Jeremiah Dufourq

j.dufourq@connect.qut.edu.au

Abstract

This document is the research booklet for the second research item for BSB113. It will cover the task, research questions, and the research with citations and respective references. It will also contain the structure for the report.

Research Booklet

BSB113 – Assessment 2 Report

# Scope:

Meat and Livestock Australia (MLA) take a proactive approach to reducing their sectors carbon emissions. MLA have approached BSB113 Consulting1 requesting an economics analysis of greenhouse gas emissions associated with farming livestock (specifically cows and sheep). They have requested that the economic analysis is framed around the following article:

Herrero, M. (2016, 22 March). To reduce greenhouse gases from cows and sheep, we need to look at the big picture. The Conversation. Retrieved from https://theconversation.com/to-reduce-greenhouse-gases-from-cows-and-sheep-we-need-to-look-at-the-big-picture-56509

The economic analysis should be presented in essay format and address the following tasks.

1. An overview of the contribution of livestock digestions to greenhouse gas emissions. Both global and Australian data comparisons are requested by MLA.
2. An analysis of the effect of greenhouse gas emissions from livestock digestions on the economic efficient equilibrium of the market. This analysis should be framed around a diagrammatic exposition of the economic theory of externalities, and as a minimum, should clearly identify the theoretical market and efficient equilibrium and any deadweight loss.
3. An analysis of policies to reduce livestock industry’s carbon emissions from livestock digestions (shifting the industry from the current market equilibrium towards an economic efficient equilibrium). This is to be limited to consideration of:
   1. a livestock methane tax on producers
   2. a non-price policy on producers. MLA have requested that the focus is on the introduction of a new production technology
   3. an increased consumption of substitutes for meat that are not derived from livestock. MLA has indicated that they are particularly interested in the potential impact on the sector’s emissions from increased consumption of near perfect substitutes.

A brief summary of the potential economic effects (costs and benefits) of each of the above policies (i, ii and iii) is required. However, MLA understands that a full analysis of the dynamic effects of these policy solutions in beyond the scope of this work, as the focus is on using a partial equilibrium analysis.

# Definitions:

## Economic situation:

*The economic situation is defined as a change in the market. It looks at how this change in the market would affect certain economic properties. As a result, the following points will be analysed:*

* The supply side:
  + What happens to the supply curve – which way is it shifted?
  + What happens to the substitute and compliment products?
  + What happens to supplier/producers?
* The demand side:
  + What happens to the demand curve – which way is it shifted?
  + What happens to customers?
* The market side:
  + What happens to the market equilibrium
  + Where is the market equilibrium compared to where it was before the change in the market?
  + What happens to the market as a whole?
  + Who are the winners and who are the losers?

# Context and problem:

# Research questions:

1. What is the contribution of livestock digestions to greenhouse gas emissions globally and locally (in Australia and overseas)?
2. What is the current market situation of livestock firms, and how would greenhouse emissions from livestock effect the current market situation (*This research question as a minimum should expose the theoretical market, efficient equilibrium and any deadweight loss*)?
   1. Look at the competitors in the market
   2. Look at the supply and demand of livestock in the market globally and nationally
   3. Look at the interaction of the competitors and analyse the effective market equilibrium
   4. Look at the effect of greenhouse emissions on the market (i.e. find out the policies nationally and globally surrounding this topic)
   5. Look at how these facts in point d effect the firms contributing in the market, and ultimately affect the market equilibrium
3. What policies have been introduced to change the current market equilibrium to account for greenhouse emissions from livestock (*i.e shifting the industry from the current market equilibrium towards and economic efficient equilibrium*)?
   1. Look at a livestock methane tax on producers – or the effect of tax policies on producers, and how this effects the economic situation
   2. Look at the introduction of a non-price policy (i.e. introducing a production technology into the market) and how this effects the economic situation
   3. Look at the consumption side of the market – what happens when consumers would like to consume more meat (*especially look at the potential impact on the sectors’ emissions from increased consumption of near perfect substitutes*)

