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The Secretary
Standing Committee on Environment and Communications Legislation Committee
PO Box 6100
Parliament House
Canberra ACT 2600

Dear Ms McDonald

Inquiry into the Carbon Farming Initiative Amendment Bill 2014

Thank you for the opportunity to make a written submission to the Standing Committee on Environment and Communications Legislation Committee.

By way of background, Australian Soil Management (ASM) Pty Ltd provides management services and products for improving Australia's soils. We cover both agricultural soils and soils in urban landscapes such as sports ovals, golf courses, parks and gardens.

Our core methodology and technology is the capture and storage of organic matter and organic carbon in soils. Significant benefits are derived from the increased capacity to store soil moisture, a reduction in the need for chemical fertilisers and reduced nutrients in run-off.

ASM Pty Ltd currently leads the market in soil carbon capture. Our technology enables an increase in soil carbon content of 1% over five years. Leading farmers require 10 to 20 years to build soil carbon at this rate. An increase in carbon content of 1% is equivalent to an additional 45 tonnes of carbon per hectare or 165 tonnes of CO_2 removed from the atmosphere. A 1% increase enables the storage of an additional 144,000 litres of water per hectare. This has enormous benefits for agricultural production in a dry landscape with unreliable rainfall.

I have examined the Carbon Farming Initiative Amendment Bill 2014. We would like to offer our full support for the amendments as stated for:

The *Carbon Credits (Carbon Farming Initiative) Act 2011* (CFI Act)
The *National Greenhouse and Energy Reporting Act 2007* (NGER Act)
The *Australian National Registry of Emissions Units Act 2011* (ANREU Act)
The *Clean Energy Regulator Act 2011* (CER Act) to provide for the establishment of the Emissions Reduction Fund.

In particular, we welcome the recognition of the potential contribution of soil carbon in meeting the objectives of the Emissions Reduction Fund. This is reflected in the shift in terminology from "emissions reduction" to "carbon abatement". The reduction of emissions is one strategy for the future. However, the active removal of CO_2 from the atmosphere by crops, pastures and turf will dramatically increase agricultural production and deliver positive environmental outcomes. In this way we can turn a problem into an opportunity.

We firmly believe that meeting the objectives of the Direct Action Plan will require the establishment of a direct link between soil carbon capture and productivity increases in Australian agriculture. A small number of innovative farmers had recognised this link and made the change to smarter soil management and more productive and profitable farming enterprises.

The challenge, however, is to convince the majority of farmers to make this same change. In our experience, their response so far could be summarised as "show me the results and show me the money". Trading soil carbon offsets has not generated much interest among the farmers we have met over the past three years.

The link to productivity increases and clean environmental outcomes will provide the incentive for farmers to make a major contribution in meeting the objectives of the Direct Action Plan.

ASM Pty Ltd has developed a National Strategy to design customised farming practices for each region to convince farmers across Australia on the merits of this approach. The attached brief outlines our project proposal entitled *"Greenhouse gas emissions as a resource: capture and storage of CO_2 to build better soils to deliver economic and environmental benefits for farmers and to Australia as a whole"*. At this stage the proposal is limited to 40 farmers across NSW and Victoria. These farmers have signed letters-of-intent and are ready to go on-the-ground to prove the concept. Sites have been selected to cover diversity in climate, soil type, production systems and commodities. These trails can be expanded to other states, if appropriate, but a larger total budget will be required.

ASM Pty Ltd would welcome the opportunity to make a presentation to the Standing Committee or to give evidence at a public hearing.

Yours sincerely
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Australian Soil Management: Soil Carbon for Farm Profit Pilot Project

The Coalition Government is committed to "a climate change strategy based on direct action to reduce emissions and improve the environment". Direct action on soil carbons is "the major plank" of that strategy as it is "the lowest cost CO_2 emissions reduction available in Australia on a large scale" (The Coalition's Direct Action Plan on Environment and Climate Change).

This strategy is the right way to achieve serious reductions in CO_2 levels. However, there are major problems impeding the introduction and success of this strategy:

- The Direct Action Plan is not well understood by decision-makers or the general public including farmers.

