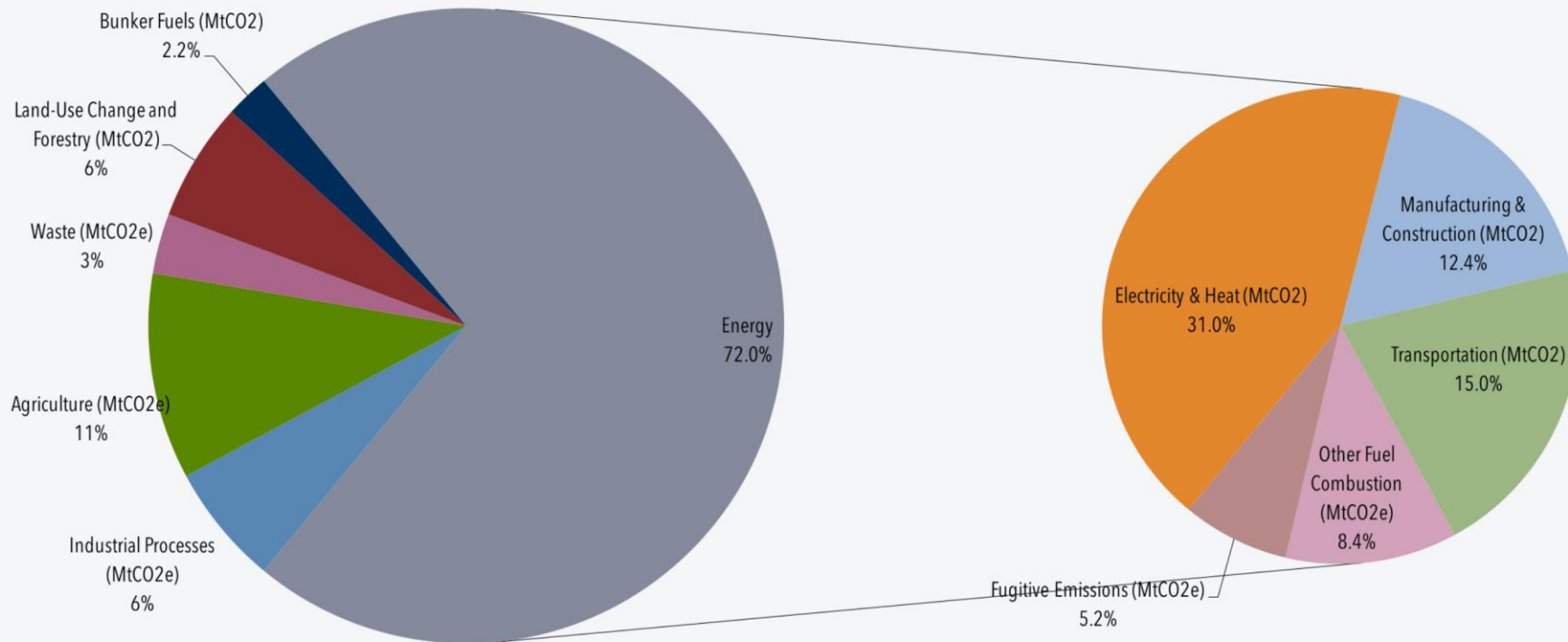
- ▶ Article 3.4 refers to other land based agricultural activities
 - ▶ 'crop land' = continuous cropping
 - ▶ 'grass land' = all other agricultural land uses
 - ▶ Article 3.4 sinks were optional in first commitment period
 - ▶ Australia chose not to include Article 3.4 sinks for 2008 – 2012
 - ▶ We don't know, or include, changes in soil carbon in GHG accounts



How much green house gas does the agricultural sector emit

- ▶ All nations submit their national accounts to the UNFCCC each year
- ▶ This is the most accurate data available
- ▶ Are global greenhouse gas emissions from the agricultural sector....
 - A. 11%
 - B. 17%
 - C. 25%
 - D. 54%

Global GHG emission by sector (2013)