# Research:

## Context article:

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| (Herrero, 2016) | Farming livestock   * contributes around 6 billion tonnes of greenhouse gases * 18% of global emissions   But the livestock sector also offers great benefits. It includes 20 billion animals,  supports 1.3 billion farmers and retailers 🡪 the consumption of meat, milk and eggs is projected to grow by 70% by 2050   * Around 1.6-2.7 billion tons of greenhouse gases each year, mostly methane, are produced from livestock digestion. * 1.3-2.0 billion tons of nitrous oxide come from producing feed for livestock. * 1.6 billion tons comes from land use changes * The developing world accounts for 70% of emissions   It seems likely that emissions from livestock could be reduced by around 2.4 billion tons of greenhouse gases each year through technology and management. Achieving these savings will be dependent on improvements in feeding practices (better pastures, new types of food, more grains and others), improved ways of handling manure, and improved genetics and animal management.  Policy changes will also be important. Adoption of many practices that reduce gross greenhouse gas emissions has been low (10-30% of producers) due to poor incentives. Unfavorable credit conditions, lack of markets, and/or systems for rewarding environmental performance are all hurdles. Our analysis highlights that global efforts should take these key areas into account when considering options to maximize return on mitigation investments.  With such an interconnected sector contributing 40-50% of agricultural GDP and to significant employment, poorly planned transitions in the global food system could have serious negative consequences in terms of  the Sustainable Development Goals.  We can get the best mitigation potential from the livestock sector if we take a wide view of land use and practice change that considers the whole of agriculture and forestry, as well as looking at dietary patterns and how we meet the needs of global nutrition.  Sustainable intensification of livestock can reduce greenhouse gas emissions, but it will require better management, economic incentives and well-designed policies. |
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## Research question 1: What is the contribution of livestock digestions to greenhouse gas emissions globally and locally (in Australia and overseas)?