- The benefits of building soil carbon have not been explained and the way to build soil carbon have not been demonstrated;

- Farmers view the idea of trading carbon offsets with a great deal of suspicion. Australian Soil Management (ASM) has held discussions with over 100 farmers in NSW (in the last 12 months) regarding soil carbon – none of these farmers are interested in changing just to collect carbon offsets. Farmers are interested in production and profits and therefore soil carbon capture must be linked to improved productivity and profits which can be achieved and will lead to a significant impact on rural regeneration;

- Farmers are in dire need of a "game changer" given the farming trends over the last 30 years. ABS, Australian Social Trends, December 2012 (4102.0) does not paint a picture of hope as seen by the following:

    - Australian farmers produce 93% of food consumed in Australia, leaving 60% of their production for export helping to feed 40 million people overseas, each day;
    - Over the 30 years to 2011, the number of farmers declined by 106,200 (40%). This equates to an average 294 fewer farmers every month over that period. And we have lost 11% over the five years from 2006 to 2011;
    - 50% work more than 49 hours per work;
    - 40% earn less than $50k per annum

    Who would be a farmer?

Increasing soil carbon is clearly the answer as it is the fuel for soil health, agricultural productivity and profitability. For the Coalition Government to achieve its target of emissions reduction and the many

other valuable co-benefits of soil carbon, farmers need to be convinced of these benefits, particularly the expected benefit of increased profit margins between 10% and 30% based on anecdotal evidence. As a result, ASM is proposing that the Federal Government fund a 40 farm (proof of concept) trial to demonstrate the economic viability of soil carbon to agriculture. The following proposal outlines the necessity and the value of the Soil Carbon for Farm Profit Pilot project.

Aims

To assess the feasibility, impact and success of soil carbon farm trials in terms of economic, environmental and social benefits to rural and remote Australia.

Hypotheses

Australian Soil Management (ASM) anticipates that 40 farm trials in NSW and Victoria covering different regions, different soils and different agricultural sectors will be sufficient proof of concept to Australia farmers to embrace the benefits of soil carbon. We expect demonstrable evidence and improvements at 18 and 30 months in farm profitability by increasing water storage in soil to maintain plant health through dry spells, improving plant nutrition (slow release) thereby reducing dependence on chemical fertilizers, realising other environmental co-benefits from capturing significant amounts of carbon dioxide from the atmosphere, reduced emissions and reduced leaching of nutrients into waterways and seas (a response to problems in the Great Barrier Reef, Murray Darling River basin, and Lake Burley Griffin in Canberra).

Following a full five-year transition to carbon-based soil management practices, we expect a 10 – 30% increase in profitability, the maintenance of cash flow through dry conditions and over 50% reduction in GHG emissions on farms.

Background

In recent times, productivity growth in agriculture has slowed from 1.4 to 0.8% per annum for the period 1977-78 to 2007-08, respectively. In addition, terms of trade have declined over this period at an average rate of 1.6 per cent per annum. Over the past decade this rate has softened to 0.6 per cent per annum (Nossal & Sheng 2010).

Fresh innovations are needed to ensure the industry can meet the food and fibre needs of the growing world population.

Converting challenges into opportunities depends on whether or not Australian farmers can be helped to adapt and address the following threats:

- A decline in profitability and ageing farmers (ABS 2012). The rate of return on investment in agriculture is already too low and this downward trend will continue unless changes are made;
- A decline in natural resources from increasing salinity, acidity and nutrient loss;
- Competition for water and arable land from urban expansion;
- Droughts and floods are increasing in severity;
- Fertilisers are expensive and over-used with nutrients polluting waterways;
- Increasing variability in climatic conditions, temperature and rainfall, adds production risk;
- Publicly funded agricultural research lacks relevance and is in decline world-wide (AARES 2013);
- Lack of dissemination of practical information to farmers – in Australia there is a fundamental, structural blockage in the transformation of agricultural research and information into practical benefits for farmers (Productivity Commission report, 2011, Report No 52);

- Insufficient investment in biotechnology – needed to address problems such as developing drought and salinity resistant crops and to find alternative sources of biofuel;
- Soil erosion;
- Other threats such as biosecurity – invasive plants & diseases as well as animal diseases.

Australian Soil Management (ASM)

The benefits from increasing soil carbon content under Australian conditions have been repeatedly demonstrated and published by the scientific community (Sanderman *et al* 2010; Campbell 2008). ASM Pty Ltd is an innovative company set up to manage soil organic carbon (carbon dioxide) to build better soils and improve the environment. The focus for ASM is how to facilitate adoption by land managers to deliver economic, environmental and social benefits from carbon capture and storage in soils.

