BEFORE THE OTAGO REGIONAL COUNCIL
AT DUNEDIN

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| Under the | Resource Management Act 1991 |
| In the Matter of | Proposed Otago Regional Council's Draft Regional Policy Statement |

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STATEMENT OF EVIDENCE OF CHRISTOPHER PERLEY
TO ACCOMPANY SUBMISSIONS BY THE WISE RESPONSE SOCIETY INC.

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## BACKGROUND

1. My full name is Christopher John Keith Perley.

2. I am a consultant and researcher in regional community potential, land use strategy, policy and practice.

3. I have published over 20 contract reports, over 150 profession papers, academic papers, conference papers and journal articles, over 50 op-eds, and over 40 public papers, unpublished reports and magazine articles.

4. My research interests include Environmental Philosophy & Policy; Economic Policy impacting on Natural Systems; The Environmental Effects of Land Use; Integrated Land Use; Forestry & Agricultural Strategy; Sustainable Land Management; Complex Landscapes Systems; Socio-Ecological Systems; Knowledge Systems; Agroecology; Resilience Theory and Practice; Integrated Catchment Management; and Complex Adaptive Systems.

5. I was made the youngest Fellow of the NZ Institute of Forestry in 2009.

6. I have worked in operational management, advisory services, policy and research in Nelson, Otago and Hawke's Bay.

7. I am familiar with the potential and limitations of Otago land use, and the associated drivers, patterns and trends.

8. My comments are based on my research and understanding of the relevant scientific literature for Otago, nationally and internationally.

9. I have previously provided expert evidence.

10. I have read the Code of Conduct for Expert Witnesses, and agree to comply with it.

11. I confirm that the issues addressed in this brief of evidence are within my area of expertise.

## SCOPE OF EVIDENCE

12. The scope of my evidence relates to the environmental, economic and social/cultural effects of increasingly energy-intensive land use activities, and the potential for alternative strategies in providing multiple benefits to desired economic, environmental and social/cultural outcomes.

## CHANGING THE FOCUS OF LAND USE FOR MULTIPLE POSITIVES

### A Land Use System in Decline

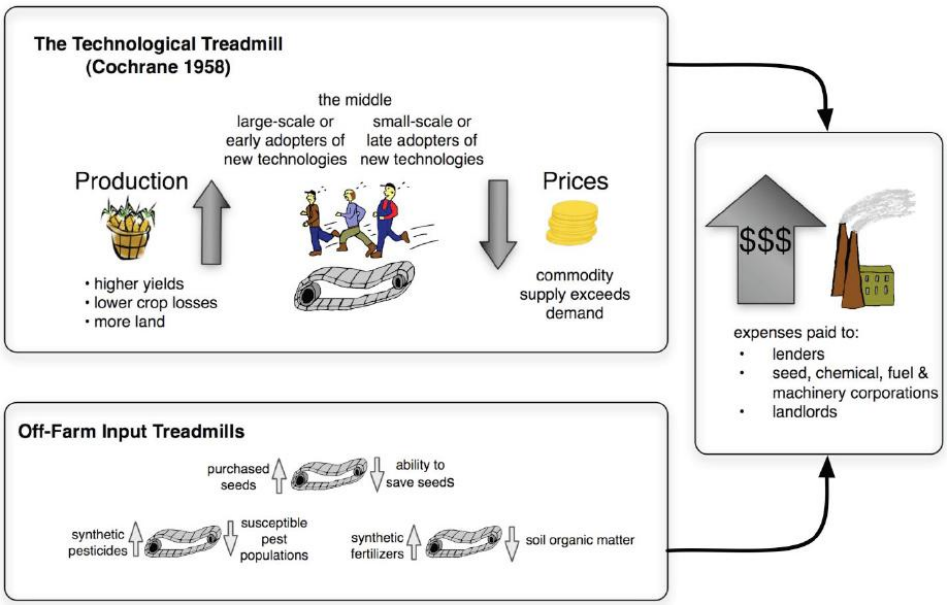
13. The negative issues associated with our current energy-intensive 'industrial' models of land use in New Zealand and internationally have

been identified and highlighted since soon after World War II. Those issues relate to negative social, economic and environmental effects. The current industrial model is associated with this decline.