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| (Agriculture, 2013) | **The climate change research program:**  CCRP is designed to tackle the climate change problems associated with livestock. This program focusses on identifying the key technology areas to improve efficiency and to tackle the problems of climate change.  **Highlights of the research findings:**  Livestock:   * Researchers have trialed several methane measurement tools for effectiveness. These include open path laser technology, which uses beams of light to measure emissions from livestock in small paddocks, and an intraluminal device, which can be placed inside the rumen to directly measure the methane produced.   **Livestock:**   * Livestock emissions account for around 10.2% of Australia Greenhouse emissions * The economic and environmental benefits of adopting practices that reduce emissions may include improving the conversion of feed to energy, reducing nitrogen losses from intensive production systems and potentially creating offsets under the Carbon Farming Initiative.   Technological change results:   * Results showed that a range of tropical legumes, novel forages (e.g. turnip, plantain and chicory) and plant extracts have the potential to reduce methane production in the rumen. Eremophila glabra was found to be one of the most effective feeds, with up to a 50 per cent reduction in methane production under laboratory conditions. * Nitrate supplementation was tested on sheep using commercial lick-blocks and was found to reduce methane production by 22 per cent in penned sheep and by 8 per cent in sheep grazing in paddocks.   **Impacts of climate change on northern beef producers:**   * By modelling pasture responses to future climate scenarios, researchers showed that rainfall will remain the key driver of pasture growth in northern Australia, although changes in evaporation and carbon dioxide concentrations will also play a significant role.   **Impacts of climate change on southern beef producers:**   * Biophysical models (models of the way living, and non-living components of an environment influence the survival of an organism and/or population) indicated that warmer and drier future climates projected for much of southern Australia will lead to: * higher pasture growth rates in winter and early spring * A shortened growing season * Earlier onset of the dry summer period.   **Where to next?**   * Further assess how producers can reduce livestock emissions through selectively breeding low-emitting livestock * Further assess the effects of diet on emissions, including fodder manipulation and use of methane-reducing feeding supplements and additives |
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| (Gerber, 2013) | **Tackling climate change through livestock:**  Three concerns have emerged with climate change and livestock:   * Production of animal protein is less efficient then the product of plant protein (due to the consumption of crops by animal protein) * Livestock are often kept in remote locations where deforestation and land degradation reflect weakness in institutions and policies * Intensive livestock production tends to cluster in locations with cost advantages where insufficient land is available for the recycling of waste from livestock, leading to nutrient overloads and pollution   Large part of the livestock sector remains supply driven  **Important statistics from the livestock industry using GLEAM:**   * GHG emissions along supply chains are estimated at 7.1 gigatonnes CO2 eq per annum, representing 14.5% of all human induced emissions * Feed production and processing are the two main sources of emissions, representing 45% and 39% respectively * Compare the livestock industry to the fossil fuel industry: fossil fuel industry equates to 20% of human induced emissions * Beef and cattle milk equate to 41% and 21% of the industries emissions   **The aggregate picture:**   * Supply chains are estimated at 7.1 gigatons CO2 per annum for 2005 reference period (data from IPCC) * Represent 14.5% of all human induced emissions * 44% of the livestock emissions are in the form of CH4 * 29% of the emissions are in the form of N2O * 27% of the emissions are CO2   Livestock supply chains emit:   * 2 gigatonnes CO2-eq of CO2 per annum, or 5 percent of anthropogenic CO2 emissions (IPCC, 2007) * 3.1 gigatonnes CO2-eq of CH4 per annum, or 44 percent of anthropogenic CH4 emissions (IPCC, 2007) * 2 gigatonnes CO2-eq of N2O per annum, or 53 percent of anthropogenic N2O emissions (IPCC, 2007)   Global estimates of emissions by species:    Main emissions pathways:  The bulk of GHG emissions originate from four main categories of processes:   * Enteric fermentation * Manure management * Feed production * Energy consumption.   Global production, emissions and emission intensity for cattle milk and beef  The emissions could be reduced by between 18 and 30 percent (or 1.8 to 1.1 gigatonnes CO2 eq), if producers in a given system, region and climate adopted the practices currently applied by the 10 to 25 percent of producers with the lowest emission intensity. |
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| (Heffernan, 2017) | Context:  By 2050, the human population is expected to increase by around 15%  to more than 9 billion people, bringing unparalleled environmental and  nutritional challenges (see page S6). During the same period, the global  demand for meat is expected to rise by 73%2, and meeting this demand  will require an additional 160 million tonnes of meat per year.  Thirty per cent of Earth’s land surface is already devoted to livestock production, a practice that accounts for nearly 15% of global greenhouse-gas emissions.  Cows are the worst culprits, not only because they emit a lot of methane,  but also because the production of beef uses vast quantities of water —15,415 litres for a kilogram of beef — as well as land.  Case study: insects tiny livestock:   * Ten kilograms of plan protein is needed per 1 kilogram of live beef cows, but only 1.7kg of feed is needed per kilogram of crickets * Mealworm larvae (considered the most likely to make it to the Western market) the greenhouse gas emissions are around 100 times lower than for cattle   Conclusion:  The overwhelming feeling is that the more informed people are,  the more willing they will be to change their habits. In one study, for  example, when people were told about the environmental benefits of  cultured beef, the number of respondents willing to try it rose from 25%  to 43%5. “We’re always changing our consumption patterns, and our  diets are constantly in flux,” says Garnett. “It’s a failure of imagination  to assume that behaviour can’t change.” |
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| (Australia, 2017) | Global market snapshot:  Australia: |
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## Research question 2: What is the current market situation?

