BEFORE THE	Canterbury Regional Council
IN THE MATTER OF	the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010
AND	
IN THE MATTER OF	Submission and Further Submission on Proposed Variation 1 to the Canterbury Land and Water Regional Plan (2014)

STATEMENT OF EVIDENCE OF MICHAEL ROBERT BENNETT ON BEHALF OF THE NORTH CANTERBURY PROVINCE OF FEDERATED FARMERS OF NEW ZEALAND

Dated 29 AUGUST, 2014

Introduction

Qualifications and Experience

1. My name is Michael Robert Bennett.

2. I hold a Bachelor of Science degree from the University of Canterbury (Ecology) and a Masters of Commerce (Agriculture) from Lincoln University. In addition, my thesis project concerned the perceptions of sustainability of dairy support land farmers, both in environmental terms, and in terms of economic and social sustainability in a businesses sense.

3. I have completed the following post-graduate planning papers by distance study at Massey University:
    1) Planning Theory - 132.732
    2) Planning Law – 132.312
    3) Professional Practice – 137.897

4. I have six years professional experience in applying resource management planning provisions and processes, to farming activities.

5. I worked for three and a half years from 2008 to 2011 at Environment Southland as Resource Planner, where I undertook a variety of RMA policy work relating to plan development and consultation, and supported Schedule 1 plan change processes, on a variety of farming-related planning topics.

6. I commenced my current role, as a Regional Policy Advisor at Federated Farmers in 2011. In this position, I provide advice on local government and RMA planning and policy issues to Federated Farmers provincial committees and members across the top of the South Island and North Canterbury/West Coast in the context of farming related issues. This role involves regular and close interaction with a wide cross section of the farming community, often in the context of discussing how resource management policies and rules affect farming enterprises and the rural community.

7. My experience and qualifications cross over areas of both farming and planning knowledge, which I integrate when discussing and considering Variation 1 in this statement of evidence.

8. I was involved in the development of the Canterbury Regional Policy Statement and proposed Land and Water Regional Plan, and in relation to these planning documents presented submissions for Federated Farmers to the Hearing Panel. In relation to Variation 1, my involvement on behalf of Federated Farmers has been limited to an advisory capacity, with the North Canterbury Federated Farmers submission authored by the Provincial Executive. I also attended community meetings, advised a number of farmers in relation to the process, at the time Variation 1 was notified.

9. I have read the Environment Court's Code of Conduct for Expert Witnesses, (Environment Court Practice Note 2011, Part 5) and I agree to comply with it. I confirm that the issues addressed in this statement of evidence are within my area of expertise.

10. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed. I have specified where my opinion is based on limited or partial information and identified any assumptions I have made in forming my opinions.

Scope of Evidence

11. I have been asked by the North Canterbury Province of Federated Farmers (NCFF) to provide a planning assessment of Variation 1 to the proposed Canterbury Land and Water Regional Plan (pLWRP). My evidence will address the following matters:
    1) The introductory sections and the vision for the catchment;
    2) The management framework for managing water quality, in particular nitrogen loss, the nitrogen baseline, and the use of Farm Environment Plans (FEPs);
    3) Farming within the Cultural Landscape/Values Management Area;
    4) The provisions for managing water allocation and transfers in the catchment.

12. In undertaking a planning assessment, I have considered:
    1) Whether Variation 1 meets the statutory requirements for a regional plan under the Resource Management Act 1991, and the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010, and;
    2) Whether, in my view, the provisions reflect good planning practice.

13. In preparing this statement I have considered the following legislation and policy documents:

1) The Resource Management Act 1991 (RMA);
2) The National Policy Statement for Freshwater Management 2011 (NPSFM);
3) The Canterbury Regional Policy Statement 2013 (RPS);
4) The Proposed Canterbury Land and Water Regional Plan (pLWRP);
5) The Canterbury Water Management Strategy (CWMS);
6) Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010.

14. I have also considered statements of expert evidence from the following people:

1) Dr Lionel Hume.
2) Dr Marvin Pangborn
3) Dr Roger Williams

The introductory sections and the vision for the catchment

15. Variation 1 contains a vision for the catchment The Vision is:

> *'…restore the mauri of Te Waihora while maintaining the prosperous land-based economy and thriving communities'.*

16. There is no catchment objective but the Vision appears to have the characteristics of a catchment-specific objective and, in my opinion, it is more appropriate that it be presented as such.

17. The section 42A report, at page 133, recommends that a new objective is not included. Reference is made to Policy 4.10 of the pLWRP which specifies that *'reviews of sub-regional sections will not make any changes to the Objectives or Policies 4.1 – 4.10 of this plan.* In my opinion an objective, reflecting the Vision of Variation 1, does not conflict with Policy 4.10. It does not seek to amend the objectives and strategic policies of the parent plan, nor, in my view, would it create an objective which is inconsistent with them. Rather, it takes the principles outlined in the region-wide objectives and applies them to the specific situation found in the Selwyn-Waihora catchment.

18. The Vision is supported by the aspirations for the Selwyn/Waihora water management zone as expressed through the Zone Implementation Programme (the ZIP), which clearly drives the content of the Variation. The Vision also addresses the complex and interwoven economic, social, environmental, and cultural factors at play in the catchment.

19. In my view a catchment-specific objective is essential to Variation 1 for the following reasons.

20. Firstly, the generalised nature of the region-wide objectives in the pLWRP do not capture the unique features of the Selwyn/Te Waihora catchment:
    1) A large and very significant coastal lake at the bottom of the catchment, which has outstanding cultural and ecological values as recognised in the National Water Conservation (Lake Ellesmere/Te Waihora) Order 1990;
    2) An intensively farmed catchment where agriculture is vital to the economic and social well-being of people and communities;

3) A catchment which is deemed over-allocated for water quality by the Regional Council but has to have a regime that can allow the operation of an already approved irrigation scheme to irrigate another 30,000 hectares of dryland. The catchment is reliant on the success of this scheme to relieve issues caused by groundwater abstraction, including low flows in lowland streams.

21. Secondly, in accordance with s67 of the RMA it is my understanding that a plan should have a clear and traceable link from objective to policy to rule. Variation 1 introduces a raft of catchment-specific polices and rules unique to Selwyn-Waihora. It would be appropriate to have an objective at the top of that hierarchy of plan provisions. In my opinion the inclusion of a catchment objective will guide the planning framework and any resource consent decision making in this complex environment.

22. In light of these problems I consider that rewriting the vision into an objective would better achieve the purpose of the RMA and give focus to the policies in Variation 1.

The planning framework for nutrient management, sediment, and microbial contaminants

23. In relation to the planning framework for nutrient management, sediment and microbial contaminants, I begin with some general observations about the management framework for nutrients in Variation 1.

24. Variation 1 seeks to manage losses of nitrate-nitrogen, phosphorous and sediment from farming activities into water in the catchment. Sediment and phosphorous is managed through on-farm management practices articulated in an FEP.

25. Variation 1 seeks to manage losses of nitrate-nitrogen, phosphorous and sediment from farming activities into water in the catchment. Sediment and phosphorous is managed through on-farm management practices articulate din a Farm Environment Plan.

26. Nitrate-nitrogen is managed through a series of rules to control nitrogen loss measured using Overseer. There are four sets of provisions:

1) All farmers are to be operating in accordance with a series of good management practices (set out in Schedule 24) by 2017.

2) A threshold of 15kg/ha/yr, which any farm activity may lose nitrogen up to. This threshold recognises the need for some flexibility among low nitrogen loss farmer to continue to develop or change their farming practices.
3) A catchment load for dryad farmers who are shareholders of Central Plains Water to allow them to increase their nitrogen losses as part of irrigation uptake. There load may be distributed by Central Plains Water but if averaged out equates to around 28kgN/ha/yr which must be reduced to around 22kgN/ha/yr by 2022.
4) A reduction regime for all other farmers who are losing more than 15kgN/ha/yr. The reduction regime requires farmers to make a percentage reduction in N loss by 2022 which is over and above ether nitrogen loss they will achieve through Good Management Practice. Those percentage reductions are set out in Policy 11.4.14

27. In my view, a substantial problem with Variation 1 is that it requires percentage reductions based on information we do not know, which creates issues of uncertainty for both farmers in knowing what they have to comply with. There is also uncertainty for the Council in being able to demonstrate that the percentage reductions required will meet the catchment load or that the catchment load is fair and reasonable, considering the practicability and costs of achieving required percentage reductions.

28. A second issue is that Variation 1 simultaneously, tries to provide for the irrigation of another 30,000 ha of dryland, while also attempting to provide for the reasonable needs of existing farmers, some of whom have high nitrogen losses, and reduce the impact of nitrogen loss on catchment water quality. The result is inconsistent provisions between activities which have similar effects.

