From:	Frank Griffin
To:	RPS
Subject:	ORC Submission
Date:	Friday, 3 September 2021 9:39:31 p.m.
Attachments:	ORC Form 5.docx FG=ORC.docx

I attach herewith Form 5 and some Background information on my submission. Apologies for lateness for the submission but COVID Lockdown has brought multiple additional tasks linked with On Line challenges for Teaching and Exams.

Sincerely Yours,

Frank Griffin

Otago Regional Council

Written Submission on Proposed Otago Regional Policy Statement 2021

(Submissions must be received by Otago Regional Council by 3 pm Friday 3 September 2021

To: Otago Regional Council

1. **Name of submitter** *(full name of person/persons or organisation making the submission. Note: The submissions will be referred to by the name of the submitter)*

Emeritus Professor J Frank T Griffin

2. This is a submission on the **Proposed Otago Regional Policy Statement 2021**.
3. I **could not** *(Select one)* gain an advantage in trade competition through this submission. (*See notes to person making submission)*
4. I **am not** *(Select one)* directly affected by an effect of the subject matter of the submission that
    a. adversely affects the environment; and
    b. does not relate to trade competition or the effects of trade competition (See notes to person making submission)
5. I **wish** *(Select one)* to be heard in support of my submission
6. If others make a similar submission**, I will** consider presenting a joint case with them at a hearing
7. **Submitter Details**
    a. **Signature of submitter** *(or person authorised to sign on behalf of submitter)*

    b. **Signatory name, position, and organisation** *(if signatory is acting on behalf of a submitter organisation or group referred to at Point 1 above)*

Name J Frank T Griffin *Position Emeritus Professor in Immunology* *Organisation University of Otago*

    c. **Date**

03 September 2021

Address for service of submitter (*This is where all correspondence will be directed*)

d. Contact person (*name and designation, if applicable*)

J Frank T Griffin

e. Email:

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g. Postal address *(or alternative method of service under section 352 of the Act):*

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8. My submission is:

Column 1	*Column 2*	*Column 3*	*Column 4*
*The **specific provisions** of the proposal that my submission relates to are:* *(Please enter the relevant objective, policy, method, or 'other' provision reference where possible. For example, 'AIR-O1'.)*	*I **support** or **oppose** the specific provisions or wish to have them **amended**.* *(Please indicate "support" or "oppose" or "amend")"*	*The **reasons** for my views are:*	*I seek the following **decision** from the local authority:* *(Please be as clear as possible – for example, include any alternative wording for specific provision amendments.)*
LF- LS- 17	*"amend"*	*No consideration given to Soil Organic Carbon (SOC) as a positive contributor to Soil biology, & health, Water storage and*	*Promote management systems that build soil carbon improving Soil Biodiversity,*

		purification	*Soil structure & fertility and climate remediation.*

Submission

I am an Emeritus Professor at the University of Otago where I have carried out research on infectious diseases of livestock for the past 48 years. I have been Director of The Disease Research Laboratory since 1985 and am currently Director of Ag@Otago; A Research Theme at the University of Otago. I also act as Convenor for a new undergraduate Batchelor of Applied Science degree titled Agricultural Innovation, graduating students in diverse specialities: BAgriTech (Science), or BAgriBus (Food & Business) or BAgriEnv (Environment).

I feel privileged to make a submission to ORC and would like to share a few issues that underpin concerns about some future regulations that will impact on Kiwi farmers as they progress towards a Net Zero Carbon future in 2050. Considering that ORC will have oversight for most of these regulations, it is important that both parties have aligned understanding and expectations of possible outcomes. My major focus is around interactions between Soil, Water and Climate.

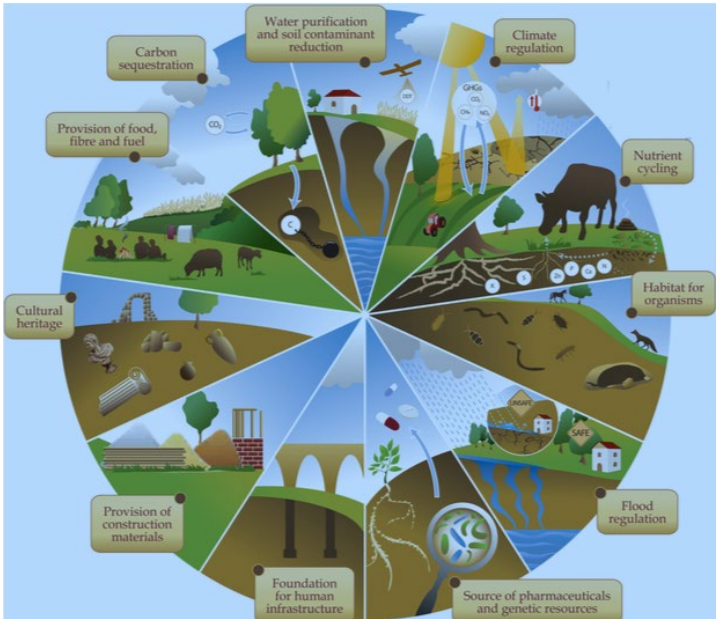
Kyoto 1997, focussed our politicians on a voluntary production driven Emissions Trading Policy with emphasis almost exclusively on emissions, with the recognition that exotic forestry alone could be credited to store carbon, to produce carbon credits that would contribute towards an Emissions Trading Scheme (ETS), designed to offset ongoing GHG emissions. While this was conceived to be an entre to Carbon farming Kyoto policies failed and were never adopted by the developed countries that were meant to carry the cost for carbon credits.