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| (Gerber, 2013) | **Current model:**  Global livestock Environment Assessment Model (GLEAM). This new modelling framework enables the production of disaggregated estimates of GHG emissions and emission intensities from the main commodities, farming systems and world regions.  GLEAM was developed to help understand livestock  *NOTE OTHER MODELS TO LOOK INTO, GTAP, CAPRI, GLOBIOM, IMPACT*  GLEAM represents the main activities of global livestock supply chains, with the aim of exploring the environmental implications of production practices for the main commodities, farming systems and regions.  Gleam is built on a subsection of five models (look at the figure below) |
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| (Gerber, 2013) | **The Kyoto Protocol:**  The Kyoto protocol to the UNFCCC establishes legally-binding mitigation targets for developed country signatories. |
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| (Mario et al., 2016) | **Moderation of demand for livestock products:**  Projects of food demand that are based on growing populations are increasing per capita wealth suggest that demand for food will increase by 60-100% by 2050.   * that about a third of the world’s cereal production is fed to animals * On average, the production of beef protein requires about 50 times more land than the production of vegetable proteins68, and GHG emissions excluding land-use change are about 100 times higher. Although meat now represents only 15% of the total energy in the global human diet, approximately 80% of agricultural land is used for animal grazing or the production of feed and fodder for animals * Adequate food production in 2050 could be achieved on less agricultural land, resulting in a reduction of GHG emissions of 4.3 GtCO2/year * More extreme scenarios would yield emissions reductions of 5.8, 6.4 and 7.8 GtCO2/year, respectively, for no-ruminant meat, no-meat and no-animal product scenarios * Reducing the demand for livestock products is necessary (mitigation strategy) * Reducing the consumption of livestock products would reduce the demand for these products |
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| (Hubbard, 2016) | **Textbook:**  **Negative externality** 🡪 occurs when a production or consumption activity imposes costs on others who are not directly involved with that activity and no compensation is paid  **Market** **equilibrium** 🡪 A situation in which quantity demanded equals quantity supplied  **Consumption** 🡪 spending by households on goods and services, not including spending on new houses  **Negative externality in consumption:**    To address the negative consumption externality, such as health problems caused by breathing in second-hand cigarette smoke and higher health care costs due to illnesses resulting from smoking, the government could place a tax on cigarettes.  In theory, a tax could be placed on consumers, which would shift the demand curve for cigarettes down by the amount of the tax. However, in practice, it is administratively more practical to place the tax on producers. (Producers will therefore off load this tax onto consumers, and consumers will bear most of the tax).  People who do not consume cigarettes are negatively affects by them. As a result, the social benefit from cigarette consumption is less than the private benefit  **Externality:**  Benefit or cost that affects someone who is not directly involved in the production or consumption of a good or service   * You can have positive and negative externalities * Buyers and sellers ignore the overall cost or benefit and therefore over or under produce or consume the good   When will the private cost of producing a good differ from the social cost?   * The private and social cost of a good will differ when there is a negative externality * Example: power plant * Private cost includes the cost to operate the plant (internal costs) * Social cost refers to the private cost plus the cost onto the environment such as pollution   What is a pigovian tax and at what level must a pigovian tax be set to achieve efficiency?   * Aims to bring about an efficient level of output by setting the tax equal to the marginal external cost * Marginal social cost = difference between the margin social cost and the marginal private cost   Introducing a tax:   * The supply curve 1 (private cost) will shift up to the supply curve s2 (social cost) so that the mark equilibrium will equal the private market equilibrium * At the efficient equilibrium, consumers will pay a higher price for the product (p efficient)   Deadweight loss: |
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| Negative externality in consumption:   * The social benefit has to be less than the private benefit   How tax would affect the market situation (in this case it is cigarettes):   * It would move the supply curve up * The quantity produced and consumes decreases to the efficient level * The price paid by consumers increases * Positive externality = amount of government subsidy * Negative externality = amount of the tax imposed | |
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| (P. o. Australia, 2010) | The Kyoto Protocol to the 1992 UNFCCC, serves to give effect to the UNFCCC's objective of reducing human-induced greenhouses gases (GHGs) in an effort to address climate change, guided by the UNFCCC's key principles of PRECAUTION, INTERGENERATIONAL EQUITY, sustainable development, and COMMON BUT DIFFERENTIATED RESPONSIBILITIES and RESPECTIVE CAPABILITIES. As a logical extension of this last principle, Parties to the Kyoto Protocol are placed into one of two categories: |
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| (C. o. Australia, 2010) | The Carbon Pollution Reduction Scheme (CPRS) was Australia’s proposed cap-and-trade emissions trading scheme. It was to have been the main element in Australia’s efforts to reduce its greenhouse gas emissions.  Effectively the CPRS, in its last legislated form, is now off Parliament’s legislative agenda. That said, emissions trading remains one option open to the government to control Australia’s greenhouse gas emissions and/or introduce a carbon price |
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| (Hamilton, 2015) | Environment minister Greg Hunt now routinely makes statements like this:  *We are one of the few countries in the world to have met and beaten our first round of Kyoto targets and to be on track to meet and beat our second round of Kyoto targets.* |
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| (OECD, 1990) | **Externalities:**  Externalities refers to situations when the effect of production or consumption of goods and services imposes costs or benefits on others which are not reflected in the prices charged for the goods and services being provided.  Pollution is an obvious example of a negative externality, also termed an external diseconomy.  **Positive externalities:**  Positive externalities arise when an individual or firm provides benefits for which it is not compensated |
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| (Gerber, 2013) | **Feed production:** which alone represents about 60 percent of total emissions from commercial systems  **Manure** is an important source of CH4 emissions |
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## Research question 3: What policies have been introduced to change the current market equilibrium to account for greenhouse emissions from livestock?