29. It is also evident that Variation 1 may not be based on sufficiently complete information to provide for the most efficient or effective outcome. Subsequent plan changes are likely to be required once the Matrix of Good Management (MGM) project is complete[1]. Having considered Dr William's evidence it is my opinion that MGM will allow a more informed assessment of:
    1) An appropriate catchment load;
    2) The appropriate nitrogen loss allowance to support reasonable use of land for different soil types and rainfall areas;

[1] Refer to the Evidence of Dr Roger Williams, 29th August 2014, which provides information about the MGM Project.

3) How much and how quickly existing users who are above these levels can be expected to reduce nitrogen emissions.

Good practice nitrogen loss rates to be achieved by 2017 and further percentage reductions required of various farm types after 2022

30. Variation 1 introduces specific requirements for land uses that result in a nitrogen loss calculation greater than 15 kg per hectare per annum.

31. I have noted the staff recommendation at paragraph 11.168 (p177) of the section 42A report to include the percentages sought for dryland and irrigated sheep, beef, and deer in the submission of Beef and Lamb NZ, which recognises errors made in the preparation of Variation 1.

32. The overall effect of the framework is to implement a nitrogen loss reduction regime as follows:

1) In the immediate term to not exceed the 'nitrogen baseline' for the property. In subsequent sections[2] it will be explained how this in itself will equate to a reduction, particularly for non-dairy farming properties which were developed during the baseline period;
2) By 2017 to meet the Good Management Practice Nitrogen and Phosphorous Loss Rates for the property's baseline land use (Policy 11.4.13). These numbers are expected to be provided by the MGM Project;
3) By 2022, to achieve a further reduction according to type of farming activity (Policy 11.4.14).

The framework is supported by rules, for example Rule 11.5.12, which prohibits farming in exceedance of the 'nitrogen loss calculation'.

33. While the further percentage reductions to be achieved by 2022 are a matter of policy (as opposed to a condition or rule), the words of Policy 11.4.14 appear to give clear direction in terms of expected further percentage reductions in nitrogen loss rates to achieve water quality targets. In my view a number of planning related issues arise with this approach:

[2] Refer to paragraph 50

1) The ‘nitrogen loss calculation’ is generated through Overseer, which while able to model a farm system at a steady state, appears to be subject to significant prediction error and therefore have a limited ability to model reductions in nitrogen loss following system changes[34] or when used as a compliance tool[5]; It is anticipated that there will be particular issues with ‘mixed’ farm types which are often a combination of dairy support, arable, sheep and beef, etc; and are often dynamic over time[6];
2) Overseer cannot model new or ‘novel’ practices[7]. The very nature of ‘novel’ methods means that they cannot be expected to be able to modeled, no matter how appropriate they may be in terms of care for the environment;
3) The ‘good management practice nitrogen and phosphorous loss rates’ are not specified in the plan, so in practical terms we cannot evaluate how much the further reduction will cost, other than the estimated ‘impact on EBIT’ which underpins the percentage reductions used in Variation 1. The use of this economic measure is discussed subsequently[8].
4) Farming activities which do not meet the ‘nitrogen loss rates’ applied to the property in accordance with Policies 11.4.12(a), 11.4.13(b) and 11.4.14(b) are subject to prohibited activity status (Rule 11.5.12), with little or no ability to make a case to continue despite the fact this number is derived from a model;

34. I consider that many of these issues arise because Variation 1 is at the limit of, or even beyond what can be accomplished with available information. Despite this, I am not aware of any other tool other than Overseer which is currently available and which can calculate a nitrogen reduction over time.

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[3] Evidence of Antony Hugh Coleby Roberts, presented to the hearing panel for the proposed Canterbury Land and Water Regional Plan, 28th March 2013 [Online] http://ecan.govt.nz/our-responsibilities/regional-plans/regional-plans-under-development/lwrp/Pages/evidence-group-two.aspx

[4] Evidence of Dr Douglas Charles Edmeades, presented to the hearing panel for the proposed Canterbury Land and Water Regional Plan. 2 April 2013 [Online] http://ecan.govt.nz/our-responsibilities/regional-plans/regional-plans-under-development/lwrp/Pages/evidence-group-two.aspx

[5] Evidence of Hamish Lowe on behalf of Central Plains Water Limited page 5, para 30, August 25th 2014

[6] Refer to Report – Canterbury Arable Cropping – 2012: Key results from the Ministry for Primary Industries 2012 arable monitoring programme, page 8 (Appended): *Most properties grow a combination of crops, which are grouped in the budget into cereals, small seeds (including grass, clover and vegetable seeds), process vegetables, silage and other crops. Most have some type of stock enterprise as an integral part of the system, for example, grazing, trading and/or breeding stock.’*

[7] Evidence of Hamish Lowe on behalf of Central Plains Water Limited page 8, para 47, August 25th 2014.

[8] Refer to paragraphs 38 - 43

35. An alternative management framework would be to make further reductions subject to the 'Best Practicable Option' to reduce nitrogen loss. I make the following observations:

1) Such an option would allow for the use of 'novel' methods to manage nitrogen loss;
2) Overseer outputs vary significantly between versions[9] and farm types[10], and is known to be subject to margins of error[11];
3) Industry standards are under development, which will provide more certainty within the life of the plan. We do not know however what these standards will deliver or how much it will cost to achieve them. The 'Best Practicable Option' method seems a useful tool to assist a transition to adopting these standards;
4) The 'Best Practicable Option' is already used in other parts of Variation 1 (for example Rule 11.5.22 (the use of land for a community wastewater treatment system). The section 42A report appears to use 'special circumstances' to justify this approach.

For these reasons I see it as appropriate for 'practicability' to be able to be taken into account, both as a last resort if required reductions cannot be met, and also to support 'alternative methods' to reduce nitrogen loss.

36. Despite these planning advantages of the best practicable option approach outlined above, farms unable to meet the somewhat uncertain test of 'practicable' would as the plan is currently proposed, still be subject to Rule 11.5.12 (prohibited activity status). From a planning perspective, use of prohibited activity status given the uncertainties of modeling limitations of Overseer, is not appropriate in my view. There are also uncertainties in the ability to meet catchment load targets. In my opinion, amending Rules 11.5.11 and 11.5.12 so that farming activities or farm enterprises which do not comply with Rules 11.5.7, 11.5.9, or 11.5.10 are subject to non-complying, rather than being prohibited activity status would create a preferable outcome.

37. I note here that for some farming activities switch are only marginally above the 15kgN/ha/yr threshold the Best Practicable Option for nitrogen loss reductions may be to do nothing more than is already being done.

[9] Evidence of Hamish Lowe on behalf of Central Plains Water Limited para 35 – 37, p 6-7, August 25th 2014.
[10] Evidence of Mr Chris Keenan on behalf of Horticulture New Zealand Limited. August 29th 2014.
[11] Evidence of Hamish Lowe on behalf of Central Plains Water para 30, p 5, August 25th 2014.

The appropriateness of allocating industry specific 'reduction' targets on the basis of 'impact on EBIT'

38. Policy 11.4.14 requires further percentage reductions for different industry 'types', to be achieved by 2022. In the absence of sufficient environmental information (MGM), Variation 1 allocates further percentage reductions on the basis of impact on profit. In my opinion, this approach is limited because profitability has very little relationship to environmental effects without consideration of other factors.

39. In planning terms, I consider that issues with incorporation of economic measures illustrate the difficulties that occur once a Council seeks to control land use, in a way that reflects impact on profitability rather than in response to observed or expected adverse environmental effects. Given that the issue is nitrate-nitrogen discharges resulting from land use activities, I would anticipate a clear relationship between the amount of nitrate-nitrogen being lost to the environment and the amount of reduction required.

40. Acceptable nitrate-nitrogen loss rates may vary with natural variations such as soil type and rainfall[12]. There may also be a distinction between the rules for nitrate-nitrogen loss for new activities and those for existing activities. However in the situation where there are two farms on the same soil type and rainfall area, both existing operations, with one a dairy farm losing 60 kg/ha/yr and the other an arable farm losing 60 kg/ha/yr, there is no environmental reason, beyond potentially a transitional phase to recognise capital commitments or practicability, for the two farms to be treated differently.

41. Despite the logic of managing to adverse environmental effects, the management framework introduced by Variation 1 requires dairy farms to reduce nitrogen emissions by 30%, while arable farms are subject to a 7% reduction, simply because the dairy farm is deemed to be able to 'cope' with the reduction, as predicted by EBIT.

42. A further issue with relying on EBIT as an economic measure is that it does not consider the effect of the policy change on land value, or that farmers might consider impact on equity or solvency to be aspects of discomfort arising from a policy change. Profitability

[12] Evidence of Dr Lionel Hume, 29th August 2014 (paras 21-22).

of farm businesses also varies the natural course of events[13]. As with EBIT, however there are enormous difficulties with a lack of knowledge of the MGM outputs and what it will deliver in terms of not knowing what (say) an irrigated cropping farm will be expected to achieve within the timeframes specified in Variation 1.