*Social & Economic Decline*

14. The effect on rural communities of shifts toward large-scale industrial production is a central problematic in the sociology of agriculture (Lyson & Welsh, 2005). The roots of the rural sociological research go back to Goldshmidt's work (1946) comparing communities of family farms and agri-business farms. The work of Willard Cochrane explained this difference, referring to this rural decline as the *Technology Treadmill* as early as 1958 (Levin & Cochrane, 1996).

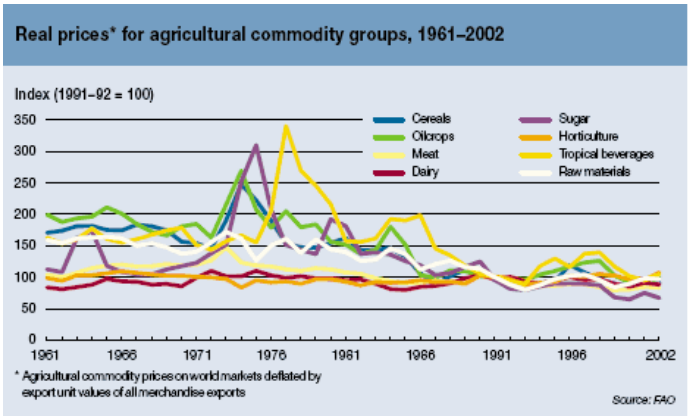
15. The dynamic of decline involves an impetus to increase yields through new technologies: which then follows a pattern of commodity oversupply; a decrease in real prices; profit margin squeeze; a focus on cost reduction through reducing labour and working conditions as well as further increases in farm scale to create temporary 'efficiencies'; homogeneity and the shift in treating land and people as 'resources' rather than a system with wider potential; increasing demand for more panacea technologies such as irrigation; a demand to externalise costs through pollution to the commons; the clearing of 'unimproved' lands to increase scale, resulting in significant environmental declines; all of which increase production still further with more pressure on commodity prices and price volatility. And so the treadmill continues.

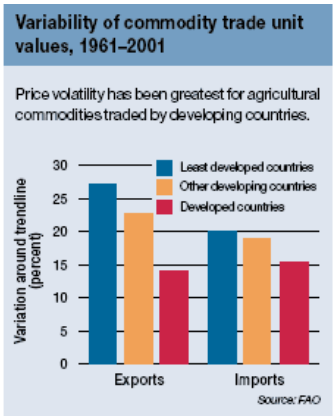



16. The wider effects include less people employed, ownership shifts out of the region, processing firms centralised for the sake of scale and continuous processing efficiencies, with expenditure and profits following. The result is the serious decline in the financial viability of family farms and

smaller towns, documented in fiction and non-fiction with such classics as Wendell Berry's *The Unsettling of America (1977)*. New Zealand is following the same pattern. Our farm 'economic size' has increased consistently for at least 70 years.

17. The real decline in farm commodity prices have had a significant impact on New Zealand farming systems since World War II, with a major structural shift being Britain's entry into the European Union in 1973. After this shift, a simple production focus was no longer a worthwhile strategy, though it continued.




18. New Zealand policy advice and agricultural universities continued to focus on an agronomic – essentially agri-business – 'maximising production' model in the decades after the 1973 key structural shift. In contrast with the metric of production, there was far less consideration of managing complex landscape systems for multiple beneficial functions, nor for the metrics of profit, risk, productivity (output per limiting input), resilience to environmental and market events, market price 'position' to hold or increase real price, or maintaining and developing natural capital which 'gifts' opportunities and cost savings to the farm enterprise. Much of this research was marginalised. This is despite the rise of agroecological thought and integrated land use work from Altieri (1983).