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| (Agriculture, 2013) | **CCRP – Australian Government Climate Change Research Program:**  **Technological change – northern producers:**   * matching stocking rates to suit future climatic conditions * Introducing innovative pasture-spelling regimes—this involves grazing pastures down to the first node of the plant, then spelling during the wet season (retaining the first node increases pasture recovery and allows carrying capacity to increase by up to 40 per cent) * Using prescribed burning at certain times to control growth of woody weeds.   **Technological change – southern producers:**   * Research results showed that no single adaptation strategy could provide a complete solution and that a combination of strategies will be needed to manage climate change for southern livestock regions. Examples that were shown to have adaptive benefits (in order of their effectiveness) include: * Increasing soil fertility * Using summer active perennial pastures (e.g. lucerne) * Protecting groundcover through confinement feeding * Improving livestock production potential through breeding * Increasing livestock conception rates. |
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| (Gerber, 2013) | **CASE STUDY: Modelling mitigation options for specialized beef production in south America:**  Pasture quality improvement (digestibility, growth rates and age at first calving)   * The digestibility of grasses can be improved though practices that reduce cell-wall concentration (Jung and Allen, 1995), including the sowing of better quality pastures and better pasture management (FAO, 2013c; Alcock and Hegarty, 2006; Wilson and Minson, 1980).   The improvements were modelled under the following   * Total diet digestibility was assumed to increase by between 1 and 3 percent. * Growth rates were calculated assuming that every 1 percent increase in diet digestibility leads to a 4 percent increase of the average annual growth rate of the beef animals (Keady et al., 2012; Steen, 1987; Manninen et al., 2011; Scollan et al., 2001; Bertelsen et al., 1993).   Other factors which were improved:   * Animal health and husbandry improvements (fertility and mortality rates) * Improved grazing managements (soil carbon sequestration)   **Main emissions reduction strategies:**   * Interventions for ruminant production: * At animal level: Optimize feed digestibility and feed balancing * At herd level: reduce the proportion of animals in the herd dedicated to reproduction and not production * At production unit level: in grazing systems: improve grazing and grassland management to increase feed quality and carbon sequestration * At supply chain levels: increase the relative beef production supplied by herds producing both meat and milk * Interventions for monogastric production * At animal level: improve feed balancing, animal health and genetics to increase feed conversation * At production unit level: produce or source low emission intensity feed * At supply chain level: foster energy efficiency and use of low emission intensity energy   **Other things to change the economic environment:**  Financial incentives:   * Includes either ‘beneficiary pays’ mechanisms (abatement subsidies), or ‘polluter pay’ mechanisms (emissions tax, tradable permits). These are economically efficient mechanisms for incentivising the adoption of mitigation technologies/practices   Regulations:   * includes assignment of mitigation targets for farmers/sectors, as well as more prescriptive approaches such as mandating the use of specific mitigation technologies and practices.   R&D:   * Research and development can play an important supporting role by generating knowledge and evidence about technologies and practices, giving farmers and practitioners greater confidence about their mitigation effectiveness and production impacts. Pilot projects to test the effectiveness and feasibility of novel technologies and practices in different agro-ecological and socio-economic contexts are an important part of this strategy.   Creative incentives for efficiency improvement:   * Financial instruments, such as low interest loans and microfinance schemes, may be needed to complement extension policies and support the adoption of modern technologies and practices.   **Policy requirements:**  Policies are needed to encourage producers to mitigate their emissions by switching to low emission intensity feeds, energy and other inputs. These policies include labelling and certification schemes to inform livestock farmers about the emission profiles of these inputs. The schemes will naturally be more effective when coupled with stronger policies to incentivize farmer purchases of low emission inputs and regulate the use of very high emission intensity feeds. Such policies could help to lower crop sector emissions, particularly where there is an absence of mitigation policies in the crop sector  Financial and regulatory incentives:  Further, while research and development initiatives are essential for the provision of new and improve mitigation options for the sector, financial and regulatory incentives can also drive mitigation technology development by the private sector. By making emissions costly or mitigation profitable, these policies will motivate the livestock industry to search for and develop less emission-intensive practices and technologies. |