43. In view of the identified problems with the use of EBIT as a measure of 'pain', it is my opinion that the percentage reductions in Policy 11.4.14 should be removed and replaced with an evenly spread percentage reduction from the 'nitrogen loss calculation' for each property until such time as a further plan change can be undertaken post-MGM. The effects of this reduction would be tempered to some extent by the increased recognition of 'practicability' recommended in the earlier discussion on Policy 11.4.15. Notably Policy 11.4.15 specifically provides for 'transitional' situations.

The implications of the section 42A Report recommendations for activities besides farming (community sewage schemes and industrial and trade processes)

44. Variation 1 as notified, commendably in my view, sets nitrate-nitrogen discharge limits for all activities with significant potential to lose nitrate-nitrogen to groundwater, including industrial and trade processes and community sewage schemes.

45. At pages 203 to 205 of the section 42A Report, the reporting officer recommends limits for community sewage schemes and industrial and trade processes are incorporated with the 'whole of catchment' load, and appear to be exempt from further reductions on the basis that "it is too difficult to comply."

46. I cannot see how it is any more difficult for a council or other party to comply with a maximum nitrate-nitrogen loss rule than farmers. In fact I would have thought applying contaminants to land in a controlled way through a sewage treatment facility or industrial or trade process would make it easier to comply than the uncontrolled nitrate-nitrogen losses which result from livestock grazing outside in all weather conditions. I note also that 'Best Practicable Option' is used, much in the same way as previously discussed in the context of nitrogen discharge from farms.

47. It does not accord with the purpose of the RMA or good planning practice to require some activities which lose nitrate-nitrogen to meet nitrate-nitrogen management and

[13] Refer to Report – Canterbury Arable Cropping – 2012: Key results from the Ministry for Primary Industries 2012 arable monitoring programme (Appended) Refer to page 7, Figure 3.

reduction requirements but make others exempt. In my view, the focus of the RMA on managing effects of activities on the environment demands a level of consistency in the regulation of activities which have the same or similar effects. If Variation 1 seeks to apply a reduction regime for nitrate-nitrogen losses from farming activities where such losses exceed 15 kg/ha/yr, my view is that nitrogen-nitrate losses from all other activities with the same adverse effects should also be similarly controlled to achieve consistency.

48. In view of the need to achieve consistency of regulation, I recommend that the recommendation of the section 42A report to remove the Nitrogen Load Limits for Community sewage schemes, and Industrial or trade processes is rejected.

Options to address the consequences of the definition of 'nitrogen baseline' for Variation 1

49. In terms of nitrogen losses, Variation 1 begins from an assumed status quo, established by calculating a nitrogen baseline which is an average of nitrogen losses for the 2009 – 2013 'baseline years', predicted using Overseer. To continue to operate, farmers are required to calculate a 'nitrogen loss calculation' each year, with no increase from the nitrogen baseline unless that baseline is less than 15 kg/ha/yr.

50. The manner in which the nitrogen baseline has been defined creates a situation where it does not always reflect current land use – or land use at the time the Variation was notified. This creates the following difficulties:

1) If any farmer has obtained resource consent to change land uses over this time but has not given effect to it or full effect to it they can no longer do so.

2) If any farmer has further developed land or increased their production over the last four years they will have a current nitrogen use which is significantly larger than the average over that time, and any farmer recovering from drought or other set-backs to production during this time may not be able to bring their farm back to its prior productive capacity. The problem is particularly marked if irrigation development was undertaken during the baseline period. A significant proportion of Canterbury arable farms undertook irrigation development during the baseline period, with one third undertaking some form of irrigation development in the 2011/12 year alone[14].

[14] Refer to Report – Canterbury Arable Cropping – 2012: Key results from the Ministry for Primary Industries 2012 arable monitoring programme, page 8 (Appended)

3) The nitrogen baseline enforces a slight (but possibly significant) reduction in nitrogen loss. This is because farms must stay somewhat below the limit in order to ensure it is not exceeded, much as the only way for a driver to avoid exceeding the speed limit is to maintain a speed somewhat below it. A key issue with this approach is that it makes lawfully established activities subject to a prohibited activity, even though a marginal shift in overall environmental effects (as predicted by a computer model) is involved.

4) Exceeding the nitrogen baseline is a prohibited activity under Rule 11.5.12, unless the baseline is below 15kgN/ha/yr. This means that some farmers whose land uses were permitted activities up to notification of Variation 1 will now find themselves prohibited activities, unless this provision is amended. It appears this is an unintended consequence of the rules as the section 32 Report does not acknowledge or evaluate this cost of regulation.

5) It is not a simple matter to reduce nitrogen-nitrate losses by 'taking one's foot off the pedal' in the way one might reduce one's speed when driving. Farmers who have increased their nitrate-nitrogen baseline from their last four yearly average and who are over 15kgN/ha/yr are likely to have done so through some comprehensive farm development or a change in land use and may not have the option to be able to simply cut-back and comply with a baseline average from 2009-2013.

51. The issue of development during the baseline period has already been recognised in relation to resource consents for dairy conversions issued during that period, and an exemption is included for them. Despite this, other types of land development (irrigated or otherwise), which would have involved capital investment, are not so provided for[15]. This is a continuation of the theme of 'picking winners' rather than focusing on adverse effects and resulting problems with consistency already raised[16]. It should also be noted that there may have been a deliberate choice to undertake farm development other than dairying due to perceptions that an alternative land use would be more in keeping with the limitations of the environment.

52. The section 42A report, at pages 164-168 suggests that it is not appropriate to provide a different definition for nitrogen baseline for the sub-regional areas. This

[15] Nitrogen Baseline Compliance Note, Environment Canterbury, 2014 [Online] http://ecan.govt.nz/our-responsibilities/regional-plans/regional-plans-under-development/lwrp/Pages/information-farmers.aspx
[16] Refer to paragraphs 39 - 41

recommendation is supported by the assertion that such a change would result in having to re-calculate the catchment load.

53. Mr van Mierlo will deal with any issues relating to the scope of a request to change a definition not specifically included in Variation 1.

54. My understanding is that the catchment load was calculated from a combination of estimates of land use and a high level model of predicted nitrogen loss. It is therefore a broad brush calculation. This assessment was based 2011 land use and therefore some of the development work undertaken during the baseline period would have been incorporated in any case. As described in Dr William's[17] evidence a large body of work is currently being undertaken that will support a much improved calculation of *expected nitrogen* losses from all farms, and by extension a more accurate calculation of the catchment load. It should also be considered that nitrogen reductions from compulsory uptake of FEPs and Schedule 24 'Best Practices' will also have an effect on the catchment load, balancing against the relatively small concession for development activities undertaken during the baseline period.

55. Based on contextual information from farmers, and facts at hand, my opinion is that in the interests of achieving a consistent, effects-based management framework for farming in the Selwyn-Te Waihora catchment, and in ensuring the most efficient and effective outcome is achieved, the best solution to resolving problems I have identified with the definition of 'nitrogen baseline' and 'nitrogen loss calculation' is to make the overall framework subject to an amended definition.

56. Changing to the definition of nitrogen baseline to make reference to 'the highest year' rather than an 'average' across the 4 years will have the following effects:

1) Farming activities which undertook development, recovery or system change during the baseline period would be provided for in the same way as dairy farms established during this same period.
2) Farming activities would still be subject to a slight reduction (to avoid exceeding the nitrogen baseline), but it would not be as significant.

[17] Evidence of Dr Roger Williams, August 29th 2014

The 15 kg/ha/yr threshold provided for all farming activities and the case for an increase to 20 kg/ha/yr on light, free draining soils

57. The section 42A report includes 'no particular recommendations' with regard to Rules 11.5.6 and 11.5.7 which make provision for farms with a nitrogen loss calculation below the threshold of 15 kg per hectare per annum.

58. It is my opinion that some level of nitrogen loss (both as a quantum and in terms of flexibility) should be generally allowed to provide for on-going reasonable use of land, without irrigation development. Without this provision, costs to owners of land with an established low nitrogen loss land use, in terms of lost opportunities and loss of ability to use land, will be excessive relative to the effects of these activities on water quality. Furthermore, the dependence of dairy farm businesses on imported grazing and feed supply services[18] means that flow-on impacts in terms of business risks for dairy farmers are also likely to be significant, as lack of provision for any further development of land still at a relatively low level of nitrogen loss per hectare, increases exposure to externalities by constraining the market for new dairy support services[19]. For these reasons, I see the 15 kg/ha/yr threshold as a positive feature of Variation 1 that will assist the sustainable management of natural resources.

59. I have evaluated the merits of a higher 'reasonable use' threshold of 20 kg per hectare per year for light or very light soils. As already noted[20], the presence of a 'hard' limit means that a farm must deliberately run somewhat below the 15 kg threshold to avoid inadvertently exceeding it. In my opinion the effort required to reliably do this on light/free draining soil types may not be worth the marginal environmental benefit achieved, particularly on dryland farms which 'farm to rainfall' and are subject to significant natural variability in nitrogen loss[21].