NOTES

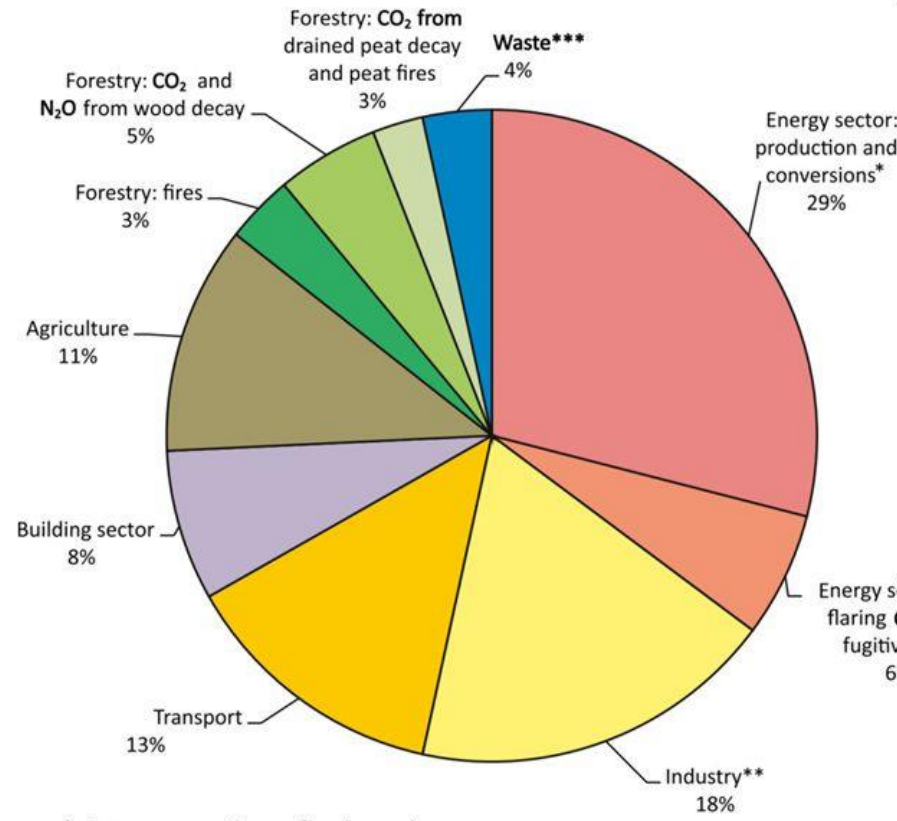
Globally, the primary sources of greenhouse gas emissions are electricity and heat (31%), agriculture (11%), transportation (15%), forestry (6%) and manufacturing (12%). Energy production of all types accounts for 72 percent of all emissions.

SOURCE

Climate Analysis Indicators Tool (World Resources Institute, 2017).

Global greenhouse gas emissions by sector (2010)

Shares of anthropogenic sources of global greenhouse gas emissions in 2010 (50.1 GtCO₂e) by main sector (in CO₂-equivalent)