*Environmental decline*

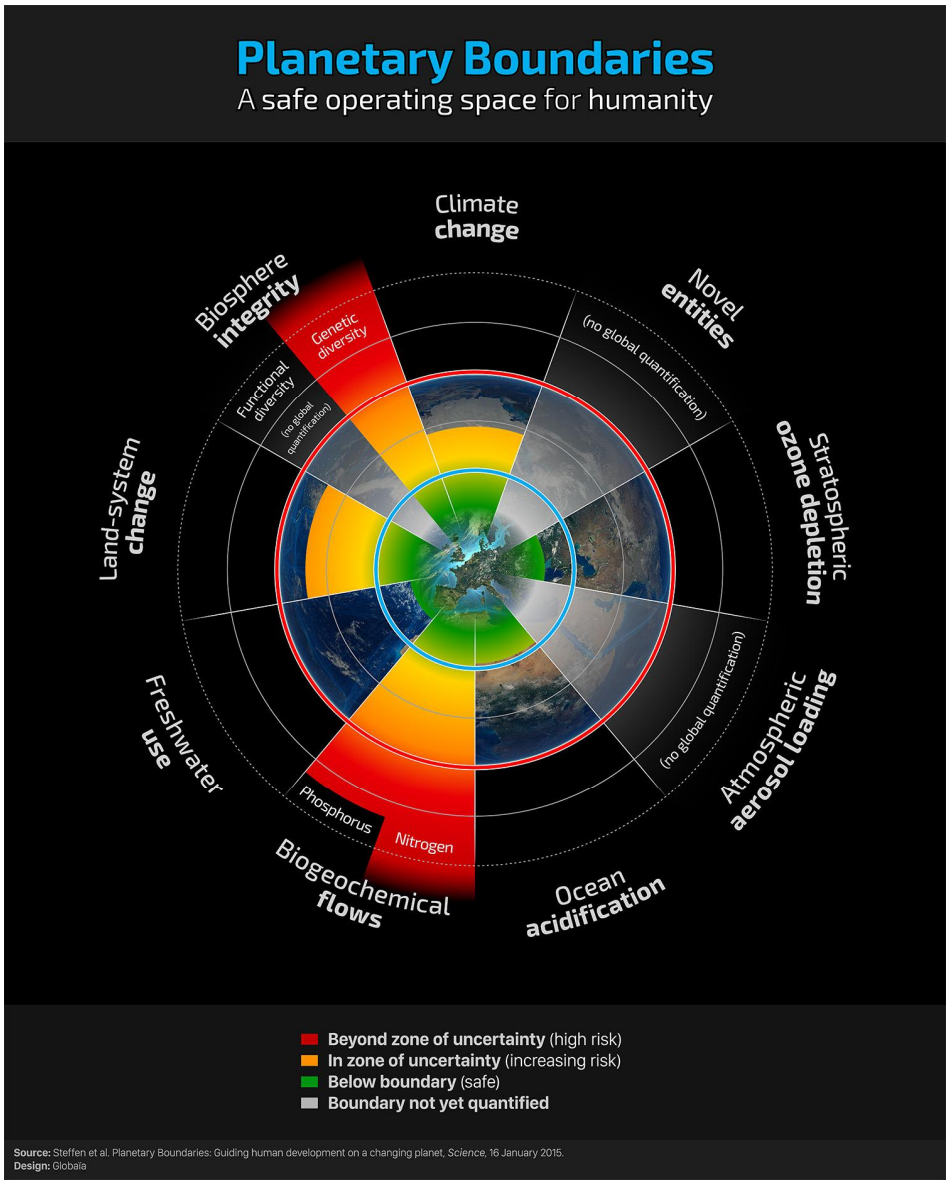
19. Key environmental concerns associated with intensive land use relate to declining soil function, biodiversity, water quality and hydrological function (particularly detention of water to reduce drought and flood risks), energy use, carbon stocks, and the free ecosystem 'gifts' each of these functions provide.

20. The Planetary Boundaries work has highlighted our environmental risks. Climate change is a seriously growing risk, with New Zealand agricultural land use contributing 49% of the nation's greenhouse gases (GHGs). However, there are other serious risks to the integrity of our biosphere

through the loss of key species and guilds, and to the mining of the critical and finite petrochemical-sourced nitrogen and phosphorus resources.

21. The issue of environmental decline is more, not less pronounced in New Zealand than internationally. A synopsis developed by Dr Mike Joy is provided in the Appendix. Agriculture and other land uses are implicated in the majority of the issues identified.

22. The immediacy of the environmental problems, coupled with the economic and social problems – all associated with a commodity and deeply colonial agricultural agri-business model – should raise concerns about the search for alternatives.




23. The more recent structural change in New Zealand came about with the commissioning of the Motonui urea plant and the resulting shift from a

clover-based renewable nitrogen system, to a dramatic rise in artificial nitrogenous fertilisers from the 1990s (PCE, 2004). Significant land use change and a shift in agricultural systems were the consequences.