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| (Mario et al., 2016) | **How to tackle the problem:**   * Switching to a low-animal-product diet that converges on the global average energy demand in the year 2000 (that is, 2,800 kcal per capita per day, compared with the global mean of 3,100 kcal per capita per day in the reference case) gave emissions reductions of 0.7–7.3 GtCO2e yr–1, if the spared land is used for bioenergy, and 4.6 GtCO2e yr–1 if afforestation is assumed. * **Climate policies -** would do the following: push up global food prices and reduce consumption in low-income regions, with negative impacts on food security79. Such impacts on global prices could be avoided, however, by implementing emissions pricing on food consumed rather on food produced77. * **Low-meat diets -** with regard to plausible low-meat diets, we find a mitigation potential of 4.3–6.4 GtCO2e yr–1, with about 1–2 GtCO2e yr–1 coming from process emissions, mostly CH4 and N2O, and the remainder from land-use change CO2 (see Supplementary Information).   **Mitigation potentials, market effects and trade-offs:**  **Key points:**  This in turn depends on public and private incentives, public policies and taxes, costs and logistics of implementation, and trade-offs between practices and with other sectors.  **MITIGATION SUPPLY 🡪 Economic supply-side mitigation potentials**  Although the technical mitigation potential for livestock is substantial, the share that can be achieved at reasonable economic cost is likely to be much smaller. Our yardstick is a marginal abatement cost of up to US$50 per tCO2e, which is higher than current carbon market prices and those of the recent past, but still lower than the carbon price needed to make significant impacts on global GHG emissions across all sectors.  The 2030 mitigation potentials for animal GHG emissions at unit costs of US$20, US$50 and US$100 per tCO2e were estimated to be 175, 200 and 225 MtCO2e yr–1, respectively81. For measures targeting soil carbon sequestration in grazing lands, higher mitigation levels of 250, 375 and 750 MtCO2e yr–1 by 2030 were estimated at these prices. Another global assessment estimated that animal GHG emissions could be reduced by 136, 193 and 228 MtCO2e yr–1 by 2030 at unit costs of US$20, US$50 and US$100 per tCO2e (ref. 27). The economic mitigation potentials in these studies were calculated without considering market interactions and their effects on reallocating livestock production, trade, land use and nutrition in the presence of mitigation policies. Some important consequences of these market interactions are discussed below.   * Key point – consider the attenuating influence of market interactions between economic agents and regions when assessing the effectiveness of mitigation policies   **MITIGATION DEMAND 🡪 Emission pricing and demand side potentials**  The overall abatement potential (considering all animal and land-use change emissions sources) under such a policy would be 1.8 GtCO2e yr–1 with a demand reduction of about 27 kcal per capita per day at US$100 per tCO2e. This relatively minor calorie cost is due to the overall small share of calories of animal origin in human diets: 18% globally. When implementing the GHG tax on all agricultural non-CO2 emissions and CO2 emissions from land-use change, the total abatement potential at US$100 per tCO2e is about 3.4 GtCO2e yr–1 and the corresponding calorie cost is about 190 kcal per capita per day. The calorie cost is low at taxes below US$20 per tCO2e and most of the mitigation comes from avoided deforestation. Above this carbon price, further mitigation comes mostly from the agricultural sector, with significant impacts on food availability. The relationship between climate mitigation and food availability varies substantially across regions (Fig. 5b), which is a crucial consideration for targeting mitigation efforts.  Potential shifts in meat and dairy demand from the implementation of a GHG tax on food in the EU have been estimated. Owing to the relatively inelastic demand for meat and dairy products, the direct mitigation potential from GHG pricing of food was found to be small. For a climate tax on animal food equivalent to €60 per tCO2e, the estimated emissions reduction was about 32 MtCO2e yr–1 — mainly from shifting from beef to other meats — which is about 7% of current GHG emissions in EU agriculture. However, this structural change in demand away from beef would also reduce total land requirements for food. If that spare land were used for bioenergy that is used as a substitute for fossil fuel energy, the mitigation effect of this policy intervention could be several times larger. |