60. In terms of the tests of section 32 I consider that it would be more efficient and effective, for dryland farms on light/free draining soils to be provided for with a higher per hectare

[18] Refer to Report – Canterbury Arable Cropping – 2012: Key results from the Ministry for Primary Industries 2012 arable monitoring programme. (Appended) At page 7 *"Most dairy farms require support from other farms in terms of grazing and supplementary feed. Each dairy conversion brings new opportunities for arable farmers to increase trade with dairy farmers, giving arable farmers alternative markets for their produce.'*

[19] Evidence of Dr Marvin Pangborn, 29th August 2014 (para 28).

[20] Refer to paragraphs

[21] Evidence of Dr Lionel Hume (para 20).

nitrogen limit offer more land use flexibility; perhaps a 20 kg/ha/annum requested in some submissions.

The unexpected consequences of regulatory requirements for low risk activities

61. Variation 1 requires the following of all farming activities:
    1) The undertaking of a nitrogen loss calculation for the property which means that an Overseer budget must be run every year to ensure the farm does not increase above the baseline (Rule 11.5.7).
    2) The preparation and implementation of a Farm Environmental Plan (by 2017 if greater than 50 hectares, by 2022 if greater than 20 hectares).

62. My contacts with famers and the evidence of Dr Pangborn[22] suggest that there is significant potential for older or more traditional farmers to make early retirement decisions rather than address regulatory burdens associated with the nutrient management framework introduced by Variation 1. On the basis of my ongoing professional involvement with the rural community, I also consider that many of these farmers will be farming at the lower end of proportionality in terms of nitrogen loss. Over-regulation of less intensive farms therefore in my view creates exactly the kinds of incentives that are not desired by anyone involved with Variation 1.

63. Positive aspects of a reduced level of regulation for 'lower intensity' farms include better linkages between regulations and environmental effects, rewarding those who have chosen to farm within the limits of the environment, and create an incentive to keep nitrogen emissions below 15 kg/ha/yr (or 20 kg/ha/yr on light or very light soils).

Nitrogen loss calculation

64. Small variations from fluctuations in rainfall and so on are not likely to be significant in terms of nitrogen loss and cannot in my view justify the cost of maintaining a 'nitrogen loss calculation'. The changes in land use which may result in increases in N loss relate to land use change; applying irrigation water and associated changes in soil moisture and land use intensity; increasing the number of cattle grazed on a property, especially intensively grazed cattle; or putting more land area under crop.

[22] Evidence of Dr Pangborn, 29th August 2014 (para 29)

65. Nitrogen loss calculations need to be done by appropriately qualified personnel. At present the key service providers of nutrient budgeting services are fertilizer companies and some farm consultants. Accordingly, a requirement for all farms to maintain a 'nitrogen loss calculation' requires in practical terms paying a representative of a fertilizer company or farm consultant, every year. This factor may be of no moment on a more intensively run farm, but could be significant on more traditionally run farms which often use very little fertiliser.

66. In view of these issues, in my opinion it would be preferable to only require farmers with nitrogen loss below 15 kg/ha/yr level to undertake a nitrogen loss calculation if they are undertaking a land use change which may result in an increase in N loss.

Farm Environment Plans

67. Dr Hume[23] describes in his evidence how contaminants enter water from soil using different pathways. He has also outlined the utility of FEPs as a management tool to guide qualitative actions or practices that may vary between farms and that are not able to be quantified and measured.

68. Despite the usefulness of FEPs I am not persuaded that the requirement for all farms over 20 hectares to have one, is the most efficient and effective option to manage contaminants entering water, considering the other methods also being applied to address water quality issues in Variation 1.

69. If a farm is not located in an area identified on the planning maps as susceptible to sediment and phosphorus loss or within the Cultural Landscape/Values Management Area, and has complied with the Stock Exclusion Rules, the land use rules under Schedule 24, and has been determined to have low N losses,, it is unclear that significant additional benefits to the environment will be achieved by an FEP. These farmers will be put through the cost of obtaining an FEP for no environmental gain.

70. Having considered the advantages of reduced regulation for farmers with smaller environmental footprints, and with a view to achieving a sustainable outcome, my opinion is that requirements to prepare and implement a Farm Environment Plan should be limited to situations where they can be beneficially applied, i.e.:

[23] Evidence of Dr Lionel Hume, 29th August 2014 (paras 7 – 11)

1) Where the land use results in calculated nitrogen loss in excess of 15 kg/ha/yr or 20kg/ha/yr on light soils and N loss reductions are required; or‘
2) In areas identified as at elevated risk of sediment and phosphorus loss; or
3) In sensitive locations such as the Cultural Landscape/Values Management Area.

The definition of ‘farming enterprise’

71. The pLWRP includes the following definition of ‘Farming Enterprise’

> *“means an aggregation of parcels of land held in single or multiple ownership (whether or not held in common ownership) that constitutes a single operating unit for the purpose of nutrient management.”*

72. This definition is reflected in Rule 11.5.10, which makes the use of land as a farming enterprise subject to a discretionary activity.

73. It appears that by using the word ‘aggregate’ this definition could be interpreted as limited to farming operations where there is an aggregate of land parcels which ‘adjoin’ or are in close proximity. In my view such an interpretation does not accord with what the plan is trying to achieve with this definition, and perhaps reflects a ‘minor error’ in preparation. It would be better if the definition was amended in a way that makes it clear that different parcel of land which are separated may be treated as a farming enterprise. The Federated Farmers submission, which seeks that the definition is qualified by the words ‘*adjoining or separated’,* provides one way in which this might be accomplished.

Discharge of land drainage water within the Lake Area in the Cultural Landscape/Values Management Area

74. I have considered the appropriateness of Rule 11.5.21 of Variation 1 which has the effect of making the discharge of land drainage water in the Cultural Landscape Management Area a discretionary activity.

75. I have also considered the merits of extending the timeline to complete Farm Environment Plans for properties greater than 10 hectares in area and within the Lake Area of the Cultural Landscape/Values Management Area from 1 July 2015 to 1 July 2016.

76. Variation 1 includes a framework to establish a Cultural Landscape/Values Management Area and manage activities within it. These plan provisions include Rule 11.5.21, which includes a new condition in pLWRP Rule 5.77:

"The discharge is not within the Lake Area in the Cultural Landscape/Values Management Area"

The effect of this rule is to make all such discharges a discretionary activity.

77. The section 42A report recommends that land drainage matters are addressed through FEPs.

78. I see it as significant that the adaptability of FEPs to on-site farm conditions is reflected in policies 4.40 and 4.41 of the pLWRP. These policies articulate the primary role of FEPs in *identifying and delivering good environmental practice across a range of farming activities*, and the development of linkages between FEPs and regulatory controls.

79. At page 32, the section 32 report for Variation 1 makes the following comment:

Te Waihora/Lake Ellesmere is highly enriched with nutrients. The lake has a current average Trophic Level Index (TLI) score of 6.8 (classified as hypertrophic), based on monitoring in the middle of the lake, compared to its estimated TLI score of 4 to 5 (eutrophic) when it was in its pre European state. With agricultural development in the catchment, and the accompanying influx of nutrients and reduction in water levels, the lake has undergone a significant regime shift from a macrophyte dominated relatively clear water lake to a de-vegetated turbid water body (Norton et al. 2014).

Despite its highly enriched state, the lake still supports abundant fish and bird communities, and does not exhibit the features, e.g. fish kills, deoxygenation, that are typical of severely degraded deeper lakes (Hughey et al. 2009). Poor water quality, however, fails Ngāi Tahu cultural expectations for a quality fishery even though fish production is good.

In other words the lake is a modified natural ecosystem which is still able to support substantial fish and bird life. This is recognised as an outstanding characteristics of the lake in the National Water Conservation (Lake Ellesmere/Te Waihora) Order 1990. Despite this, the state of the lake is such that it is no longer able to meet cultural needs, and accordingly should be improved to better provide for these needs. While the

achievement of a ‘pre-European’ level of resource quality may be seen as a worthy aspirational goal, it has not been established that this will be necessary to meet cultural expectations or that it can be achieved within a generational timeframe. What is apparent however is that improvement will not occur unless we start somewhere, and it makes logical sense, in terms of efficiency and effectiveness, to have some focus on land and rivers from which contaminants can flow directly into the lake, as well as the overall catchment.

80. Despite the clear need for a focused response to activities within the Cultural Landscape/Values Management Area, control via a discretionary activity is not in my view an efficient method to administer the discharge of land drainage water from farmland. An application for resource consent as a discretionary activity can cover a wide range of environmental effects, and there is the possibility that they may be notified; all of which leads to some uncertainty and cost. In my opinion it would be better in terms of efficiency and effectiveness if this activity were controlled through FEPs, which are already required to be prepared according to separately defined timeframes for the Cultural Landscape/Values Management Area in any case, and which can be adapted to each individual farm situation, at less cost, and (relative to a discharge permit) more readily updated over time in response to new knowledge of practice or of better understandings of the farm situation.

81. In light of the evaluation made above, I endorse the recommendation of the section 42A report to incorporate the discharge of land drainage water with Farm Environment Plans.