Paris Accord 2015 established another voluntary scheme, with the goal to establish Carbon neutrality by 2050, where individual participants could establish ***Intended National Determined Contributions (INDC).*** The goal was to limit climate increase to < 2degrees above pre-industrial CO2 levels. The major re-priorotisation from Kyoto to Paris was that the increased emphasis on CO2 mitigation, where not only forestry, but the oceans and **soil** could be considered as Carbon sinks to offset CO2 emissions. With this scenario pastures and shrubs could be considered relevant for above ground storage of carbon in biodiverse pastures under managed grazing. The Paris Agreement empowered those who could provide evidence of Soil Organic Carbon (SOC) sequestration, to balance Carbon deficits against Carbon credits. Unlike Kyoto, where the emphasis was on the cost of Emissions, Paris established a model where **emissions** and **offsets** could be balanced more equitably. This could result NZ Agriculture no longer being treated as the global laggards for GHG emissions, especially methane from grazing livestock, because of the reality that New Zealand had more herbivores than humans. GHG neutrality would be reliant on NZ farmers adopting management systems where GHGs emitted by grazing livestock would be offset by capture of CO2 through photosynthesis and its storage in soil as SOC or as a biological residue in plants. Farmers using biological systems with minimal use of inorganic agrochemicals and fertilisers could have carbon credits where the farm would be registered as a 'carbon sink' (Mitigator), rather than a 'carbon emitter' (Exacerbator), in a Net Carbon Zero future for New Zealand.

The role of SOC is not limited to GHG mitigation, but in addition it has an essentially positive role in multiple other processes involving Soil, Water & Atmospheric interactions involved in a balanced sustainable environment The diversity of its function of SOC can be seen in the attached cartoon (fig 1)

Soil Organic Carbon: Considering that Soil Organic Carbon is the richest reservoir of carbon on the planet and it can be reduced or increased by Land Use Change (LUC), one could question the need for the majority of New Zealand pastoral farmers to offset CO2 & GHG emissions. As New Zealand pastures and forests represent some of the largest **Natural Capital** (Biomass) *per capita* globally, NZ farmers have the potential to use LUC to increase SOC and offset natural CO2 & GHG emissions from livestock and pastures. Regenerative Agriculture principles and pasture management through adaptive grazing can cause a sufficiently extreme transformation of pasture use, to significantly increase SOC levels in NZ pastures.

The Benefits from Increased Levels of Soil Organic Carbon (SOC) are Multiple



Baveye, R. C. *et al* (2020) *Front Env Sci. 8:1-8.*

When one questions SOC storage levels in NZ soils the typical response is; NZ SOC levels are extremely high, and are almost at plateau levels, but results are highly variable and difficult to measure. How come NZ AgriScience has made so little progress surveying SOC levels, and changes in response to different LUC. They have concentrated exclusively on NZ topsoils @ 20-30 cm depth, when 80% of this Organic Carbon (Sugars) returns to the atmosphere as CO2, through decomposition or oxidation. Most dairy and heavily fertilised drystock pastures will have equivalent amounts (6 -7%) of SOC in their topsoils (< 30cm). The real evidence for changes in levels of stable Carbon sequestration in soil, will be found deeper at depths > 30 cm, here there is considerable unused capacity to store organic carbon.

Until ratification of the Paris Accord in 2016 farmers were treated like industrialists or consumers, where GHGs consumption invoked an emission cost that required remediation by a tax, or a carbon credit offset, or $$$s as a Government levy. Considering that Agriculture is unique and can act both as an Exacerbator or Mitigator for Carbon/GHG emissions, **Natural Justice** demands that each farm has a accurate carbon audit where all facets of emissions and sequestration are measured accurately and rewarded or levied as the equation defines. We anticipate that soil carbon monitoring will become an important part of environmental monitoring and ORC will have a role to play. Consequently, we consider that ORC need to put a finer focus on the properties of soil, largely mediated by organic carbon as part of its future Environmental management portfolio. Considering that farmers should see immediate benefits from building soil carbon through LUC, this provides a 'win-win' outcomes for the Producer and the Regulator.

The methane story:
In a world of equity where debits and credits should be fairly balanced we must be cautious to ensure that the rules of engagement are fair and reasonable. Considering that synthetic fertilisers have become central to most aspects of agriculture and horticulture we must ensure that their impact is evaluated fairly and objectively. In this regard we must be careful to apply rigorous ***Life Cycle Assessments (LCA)*** to the Manufacture of Synthetic Fertilisers and Agrochemicals. In this area it appears that the production and leakage of methane from industrial production of synthetic fertilisers may have been grossly underestimated (10x-100x). It is important that the final estimate is accurate, because it could have a serious impact on Agricultural practices that are heavily reliant on synthetic fertilisers and agrochemicals. If the cost of synthetic fertiliser production incorporates the full **LCA** costs there will be no need to invoke a N tax, as real costs may make the use of synthetic fertilisers unsustainable and unaffordable.