24. For instance, homogenous industrial continuous-cropping farms replaced family owned mixed farms, land values rose on the promise of more production and became unlinked from the wider enterprise (its risk, profit, environmental damage and social damage), and dairy systems changed to one that was less closely linked to the patterns of seasons and land use systems to one where bad soil, hydrological, stock, shelter and shade, pasture and feed management was masked by the buying in of more nitrogen, supplementary feeds, and other inputs to treat symptoms, rather than avoid them.

25. The environmental and social consequences were obvious by the early 2000s. The economic consequences have been the subject of research in the US, where the effects of the model is more advanced than New Zealand, and that system is under considerable critique.

## The Search for Alternatives – Agriculture at a Crossroads

26. Recognition of the negative effects of industrial land use thinking has focused the thoughts of land use strategists and philosophers since Leopold (1949). However, New Zealand land use has arguably been led by technologists rather than strategists, and this has worsened with the commercialisation of science in 1992.

27. The first strategic challenge to the intensification of land use in New Zealand came with the *Growing for Good* report (PCE 2004) produced by then Commissioner Dr Morgan Williams. It highlighted the unsustainability of the current system, the emerging drivers and trends (none of which have been mitigated), the 'opportunites' for 'redesign', some initiatives already underway, and the resources needed to realise these opportunities.

28. There are opportunities in looking at land not as a factory, but as an integrated system whose linkages and potential can be developed by thinking synthetically (linking things together) rather than simply analytically (carving up the system and looking a the parts in isolation from wider connections in time and space). Those opportunities extend across environmental, social and economic domains. Analytical 'trade-off' thinking is unable to see these potentials because it is not looking for them.

29. Within the next 10 years following the *Growing for Good* report, significant international reports have been published elaborating on the need to shift off the agri-business industrial model, as well as the opportunities to solve multiple social, economic and environmental problems.

30. The International Assessment of Agricultural Knowledge, Science & Technology for Development (IAASTD, 2009) report was aptly titled "Agriculture at a Crossroads". This report recognised the environmental and social consequences of many of the 'successful' technologies developed to increase food production. The call was effectively for a Doubly Green Revolution (Conway, 1998), one that understood the multifunctionality of a land use 'system' extending to environment and social/cultural values as well as economic values, rather than a single-minded focus on production at whatever cost.

31. The 2011 United Nation's Special Repporteur Olivier de Schutter presented a significant report to the UN General Assembly (de Schutter, 2011), Agroecology and the right to food. This report was more specific than the IAASTD in its outline of the particular problems, was more specific in identifying the industrial agri-business model as the problem, and was also more specific in recognising and recommending a systems approach to the 'wicked problems' around agriculture, food, climate change, rural equity, etc., requiring agroecological methods. The report is extensively researched in deducing these conclusions. The conclusions apply just as much to New Zealand as internationally.

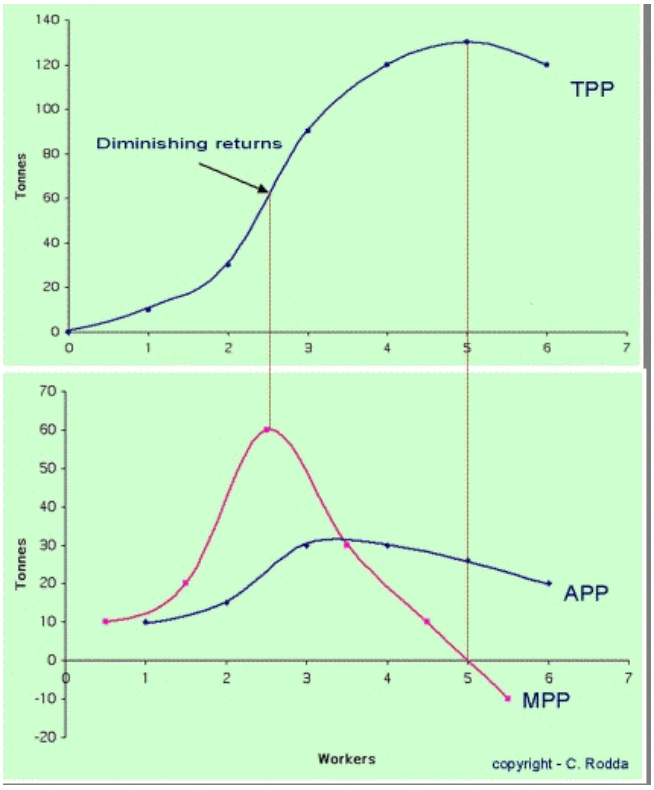
32. The challenge for New Zealand agricultural education, policy, research (and for local government wose responsibilities relate to these findings) is to seriously examine these developments in agricultural strategy.