Farm environment plans and properties within the Cultural Landscape/Values Management Area

82. Submitters, including NCFF and Te Rūnanga o Ngai Tahu, seek the date of 1 January 2016 (rather than 1 July 2015) as a deadline for the development and implementation of an FEP for properties of 10 ha or more in area and located within the lake area of the Cultural Landscape/Values Management Area, as required by Policy 11.4.12.

83. In my opinion the relief sought is sensible as it is important that these FEPs are done well, to recognise the sensitivity of the lake, and to allow time to build in appropriate responses to matters such as the management of land drainage.

Water allocation

84. With regards to issues related to Water Allocation I have been asked to consider the following points:

1) The appropriateness of setting an allocation limit at 30% of current allocation when we know that this can only be achieved through recharge effects of an irrigation scheme which has not yet been established;
2) The appropriateness of 'clawing back' existing water permits to 85% reliability;
3) The appropriateness of a 'reasonable use' test as opposed to 'demonstrated use' test for establishing annual volumes;
4) The appropriateness of a requirement to surrender 50% of water upon transfer;
5) The appropriateness of making water storage schemes subject to a 'second tier' of approval through the mechanism of a cultural impact assessment.

Table 11 (e) – Allocation Limits

85. The section 42A report (at page 298, paragraph 13.1380) notes that:

> *Adverse effects on stream flows are being observed with current levels of abstraction (estimated on average to be 50% of allocation). Although the current groundwater allocation limits are exceeded by approximately 35%, this would indicate that the existing limits based on 50% of land surface recharge may not be sustainable or support healthy lowland streams.*

This comment is reflected in recommendations to make no substantive changes to the limits in Table 11 (e) other than to specify that they are also targets.

86. In my view to achieve the purpose of the RMA and give effect to Policies B1 and B2 of the NPSFW and Policy 7.3. of the RPS, Variation 1 must set a first stage groundwater allocation target that can be achieved without reliance on augmentation or recharge from an irrigation scheme. Variation 1 sets a groundwater allocation limit of 120 million cumecs, or approximately 30% of the current allocation. This limit is to be implemented if and when groundwater recharge from the operation of the Central Plains Water Scheme occurs, and is understood from reading the section 32[24] report

[24] Section 32 Report. P152

to be based on an estimate of what is required to achieve a minimum flow of 90% of 7D MALF in lowland streams in the catchment affected by groundwater abstraction.

87. On its own the proposed allocation limit for water abstraction, and the claw-backs it would require, does not, in my opinion achieve the purpose of the RMA, does not reflect Objectives 7.2.1 and 7.2.4 of the Canterbury Regional Policy Statement, or Objectives 3.5, 3.10, 3.11, and 3.12 of the pLWRP. Furthermore, the fact that the revised water quantity limit is only proposed to be implemented if and when CPW recharge occurs suggests that the potential economic and social effects of such a dramatic clawback would fail to achieve the purpose of the Act in the mind of the Council in the absence of that recharge occurring.

88. In my opinion it is inappropriate to make water allocation contingent upon the actions of a third party (as predicted to occur at a future time). This is particularly so within a management framework that is meant to give effect to the NPSFW. Such a plan does not make clear the position of the Council and the community if for reasons unforeseen, CPW is not implemented or the recharge does not occur at the rate or in the way that is anticipated. I see it as better, both in terms of the requirements of the Act, and good planning practice to seek an allocation limit for water abstraction that achieves sustainable management of natural and physical resources in the current environment, with a second, increased allocation limit that takes effect if and when CPW recharge occurs.

89. Further work may be required, particularly if it is determined that a reduction in the allocation regime will be required in the absence of recharge from CPW. In the absence of sufficient information or scope to address these matters immediately, it may be that a water allocation regime will need to be introduced by way of a plan change at the same time as a plan change to introduce a regime to reduce N loss, once the information needed for that process becomes available. In the interim the rules in Variation 1 already prevent additional water takes that could result in further over-allocation of water in the catchment.

Policy 11.4.23 and Schedule 10 – Reasonable use

90. The section 42A report, at page 250 recommends adopting an approach to calculating annual volumes for water allocation based on a reasonable use test.

91. The distinction between 'demonstrated use' and 'reasonable use' is important because many abstractors do not exercise their consents at full allocation, particularly with older permits which don't have annual volumes based on the most recent 'reasonable use' modelling.

92. Relevantly, Objective 3.9 of the pLWRP includes the following:

> *Abstracted water is shown to be necessary and reasonable for its intended use and any water that is abstracted is used efficiently.*

93. In my opinion it is better to apply a test of 'reasonable use' than demonstrated use. The evidence of Mr Curtis[25] describes the shortcomings of a 'demonstrated use' approach, including the manner in which demonstrated use is not an accurate assessment of need as it will reflect the short-term rainfall conditions. Such an approach has the potential to result in a 'use it or lose it' mentality, which will not encourage reduced water use, particularly if farmers see that they have to over-use water to ensure sufficient allocation to support their operations in drier years.

Policies 11.4.26, and Schedule 10 – Reliability

94. At page 249 (para) 13.109, the section 42A report notes that '…*adjustment to the level of reliability to meet demand in 8.5 years out of 10 is one component of an integrated solution to reduce allocation down to the proposed limits*…. Reference to 8.5 years out 10 is recommended to remain.

95. The evidence of Dr Hume[26] and Mr Curtis[27] describes how access to more reliable water also supports a more efficient and less reactive approach to water management and ultimately facilitates more sustainable resource use. Dr Hume also explains how established land uses such as horticulture or arable farming that are sensitive to lack of water at critical times, will result in a higher risk of crop failure, and is likely to discourage uptake of these farm types relative to more resilient pasture based farming system[28]. In the overall context of the Variation, I see loss of flexibility as an undesired outcome, at a time when farming as an industry is attempting to adapt to capping and reduction of nitrogen emissions across the catchment.

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[25] Evidence of Andrew Robert Curtis on Behalf of Irrigation New Zealand Limited – August 29th 2014
[26] Evidence of Dr Lionel Hume (paras 18 – 21)
[27] Evidence of Andrew Robert Curtis on Behalf of Irrigation New Zealand Limited – August 29th 2014
[28] Evidence of Dr Lionel Hume, August 29th 2014 (paras 18 – 22)

96. As far as I am aware, the cumulative effects of reducing reliability of water supply have not been considered in the section 32 report, including effects on the ability of farmers to exercise enterprise flexibility to reduce nitrogen losses, and consequent reduced ability to give effect to the RPS and NPSFW and achieve the objectives and policies of the pLWRP.

97. Finally, I point out that the approach used in Variation 1 is inconsistent with the pLWRP, which applies 9 in 10 year reliability via Schedule 10 (Reasonable Use Test). The parameters of Schedule 10 were developed following considerable efforts and debate by a number of very qualified and informed people, and in my opinion, clear justification is required if changes are to be made to them.

98. In view of the identified problems with the allocation regime, the desirability of maintaining flexibility in land use, and in the interests of achieving an efficient and effective outcome, a reduction to 8.5 year reliability does not appear sufficiently justified in this instance.

Transfers

99. At page 310, the section 42A report recommends deletion of Policy 11.4.22(b), which restricts transfer of water from down plains to up plains. Reference to 50% transfer of water is recommended to remain except in relation to community water supply.

100. The evidence of Mr Curtis[29] illustrates how the transfer of water permits results in more efficient use of water resources, creates opportunities for economic gain that would not otherwise occur, and creates opportunity for environmental gains as a portion of water is surrendered[30].

101. In practical terms, control of water transfers as a method to address over-allocation is limited in effectiveness in addressing over-allocation in two ways:

1) It relies on people transferring water permits before it can have any effect; and;
2) It may still result in increased abstraction in the catchment if people who are currently not utilising their water permits transfer them.

[29] Evidence of Andrew Robert Curtis on Behalf of Irrigation New Zealand Limited – August 29th 2014
[30] Evidence of Andrew Robert Curtis on Behalf of Irrigation New Zealand Limited – August 29th 2014

102. Despite these limitations, I consider that water transfers have some potential to realise environmental benefits, as long as the amount of water required to be surrendered is appropriately weighted so as not to discourage the activity (through a perceived loss of value or unfair taking) on one hand, while achieving appropriate management of adverse environmental effects (including reduced actual abstraction) on the other. In other words the policy, as with any policy, should include the right balance of incentives if it is to work properly.

103. Finally, I note that Council's decisions on the pLWRP have already dismissed the appropriateness of rules in a plan requiring a blanket surrender of water when transferring water permits. The notified management framework appears inconsistent with that decision[31].

104. In view of the identified problems with a 'blanket' requirement to surrender 50% of allocated water upon transfer, and considering past decisions of the Council on the same matter, I consider that an alternative solution such as restricting the water transferred to a portion of the allocation such as that which is used in an average rainfall year rather than the ability to transfer the full allocation including that water allocated to ensure 90% reliability provides a fairer and more effects-based framework, which is more likely to result in the environmental benefits of water transfers being realised, thereby creating a better outcome, both as a planning solution, and in terms of the requirements of the Act.