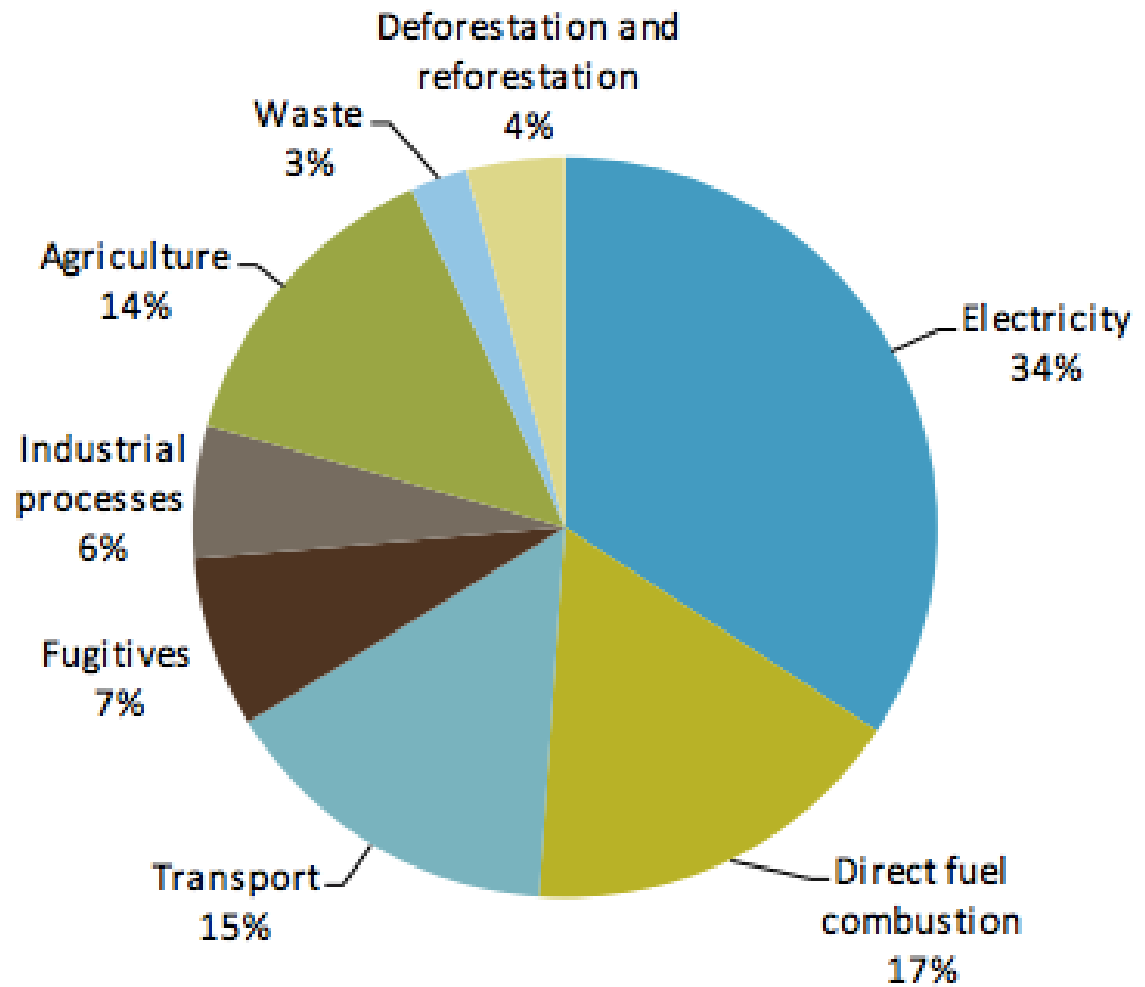
Source	Sample Emission-generating Activities
Energy Supply	Electricity and centralized heat generation, resource extraction, and grid base transmission/distribution
Industry	Production of metals, pulp and paper, cement, and chemicals; petroleum refining
Forestry	Deforestation, decomposition of biomass that remains after logging
Agriculture	Crop and livestock production
Transport	Travel by car, freight truck, plane, train, or ship
Residential and Commercial Buildings	Heating, cooling, and electricity
Waste	Landfills, incineration, wastewater

<http://www.unep.org/pdf/2012gapreport.pdf> (22.11.2012);
 McKeown & Gradner (2009): Climate Change Reference Guide. Worldwatch Institute, 17 pp.

* Power generation, refineries, coke ovens.
 ** Including non-combustion CO₂ from limestone use and from non-energy use of fuels and N₂O from chemicals production.
 *** Including wastewater.
 **** Including peat fires.

