Submission To the Inquiry into Agricultural Innovation

Thank you for the opportunity to provide a submission on Agricultural Innovation.
I am a fourth generation farmer located in the small farming community of Mudgegonga in the North East of Victoria. Our family have been involved in the local Mudgegonga & District Landcare Group where we have undertaken courses and research on soil health. One such project undertaken in 2009 was a program connecting our group with Charles Sturt University scientists, involving the establishment of humidified compost trials and testing our properties for carbon levels. This project was investigating ways to develop carbon rich soils. Soil organic carbon (SOC) tests varied from 1% (an ex tobacco property with high nitrogen applications) to 9% (a dairy farm paddock that was spreading effluent back on the paddock) with the majority of tests varying from 2 – 3 % carbon.

Although the outcome of this project demonstrated impressive visual improvements to the soil and plant growth where the compost was trialled the actual soil testing did not provide any real evidence of change, to this end we believe innovation is required in seeking technical and scientific advances in soil testing to include biology and carbon levels which will best represent the health of the soil which needs to become a mainstream agricultural process.

Leading experts in this field claim soil organic carbon is the basis of sustainable agriculture and the process of storing carbon in the soil is called soil carbon sequestration. This process involves the decomposition of soil organic matter which releases a range of nutrients for plant growth and promotes:

- Soil fertility
- Soil structure
- Water holding capacity and
- Water filtration

Increasing soil organic matter reduces the effect of harmful substances e.g. toxins, and heavy metals by acting as buffers and if more carbon is stored in the soil as organic carbon, it will help to alleviate climate change. (Primefact 735, Increasing Soil Organic Carbon of Agricultural Land, NSW DPI).

According to Dr Christine Jones (Jones 2006), one of Australia's leading experts on carbon Sequestration: 'Every tonne of carbon lost from soil adds 3.67 tonnes of carbon dioxide (CO_2) gas to the atmosphere. Conversely, every one tonne increase in soil organic carbon represents 3.67 tonnes of CO_2 sequestered from the atmosphere and removed from the greenhouse equation.
For example, a 1% increase in organic carbon in the top 20 cm of soil with a bulk density of 1.2 g/cm3 represents a 24 t/ha increase in soil OC which equates to 88 t/ha of CO_2 sequestered'.

So we can understand the importance and great need for innovation and technology to assist farmers in building healthy soils to increase soil organic carbon.

Unfortunately the basic soil test to determine nutrient levels for (P, K, Ca, Mg, etc) provides no information on soil biology and this basic test is often the first and only monitoring tool used to assess changes in the soil. Although there has been considerable research and interest from our local farmers about soil biology and soil organisms and how they affect soil health and productivity this research has not become mainstream. If we wish to improve the efficiency of agricultural practices we need to seek new technologies to test biology and physical soil properties to assist overall soil management. In fact Dr Christine Jones suggests "A soil test will only tell you what is available to plants by passive uptake. The other 97 percent of minerals – made available by microbes – will not show up on a standard test. By looking after the microbes in the soil we can increase the availability of a huge variety of minerals and trace elements – most of which are not

even in fertilizers."(SOS: Save our Soils, Dr Christine Jones Explains the Life-Giving Link between Carbon and Healthy Topsoil, ACRES March 2015.Vol.45,No3)

Mainstream agricultural organisations and government departments have been very slow to undertake research and development in this area and there has been anecdotal commentary to the effect that international corporations funding research to benefit their product sales and pressuring government not to invest in low input farming methods. Why has there been such slow progress? Farmers generally are very interested in learning about microbes and 'livestock' in the soil and I for one am disappointed of the little advancement generally in this area. It is imperative that we build carbon in our soils to improve soil health and to assist in the sequestration of carbon to reduce greenhouse gases. Evidence of increased water retention and soil aeration supports long-term sustainable farming practices and will assist in mitigating both drought and floods and increase the natural biology in the soil.

I hope this submission provides some insight into the possibilities for future innovative research and development that may assist farmers to reduce their high input costs of chemical fertilisers whilst improving the quality of food production and the natural health of our soils.