Water storage - Policy 11.4.32(c)

105. The section 42A report recommends various changes to Policy 11.4.32, including a recommendation to modify requirements around cultural impact assessments.

106. In my opinion, the recommendation is correct in the circumstances; while it is not appropriate to fetter the discretion of the Council, it is quite appropriate to require decision makers to have regard to a cultural impact assessment in these circumstances.

Michael Bennett

29th August 2014

[31] Report and Recommendations of the Hearing Commissioners on the Proposed Canterbury Land and Water Regional Plan.

CANTERBURY ARABLE CROPPING

Key results from the Ministry for Primary Industries 2012 arable monitoring programme

KEY POINTS

- Crop yields and quality were much better in 2011/12 than in the previous year due to good growing conditions. Wheat yields reached 10.6 tonnes per hectare on average.
- Farm profit before tax for the model increased 136 percent to $448 700 in 2011/12 mainly due to higher yields increasing the amount of crop on hand. Higher prices for wheat and herbage seeds also contributed.
- Arable farmers are expecting to achieve high profit levels again in 2012/13, with a farm profit before tax of $425 500 anticipated for the model. A lift in cropping revenue is budgeted due to an increase in cropping area and a rise in prices for small seed crops. A large crop carryover from 2011/12 will help with cash flow.
- Investment in irrigation, either in new systems or upgrading existing systems, is deemed by many to be essential to maintain business viability.
- Arable farmers are cautiously optimistic as world food demand increases, while locally, the opportunities for dairy support increase.

Editor's Note

At the time of publication in mid-August, forward contract prices for wheat and barley crops harvested in 2013 are higher than those offered at the time of data collection in May-June 2012. For example, forward contract prices for feed wheat have risen from $365 to $400 per tonne delivered. This is a result of increasing global prices caused by overseas drought. These price lifts should further improve the budgeted financial outcome for arable farmers in 2012/13, above that presented in the following report.

Table 1: Key parameters, financial results and budget for the Canterbury arable cropping model

Year ended 30 June	2008/09	2009/10	2010/11	2011/12	2012/13 budget
Total effective area (ha)	300	300	300	300	300
Effective cropping area (ha)	259	263	253	261	276
Total crop revenue ($)	844 400	885 000	841 300	1 086 700	1 132 800
Sheep opening stock units	859	1 759	1 459	1 219	1 289
Lambing (%)	120	130	125	130	130
Gross farm revenue ($)	1 012 000	1 073 100	1 005 400	1 272 100	1 270 700
Farm working expenses ($)	597 400	566 000	567 000	610 500	640 300
Farm profit before tax ($)	198 000	264 300	190 400	448 700	425 500
Farm surplus for reinvestment [1]($)	48 200	125 800	208 900	229 100	401 300

Notes
The Canterbury arable cropping model is based on an owner-operator business structure.
1 Farm surplus for reinvestment is the cash available from the farm business, after meeting living costs, which is available for investment on the farm or for principal repayments. It is calculated as farm profit after tax plus depreciation plus stock value adjustments less drawings.

Table 2: Canterbury arable cropping model crop areas

Year ended 30 June	2010/11 (ha)	2011/12 (ha)	2012/13 budget (ha)
Wheat	82	79	89
Barley	33	33	36
Other cereals	4	4	3
Grass seeds	41	46	52
Clover seeds	12	16	15
Vegetable/brassica seeds	20	17	18
Other seeds	11	19	11
Pulses	22	9	10
Silage crops	12	25	25
Process/fresh vegetable crops	16	13	17
Total crop area	**253**	**261**	**276**
Effective area	300	300	300
Percent of effective area in crop	84%	87%	92%

Table 3: Canterbury arable cropping model budget

	2010/11	2011/12		2012/13 budget	
	Whole farm ($)	Whole farm ($)	Per ha ($)	Whole farm ($)	Per ha ($)
Revenue					
Cereals	358 500	411 650		488 650	
Small seeds	332 100	362 550		503 000	
Other crops	97 500	96 000		111 700	
Process/fresh vegetables	58 000	54 300		54 400	
Land leased for cropping	7 000	14 000		25 850	
Crop residues	55 600	48 400		57 000	
Change in value of crop on hand	–67 400	99 800		–107 800	
Total crop revenue	**841 300**	**1 086 700**	**3 622**	**1 132 800**	**3 776**
Sheep income (including wool)	242 600	243 200	811	209 600	699
Grazing income	63 500	45 300	151	52 100	174
Other farm income	18 000	13 200	44	13 000	43
Less:					
Sheep purchases	123 600	127 000	423	115 400	385
Stock value adjustment	–36 400	10 700	36	–21 400	–71
Gross farm revenue	**1 005 400**	**1 272 100**	**4 240**	**1 270 700**	**4 236**
Farm working expenses	**567 000**	**610 500**	**2 035**	**640 300**	**2 134**
Cash operating surplus	**438 400**	**661 600**	**2 205**	**630 400**	**2 101**
Interest	173 500	143 900	480	133 300	444
Rent and/or leases	0	0	0	0	0
Depreciation	74 500	69 000	230	71 600	239
Farm profit before tax	**190 400**	**448 700**	**1 496**	**425 500**	**1 418**
Tax	98 100	112 000	373	155 000	517
Farm profit after tax	**92 300**	**336 700**	**1 122**	**270 500**	**902**
Allocation of funds					
Add back depreciation	74 500	69 000	230	71 600	239
Reverse stock value adjustment	103 800	–110 600	–369	129 200	431
Drawings/living expenses	61 800	66 000	220	70 000	233
Farm surplus for reinvestment[1]	**208 900**	**229 100**	**764**	**401 300**	**1 338**
Reinvestment					
Net capital purchases	38 000	86 000	287	40 000	133
Development	92 000	146 000	487	25 000	83
Principal repayments	60 700	72 800	243	78 000	260
Farm cash surplus/deficit	**18 200**	**–75 700**	**–252**	**258 300**	**861**
Other cash sources					
New borrowings	58 000	78 500	262	0	0
Introduced funds	0	0	0	0	0
Off-farm income	0	0	0	0	0
Net cash position	**76 100**	**2 800**	**9**	**258 300**	**861**
Assets and liabilities					
Farm, forest and building (opening)	7 600 000	7 600 000	25 333	8 700 000	29 000
Plant and machinery (opening)	496 900	460 400	1 535	477 300	1 591
Stock valuation (opening)	220 900	184 500	615	195 300	651
Crop valuation (opening)	631 900	564 500	1 882	664 300	2 214
Other farm related investments (opening)	0	0	0	0	0
Total farm assets (opening)	**8 949 700**	**8 809 400**	**29 365**	**10 036 900**	**33 456**
Total liabilities (opening)	1 931 600	1 928 900	6 430	1 929 700	6 432
Total equity	**7 018 100**	**6 880 500**	**22 935**	**8 107 200**	**27 024**

Notes
1 Farm surplus for reinvestment is the cash available from the farm business, after meeting living costs, which is available for investment on the farm or for principal repayments. It is calculated as farm profit after tax plus depreciation plus stock value adjustments less drawings.

Table 4: Canterbury arable cropping model expenditure

	2010/11	2011/12		2012/13 budget	
	Whole farm ($)	Whole farm ($)	Per ha ($)	Whole farm ($)	Per ha ($)
Farm working expenses					
Permanent wages	45 000	49 800	166	51 000	170
Casual wages	6 000	6 000	20	6 000	20
ACC - employees	900	1 200	4	1 350	5
Total labour expenses	**51 900**	**57 000**	**190**	**58 350**	**195**
Contracting (including harvesting/drying)	27 000	28 500	95	19 800	66
Animal health	4 200	4 500	15	4 500	15
Breeding	0	0	0	0	0
Electricity	21 600	18 000	60	24 600	82
Feed (hay and silage)	9 000	9 000	30	9 000	30
Feed (crops)	0	0	0	0	0
Feed (grazing)	4 200	5 400	18	3 600	12
Feed (other)	2 100	1 800	6	1 800	6
Fertiliser	112 950	110 550	369	126 250	421
Lime	2 400	7 550	25	7 550	25
Freight	20 100	24 000	80	27 000	90
Seed dressing	29 100	36 000	120	34 500	115
Seeds	35 260	30 000	100	31 800	106
Shearing costs	6 300	6 300	21	6 500	22
Weed and pest control	85 050	94 500	315	96 300	321
Fuel	32 400	38 700	129	38 700	129
Vehicle costs (excluding fuel)	24 900	23 400	78	23 100	77
Repairs and maintenance	35 700	40 800	136	35 700	119
Total other working expenses	**452 260**	**479 000**	**1 597**	**490 700**	**1 636**
Communications (phone and mail)	4 200	4 500	15	4 500	15
Accountancy	6 000	6 000	20	6 000	20
Legal and consultancy	3 600	3 600	12	4 500	15
Other administration	4 800	4 800	16	4 800	16
Rates	11 400	11 700	39	14 400	48
Insurance	16 500	16 800	56	27 000	90
Water and related charges	8 400	16 800	56	16 800	56
Other expenditure (including ACC - owners)	7 960	10 300	34	13 250	44
Total overhead expenses	**62 860**	**74 500**	**248**	**91 250**	**304**
Total farm working expenses	**567 010**	**610 500**	**2 035**	**640 300**	**2 134**
Calculated ratios					
Economic farm surplus (EFS)[1]	288 900	517 600	1 725	483 800	1 613
Farm working expenses/GFR[2]	56%	48%		50%	
EFS/total farm assets	3.2%	5.9%		4.8%	
EFS less interest and lease/equity	1.6%	5.4%		4.3%	
Interest+rent+lease/GFR	17%	11%		10%	
EFS/GFR	29%	41%		38%	
Wages of management	75 000	75 000	250	75 000	250

Notes
1 EFS is calculated as follows: gross farm revenue less farm working expenses less depreciation less wages of management (WOM). WOM is calculated as follows: $31 000 allowance for labour input plus 1 percent of opening total farm assets to a maximum of $75 000.
2 Gross farm revenue.