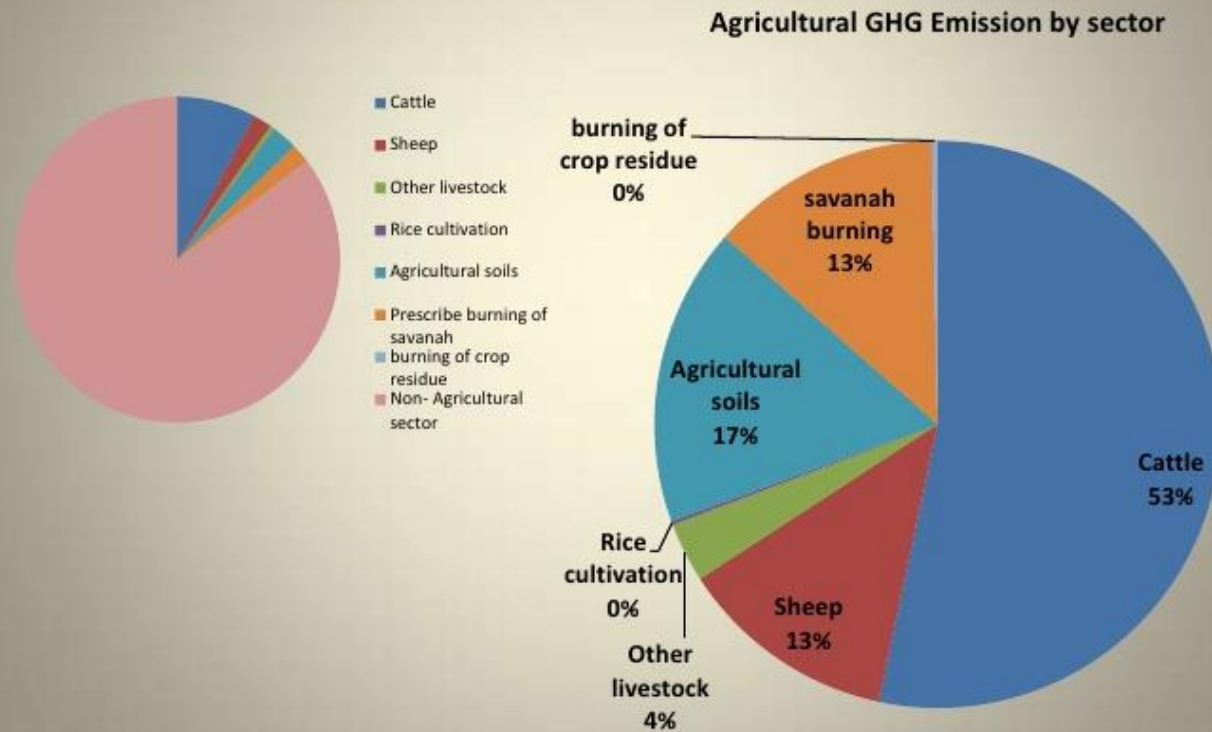


Australian
greenhouse
gas
emissions by
sector
(2012)



Livestock is
9% of
Australian
total GHG
emissions
(2008)

Agricultural GHG Emission by sector





CFI “Methodologies”

- Sets out approved practices for sequestering carbon or avoiding emissions
- Rules for estimating abatement for projects
- Rules for documenting practices, monitoring, record keeping, auditing and reporting
- Requires a review of each projects by an independent expert
- Rules for discounting the amount of ACCU's issued
 - discount for statistical uncertainty (60% confidence level)
 - -5% all projects
 - -25% for 25 year permanence
 - Soil carbon has a 50% deferred from first monitoring period to the second period
- Abatement must be ‘additional to business as usual’
- <http://www.environment.gov.au/emissions-reduction-fund>



Emissions Reduction Fund (ERF)

1. Issues ACCU's to Carbon projects
 2. Purchases ACCU's
 3. Implements 'Safeguard mechanism' emissions for big emitters
- ACCU's are purchased by ERF using a reverse auction
 - ACCU's can be sold to industry
 - ACCU's can be banked

 - Government policy can have a big impact on Carbon Credit price
 - Unclear what the policy will be following the next election



'Methodologies' for soil carbon sequestration projects

1. *'Estimating Sequestration of Carbon in Soil Using Default Values'*
2. *'Sequestering Carbon in Soils in Grazing Systems'*
3. *'Measurement of Soil Carbon Sequestration in Agricultural Systems'*


Some of the other 'Methodologies' cover

- *Reduced fire in northern savanna*
- *Tree planting*
- *Regeneration of natural 'forests'*
- *Reduced livestock methane emissions*
- *Avoided emissions with renewable energy, reduced landfill emissions.....*



'Measurement of Soil Carbon Sequestration in Agricultural Systems' Methodology

- Eligible Management Activities

1. New irrigation (water sourced from efficiency savings)
 2. Sowing or rejuvenating pastures
 3. Modifying landscapes
 1. (e.g. rehydration from water ponding)
 4. Soil amendment by delving or claying
 5. Applying synthetic & non synthetic nutrients
 6. Applying lime
 7. Applying gypsum
 8. Introducing pasture onto crop land or fallow
 9. Changing grazing
 10. Retaining stubbles
 11. Reduced tillage
- 



Not allowed

- ▶ The Eligible Management Practice was applied to the land before the baseline measurements
- ▶ Land cleared during the 10 year baseline period
- ▶ Land was drained during baseline period
- ▶ Previously grazed land is destocked
- ▶ Using coal as a soil amendment
- ▶ Pyrolysed materials that are not biochar
- ▶ Soil disturbance below 30 cm
- ▶ Inducing acid sulphates in soil
- ▶ Vegetation thinning without approvals
- ▶ Biochar raw material sourced from outside of the project area
- ▶ Other technical issues.....