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| (Beavan, 2017) | Research and marketing group Meat and Livestock Australia (MLA) says the country's red meat industry could be carbon neutral by 2030.  Managing director (MLA) Richard Norton "As an industry, we can achieve neutrality by 2030 and we'd be the first beef industry in the world to do so,"  "The livestock industry has reduced its emissions by two-thirds over the last decade.”  Cattle Council of Australia (CC) President Howard Smith “"If we're the most exposed exporter for the Federal Government GDP-wise, it's critical that they get it sorted." |
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| (C. o. Australia, 2010) | The Carbon Farming Initiative (CFI) allows farmers and land managers to earn carbon credits by storing carbon or reducing greenhouse gas emissions on the land. These credits can then be sold to people and businesses wishing to offset their emissions.  **Opportunities in carbon farming:**  The Carbon Farming Initiative (CFI) is a voluntary carbon offsets scheme that provides economic rewards to farmers and landholders who take steps to reduce  greenhouse gas emissions. Farmers and landholders can choose whether or not to be involved.  Under the CFI, they may be able to earn carbon credits from activities such as:   * reducing livestock emissions * increasing efficiency of fertiliser use * enhancing carbon in agricultural soil * storing carbon through revegetation and reforestation.   Some abatement activities count towards Australia’s national target under the Kyoto Protocol  To be eligible, projects must deliver extra reductions in greenhouse gas emissions  The government is working hard to develop methodologies as quickly as possible. To date landholders can undertake projects using approved methodologies for the destruction of methane generated from manure in piggeries and dairies; capture and combustion of landfill gas; waste diversion; savanna burning; feed supplementation for milking cows; avoided deforestation; regeneration of native forests; and environmental plantings. |
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| (Oosterzee, 2014) | With the carbon price looking set to be scrapped by the new Senate, the government’s plan is to fold the Carbon Farming Initiative into its new A$2.55 billion Emissions Reduction Fund.  In a recent speech, Environment Minister Greg Hunt said that there’s not much point in having the most rigorous, gold-plated carbon sequestration rules in the world if it means that nobody participates.  For Australia to meet our 2020 Kyoto Protocol emissions target, we need to purchase or cut a total of 421 million tonnes of greenhouse gas emissions.  But under the Carbon Farming Initiative, there are far more costs that need to be taken into account. Its reforestation methodology then requires onerous audits not required of other sectors such as the energy sector. |
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| (C. P. M. Wilks, 2017) | In Vitro meat (IVM):   * Meat grown in a laboratory and not in a farm   That was back in 2012 and now our survey has found that 65% of people surveyed in the United States said that they would or probably try IVM |
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| (M. Wilks & Phillips, 2017) | One potential method to alleviate these effects is to produce *in vitro* meat: meat grown in a laboratory that does not carry the same environmental or ethical concerns.  Through conducting an online survey with US participants, we identified that although most respondents were willing to try in vitro meat, only one third were definitely or probably willing to eat in vitro meat regularly or as a replacement  for farmed meat.  The main concerns were an anticipated high price, limited taste and appeal and a concern that the product was unnatural. It is concluded that people in the USA are likely to try in vitro meat, but few believed that it would replace farmed meat in their diet.  Results:  These findings align with previous research suggesting that taste/appeal is a key  barrier to engaging in alternative meat consumption practices  Respondents felt that IVM was less natural, less appealing, less tasty than farmed meat, but more environmentally friendly and with less risk of zoonosis compared to farmed meat |
| Key points/summary | |
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