FINANCIAL PERFORMANCE OF THE CANTERBURY ARABLE CROPPING MODEL IN 2011/12

Farm profit before tax increased 136 percent to $448 700 for the year ended June 2012. This was influenced by good yields and prices for cereals and seed crops and a significant lift in the volume of crop on hand.

The model size remained at 300 hectares, with the crop area increasing 8 hectares to 261 hectares.

NEAR RECORD YIELDS PROPEL CROP REVENUE

Total gross revenue from crops, after adjustments for stock on hand, increased 29 percent to $1.09 million in 2011/12. More crops were grown, in particular, silage and seed crops.

Favourable climatic conditions during the 2011/12 growing season resulted in above-average yields for most crops. Wheat yields were up around 3 tonnes per hectare on last season, at 10.6 tonnes per hectare. Ryegrass seed yields also exceeded expectations, at 1760 kilograms per hectare.

Higher production resulted in higher closing stocks of feed wheat and barley at year end. Most of the 2011/12 feed wheat and barley crops were contracted, meaning buyers were in no rush to purchase free-market feed grain. Conversely, milling wheat was in short supply pre-harvest, so was delivered to the mills steadily during the first half of 2012, helping to draw down stocks from the previous year.

Cereal production increased significantly in 2011/12 due to an increase in planted area and above-average yields in the main producing regions. The Arable Industry Marketing Initiative farm survey suggests 2012 national production for feed wheat was 415 100 tonnes, up 65 percent, while feed barley production was 419 400 tonnes, up 36 percent on 2010/11.

Quality maintained during frustrating harvest

The 2012 harvest season in Canterbury was continually disrupted by wet weather, in particular, during February. However, expected losses in grain and seed quality generally did not eventuate. Milling wheat had slightly below average protein levels but excellent protein quality.

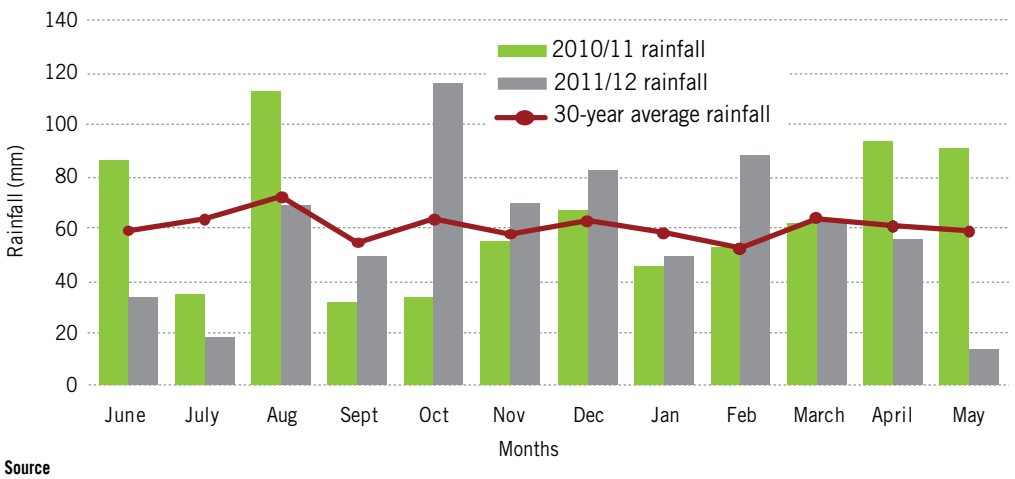
Lower than average temperatures during grain fill in December 2011 and January 2012 prevented sprouting and helped starch levels to build up in feed grains. Germination tests of seed crops to date have been satisfactory. However, grain and seed that went into storage with higher than ideal moisture contents are at risk of losing quality during the year.

Prices improve

Contract prices for cereals were good at the beginning of the 2011/12 season, following strong global prices towards the end of 2010/11. Farmers were able to secure contracts for premium milling wheat at $465 per tonne delivered; feed wheat at $415 per tonne delivered; and feed barley at $390 per tonne delivered.

Free-market prices for feed wheat and barley weakened to around $350 per tonne in the first half of 2012 due to over supply from good yields.

Figure 1: Mid-Canterbury rainfall



Source
NIWA (Winchmore).

Average prices received across the monitored farms lifted about $30 per tonne for wheat to $400 per tonne in 2011/12 but remained stable for barley at $370 per tonne.

Herbage seed prices rose nearly 10 percent across a range of species at up to $2.20 per kilogram for proprietary perennial ryegrass and up to $5.50 per kilogram for proprietary white clover cultivars.

Lamb trading margins in 2011/12 were excellent at $35 to $55 per head and, consequently, additional lambs were finished. The model had 1500 finished lambs in 2011/12 compared with 1400 in the previous year.

EXPENSES CONTINUE TO CREEP

Total farm working expenses rose 8 percent on 2010/11 levels to $610 500, or $2035 per hectare, influenced by an increase in crop area and a wetter growing season.

Frequent rain events during the growing season led to a lift in expenditure on weed and pest control by 11 percent to $94 500, as more herbicides, growth regulators and fungicides were used. Seed dressing increased 24 percent to $36 000 due to increased small seed areas and yields plus delayed dressing of the 2011 harvest.

Fuel expenditure rose 19 percent to $38 700 due to increased crop area plus the need for more crop drying because of higher moisture content in seed crops and grains at harvest.

Freight expenses were up 19 percent to $24 000 due to relatively more milling wheat being delivered to the mills (some earlier than usual), while the price of fuel also increased.

Water charges doubled to $16 800 due to a combination of the first full season of annual charges for some new irrigation schemes, and new annual charges on irrigation consents by Environment Canterbury.

The wet season helped to reduce electricity expenses by 17 percent to $18 000, with less irrigation needed.

GOOD NET RESULT

Due to the lift in revenue in 2011/12, the farm working expenses to gross farm revenue ratio dropped to 48 percent from 56 percent in 2010/11.

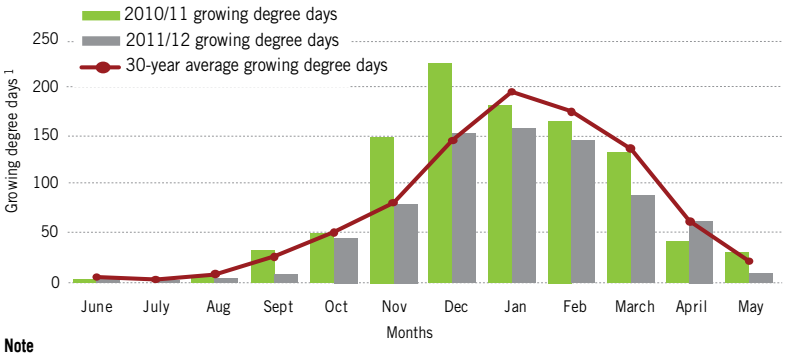
Interest expenses for the model fell 17 percent from $173 500 to $143 900, despite new borrowing in 2010/11. Term interest rates dropped to an average of 6.6 percent. Most farms are on short-term fixed-rate contracts or floating rates, which means interest expenses are reducing, thereby helping farmers to pay off overdrafts and make principal repayments.

Farm profit before tax increased 136 percent to $448 700. Most farmers have sought to reassess their provisional tax payments for 2011/12 within the year, rather than carrying forward a large tax liability into 2012/13. The model reflects this position, with tax payments of $112 000 made in 2011/12.

The model reported a satisfactory farm surplus for reinvestment at $229 100, allowing for significant investments in capital items and development work on-farm. Typical capital purchases by the monitored farms were tractors, cultivation implements, motorbikes and combine harvester upgrades. Development is mainly in irrigation, sheds and silos.

Farmers believe that farm values have increased because of investment in irrigation and a short-lived surge in the property market at the end of 2011 and beginning of 2012. Land and building values for the model increased during 2011/12 to reach $29 000 per hectare at year end, up from around $25 000 at the start of the year. Land values for arable farms of course vary greatly across the Canterbury region, depending on soil type and whether they are dryland or irrigated farms.