Project requirements

1. ROI registers the project including all relevant documentation
2. Baseline estimates
 1. Map project area and determine sampling sites using the rules
 2. Sample soils, analyse total carbon & estimate carbon stocks in t/ha
 3. Estimate other emissions for the last 10 years
 1. Mostly methane from livestock, but also N fertiliser, fuel and lime
3. Implement the Approved Management Practice
4. Follow up sampling
 1. 1 to 5 years after baseline
 2. Resample soils to calculate new soil carbon stocks
 3. Estimate other emissions
5. Calculate change in soil carbon stocks + other emissions
6. Discount estimate to claim ACCU's (5% + 25% (+ 50%))
7. Independent audit & Report to DEE to claim ACCU's



Soil sampling & analysis

- ▶ Map out Carbon Estimation Areas (CAE)
 - ▶ Exclude buildings, roads, bush etc
- ▶ Stratify CAE's in to at least 3 sub areas
- ▶ At least three soil samples taken from each sub strata
 - ▶ Can use mix soil cores to give a composite sample
- ▶ Randomly select (GPS coordinates) sample sites within each strata
- ▶ The soil coring contractor must not have financial interest in project
- ▶ Sample within 4 m of selected sites, & record coordinates
- ▶ Minimum sample depth of 0 to 30 cm
 - ▶ Can take deeper samples but must be a separate sample
- ▶ Weigh samples to calculate Bulk Density
- ▶ Analysis soil samples for Total Carbon by an accredited lab
- ▶ Calculate carbon stocks in tonnes per hectare, then convert to CO₂e



Project length

- ▶ Maintain management practice for 25 years after first follow up sampling
 - ▶ Or 100 years with no 25% discount
- ▶ Resampling is done at intervals of 1 to 5 years
 - ▶ Extra ACCU's issued after each follow up sampling round
- ▶ You may stop sampling if the sequestration rate drops too low but management must be maintained for the 25 year period
- ▶ Review of the management practices by independent expert every 5 years
- ▶ DEE may cancel a project if Methodology not being followed



Economics of soil carbon projects

- ▶ Profit = Income – Costs
= (Yield x Price) – Costs
- ▶ Yield is tonnes of Carbon sequestered that can be claimed
 - ▶ Depends on soil type, plants species, management practices, seasons
- ▶ Price depends on market forces and government policy
 - ▶ Government has been price setter through the ERF reverse auction
 - ▶ Demand from industry could increase particularly from natural gas sector
 - ▶ Uncertainty of policies after next election
- ▶ Costs are mostly due to soil sampling and analysis
 - ▶ But project set up, reporting & auditing can be significant



Current global prices for Carbon Credits

➤ As at January 2019 AU\$ equivalent:

➤ Australian ACCU spot price is **\$15.55**

➤ NZU price is **\$24**

➤ California price is **\$22**

➤ EU price is **\$36**

➤ South Korea **\$30** (est 28/1/19)



What might happen in the future??

- Demand for carbon offsets is building
 - Demand from the natural gas industry is about to increase significantly
- Supply of credits is short in Australia
- Low hanging fruit is running out
- Upward price pressure (Australian market underpriced)
- Lag between production and delivery of credits
 - → 50 million T of soil carbon projects registered, but no ACCU's delivered yet
- Environmental tree plantings is probably largest existing opportunity for Australia
- New Methodologies (& technologies) take time to bring to the market



My conclusions

- ▶ The key question is whether your carbon sequestration rate will be high enough to cover costs???
 - ▶ Have you already sequestered too much carbon in your soils already?
- ▶ The 50% deduction in credits in the first round is making cash flows unviable
 - ▶ DEE needs to drop this requirement to get uptake of soil carbon projects
- ▶ Income from Carbon Credits may only contribute 10% to 20% of the Gross Margin of a paddock
 - ▶ But that may be enough motivation to make changes
- ▶ Are other types of offsets viable for KI?
 - ▶ Revegetation Carbon projects?
 - ▶ Reduced methane emissions from livestock?
 - ▶ Natural Capital environmental offsets????