## Strategic Directions for Land Use Enterprises

33. In giving regard to these changes, consideration should first be given to the economic trap of the industrial model.

34. The priority for farm enterprises is to get off the Technology Treadmill. This is the primary mechanism by which negative economic, social and environmental consequences arise. To that end, the focus of land use education, extension, policy and research should shift from *gross production* beyond the asymptote of the diminishing returns, to a number of other metrics.

35. Most importantly, a *market price 'position'* to hold price, and an emphasis on *productivity* (O/I Output per limiting Input), and *risk/resilience* (to climatic event, flood, drought, pests, off farm costs & availability, price volatility and long-run real price decline), long-term *profit*, the *functionality of natural systems* which provide free 'gifts' that substitute for off-farm inputs – soil functions, farm water retention, evapotranspiration loss, carbon sequestration etc. – and reducing the need for, and effectiveness of, *off-farm expenditure* on fertiliser and other expenses.

36. 


37. Dr Alison Dewes from Headlands has demonstrated repeatedly that the sweet spot of profit, risk and environmental performance is around the point of maximum Marginal Return. Beyond this, profits reduce, risk increase, reliance on inputs increase, and environmental effects significantly ramp up.

38. The Regional Council Land Management, science and policy teams might consider coordinating messages to land users on this point because so many of the poorer economic, social and environmental consequences relate to this over emphasis on production, even at the expense of profit and risk, and very much at the expense of the environment. This is a fundamental issue to address before looking at how land systems can be redesigned for mutual positives, particularly environmental benefits.

Specific Agroecological Opportunities for New Zealand Land Use

39. There are a number of *'keystone' issues* relating to farm environments: soil function[1], water & hydrological functions[2], energy efficiency[3], generation & sequestration of GHG[4], biological functions[5], and carbon stocks[6].

[1] Soil natural fertility, biological activity, water infiltration and holding capacity, detoxification functions, rooting depth, etc.

[2] Water retention, movement within the landscape, evapotranspiration reduction.

[3] The demand of the system for supporting inputs of energy, time, fertiliser, etc, especially relating to non-renewable energy sources.

40. There are a number of *keystone structures and elements* that maximise these functions. They include: Soil Organic Matter, Woodland systems, Wetland systems, and tall herbaceous leys.

41. The functionality of these keystones strongly relates to spatial and temporal placement and design. Many microsite areas are uneconomic in pasture, provide far better economic opportunities for other land covers, and create positive environmental functions to augment their economic positives. Multiple benefits accrue from designing for linkages and heterogeneity of structure and composition among patches in the landscape, as well as within particular patches.

42. There are also key operational keystones relating to these functions: pasture management; stock management; tillage, etc.

43. The significant point in looking at a landscape as a systems of potentially synergistic linkages, is that the environmental functions are good for the productivity (O per limiting I), reducing costs, increasing returns, and creating economic opportunities, reducing resilience, and holding price because the quality of the environment is a point-of-difference within the discerning markets that pay high prices.

CONCLUSIONS?

44. The current system is failing economically, socially/culturally, and environmentally.

45. There are considerable opportunities economically, socially/culturally and environmentally in encouraging a redesign of land use policies around agroecological thinking.

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Chris Perley

Date: 25th November 2015

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[4] $CO_2$, $CH_4$, $NO_x$, with the $NO_x$ being 310x the impact of $CO_2$.

[5] With a huge range from animal health, shelter, shade, evapotranspiration reduction, biodiversity, pollination support, pest control, etc.

[6] Both within soils, woodlands and wetlands.

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# Appendix

## Dr Mike Joy Synopsis of New Zealand's Environmental Challenges