ASM has unique technology for the acceleration of carbon capture and storage processes to build better soils. In the last month, ASM has achieved a major scientific breakthrough as it has been able to accelerate the time needed to build a 1% increase in soil carbon from 20 years to less than five years (see attached Case Study for how this can be achieved). ASM fills the gap between scientists and land managers through the linkage of science to the financial and environmental needs of land management enterprises.

The most important aspect of soil carbon capture that interests farmers is the improvement in water storage capacity of the soil by between 144,000 and 450,000 litres per hectare. Australian rainfall is unreliable and there is debate as to whether this may be made worse by climate change, leading to more severe droughts. Due to Australian soil composition, most of the rain is lost to plants and agriculture as the water runs off the surface.

An additional practical benefit is a reduction in the need for chemical fertilizers. Smarter soil management reduces costs and overheads and offers sustainable land management with minimal environmental impact. Our approach is an important plank in ensuring that the Government's Direct Action Plan is successful.

Proposal

Title

Greenhouse gas emissions as a resource: capture and storage of carbon dioxide to build better soils to deliver economic and environmental benefits to farmers and to Australia as a whole.

Project outcomes

This new program delivers a formalized procedure and process tailored to meet the individual needs of land managers. The program has the potential to capture carbon dioxide from the atmosphere in quantities in excess of Australia's net emissions rate.

The project is designed to adapt and develop the program to:

a. Be effective across different soil types, climates and land-based enterprises in NSW and Victoria;

b. Establish benchmarks against which land managers can assess soil performance over long periods to continually improve and maintain higher soil carbon levels.

Unique features of the program

The program is new to Australian Agriculture. It has the following innovative features:

- A unique high-carbon soil additive to accelerate the improvement of soil quality;
- Translation of the soil science data base into practical methods for direct adoption by farmers;
- The latest scientific soil testing methods and interpretations;
- New microbial formulations to accelerate the improvement of soil carbon and quality;
- Education component for farmers and their farming communities on building soil carbon.

Benefits for Land Managers (farmers)

The primary objective of the project is to establish Proof-of-Concept for the ASM Structured Soil Management Program. Full adoption of the program by land managers over five years to increase their soil carbon levels by 1% will:

- Increase annual farm profitability by 10% to 30% and reduce risks associated with variable rainfall;
- Increase the level of stored carbon by 45 tonnes per hectare (Chan *et al* 2010);
- Remove the equivalent of 165 tonnes of carbon dioxide from the atmosphere per hectare;
- Improve soil water storage capacity by 144,000 litres per hectare as a buffer against unreliable rainfall and drought (Morris 2004);
- Cut production costs by reducing dependence on expensive chemical fertilizers, particularly phosphorous and nitrogen;
- Reduce soil erosion;
- Improve weed control – improved soil fertility suppresses weeds such as African Lovegrass and Serrated Tussock. Individual farmers can save around $18,000 per year as the need for weed control is reduced (Soils for Life 2012 Case Study 3);
- Cut nitrous oxide emissions from the application of nitrogenous fertilizers (Brock *et al* 2012);
- Improve water quality and run-off for rivers and lakes.

Successful completion of the project will enable ASM to demonstrate the effectiveness of the program to land managers in Australia. From this project, the process of adoption of these practices will be accelerated. Managed farmland (6% of Australia's total land area) with a 1% increase in soil carbon taking 5 years has the potential to keep pace with total net carbon dioxide emissions for Australia. For every 1% increase in soil carbon, 165 tonnes of CO_2 equivalents can be removed from the atmosphere (Chan *et al* 2010).

Budget

Expenditure	2015	2016	2017
Materials	361,000	301,000	301,000
Salaries (4/5 staff)	260,000	270,000	140,000
Field days (40)	100,000	100,000	100,000
Plant & equipment	144,000		
Administrative costs	120,000	120,000	65,000
Travel	40,000	40,000	40,000
Annual costs	1,025,000	831,000	646,000

Total budget	2,502,000

Contributions from Land Managers

To date, ASM has received over 100 signed letters-of-intent from land managers in NSW and Victoria wishing to participate in field trials for the project. Land managers will provide fencing, on-site management and use of equipment required in the trials.

The Agriculture Back Bench Committee is being asked:

- To recommend to the Federal Government that it funds the costs of large scale farm soil carbon trials in NSW and Victoria totalling $2.5m to be distributed over the 3 year term of the pilot project; and

- To support Australian farmers in the ongoing long term conversion to soil carbon management (assuming positive outcomes of the pilot work) by developing more practical educational programs.

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