Figure 2: Mid-Canterbury growing degree days



Note
1 GDD – growing degree days. GDDs are calculated by taking the average of the daily high and low temperatures each day compared with a baseline (usually 10 degrees centigrade). They help to predict the date that a flower will bloom or a crop reach maturity.
Source
NIWA (Winchmore).

BUDGET FINANCIAL PERFORMANCE OF THE CANTERBURY ARABLE CROPPING MODEL IN 2012/13

Arable farmers are anticipating another excellent financial outcome in 2012/13, with a profit before tax of $425 500 budgeted for the model.

HIGH REVENUE TO BE MAINTAINED

Total crop revenue is anticipated to increase 4 percent to $1.13 million in 2012/13, driven by increased crop area and a lift in prices for small seed crops.

The contracted area for ryegrass production for export is up significantly in the Canterbury region for the 2013 harvest, due to a seasonal supply shortfall in Europe. Proprietary ryegrass and white clover contract prices are up 20 percent and 15 percent respectively, albeit constrained by the high New Zealand dollar. Contracted production and prices of specialist vegetable seed are not expected to change in 2012/13, due to balanced supply and demand.

Income from grazing is expected to remain relatively stable, mainly for dairy support. The model is budgeting on lower sheep income due to a reduction in the number of lambs traded and in the expected trading margin to $30 per head at best.

Large opening feed grain stocks

Following good yields in the 2012 harvest, there are near record opening stocks of feed grains both in New Zealand and Australia. Forward contract prices for 2013 crops are being reported at $365 per tonne delivered, as at June 2012.

High protein bread wheat and low protein biscuit wheat are in short supply. Forward contract prices for 2013 crops offer a higher premium than usual for premium milling and biscuit wheat, at $430 and $420 per tonne respectively.

Dairy support evolving

Fewer dairy cows were wintered in 2012 across the monitored farms compared with recent years. This is likely due to good feed surpluses on dairy run-offs, plus extra silage cut from milking platforms.

Arable farms grew more silage in 2011/12 to sell to dairy farms including grass and maize silage, and lucerne baleage. This trend is set to continue, as shown by the increase in total crop area for silage from 5 percent in 2010/11 to 9 percent in 2012/13.

MODERATE INCREASE IN EXPENDITURE

Farmers anticipate being able to hold expenditure in 2012/13 to an overall 5 percent increase. This would hold the ratio of farm working expenses to gross farm revenue at 50 percent, which is considered a healthy level.

The main drivers for the expected lift in farm working expenses are:

- a return to typical electricity use for irrigation;
- increased freight due to high production in 2011/12;
- higher fertiliser prices;
- increased compliance costs especially with regard to resource consents; and
- higher insurance premiums, in particular for farm buildings.

Industry commentators expect the ratio of farm working expenses to gross farm income to rise to a more usual 55 percent to 60 percent in 2013/14, with lower revenue expected from the sale of the 2013 crop due to lower contract prices.

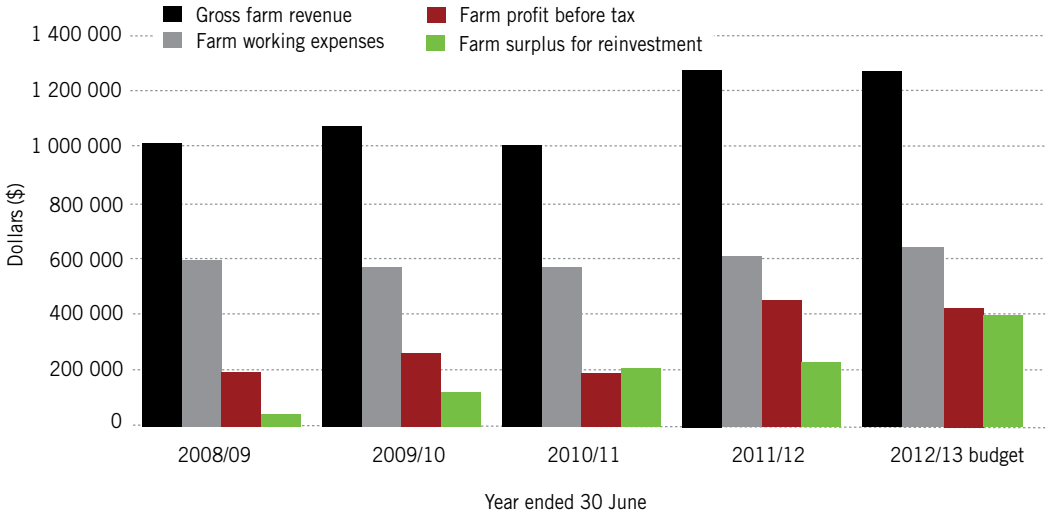
NET RESULT REMAINS POSITIVE

Arable farmers are anticipating another excellent financial outcome in 2012/13, with a profit before tax of $425 500 budgeted for the model. Accountants and farmers are anticipating another year of increased tax payments and are making provisions accordingly.

Despite the lift in tax payments, farmers anticipate substantial farm surpluses for reinvestment. These surpluses are likely to be used to repay debt.

Development expenditure is expected to reduce after a two- to three-year period of irrigation investment on the monitored farms. Farmers now expect a period of consolidation, after these recent infrastructural developments.

Figure 3: Canterbury arable cropping model profitability trends



INDUSTRY ISSUES AND DEVELOPMENTS

FARMER MORALE AND BUSINESS VIABILITY PLANS

Morale amongst most arable farmers has been boosted by good financial outcomes in 2011/12 and prospects of sustained profitability and good cash flow in 2012/13.

Many farmers in the Canterbury region regard irrigation as essential. It sustains the viability of their business by protecting from major financial losses in drought years and provides consistent production volumes that buyers can rely on. A viable business, underpinned by irrigation, gives more chance of succession within the family farming business. Generally, farmers will invest in irrigation rather than in more land.

Some farmers are holding back from other farm development and capital expenditure in anticipation of pending irrigation schemes in the Canterbury region. By managing debt now, they hope to have stronger balance sheets later when they need to secure finance for irrigation development.

Proactive farmers have invested in on-farm drying systems for drying grain and seed crops harvested in high-humidity weather. Seed with high moisture levels will spoil during storage. Growers who did not have this key infrastructure during the wet 2012 harvest have realised their economic vulnerability. Many are now investigating the development of drying systems.

Arable farmers are constantly monitoring the economics of dairy farming. Consistent cash flow, less harvest risk, ease of marketing, profitability and farm succession are the main reasons cited by farmers when considering conversion to dairy production.

FARMER RESPONSE TO INPUT PRICE CHANGES AND SHORTAGES

Each year, farmers have more working capital committed but the same inherent risks of crop failure. Many are choosing crop options that involve less working capital outlay and less production risk, while saving on overdraft interest. Examples are forage crops for contract grazing and silage crops sold standing. Moreover, these options have fewer labour requirements and better cash flow, for similar income.

Increasingly, arable farms have dairy farm neighbours. This provides further opportunities for dairy support where cartage and/or stock walking distance is minimal. This reduces the amount of fuel, time and labour expenses incurred by the arable farmer, compared with delivering grain and seed to the main centres. It reduces the price of "landed" supplementary feed to the dairy farm and the distance travelled when regularly checking on stock grazed off-farm.

Most dairy farms require support from other farms in terms of grazing and supplementary feed. Each dairy conversion brings new opportunities for arable farmers to increase trade with dairy farmers, giving arable farmers alternative markets for their produce.

Seed companies are aware of this competition for land use and are having to pay higher prices to secure land for seed multiplication.

Grass grub control

Farmers are concerned about the potential deregistration of diazinon in New Zealand as a result of the on-going review of this organophosphate by the Environmental Protection Authority. Diazinon is used by arable farmers to control grass grub, a significant pest of several crops, and is deemed to be the most effective product currently available.

ENVIRONMENTAL AND NATURAL RESOURCE MANAGEMENT

Over two-thirds of the monitored farms are irrigated and half of these have been undergoing irrigation reinvestment or development during 2011/12. If short of irrigation water, farmers are watching for opportunities to contract additional volumes, in expectation that the growing dairy industry will require more water in the future. Recognising that water allocations are limited, farmers are upgrading irrigation hardware and investing in new technologies to increase water-use efficiency.

Arable farmers understand and respect the concept of using nutrients efficiently to prevent losses from farm systems and protect water quality. There is some trepidation about how regional councils might set and manage limits for water quality in the future as the national policy statement for fresh water management is implemented. Farmers are concerned about potential compliance costs. They are also concerned about what tools or instruments might be used in a regulatory plan to measure nutrient loss and their likely accuracy.

INFORMATION ABOUT THE MODEL

Canterbury is the largest arable cropping area in New Zealand. The Canterbury arable cropping model represents approximately 500 properties larger than 100 hectares located throughout Canterbury, of which about half are in the mid-Canterbury region.

The model is created from information drawn from 18 arable farms and a wide cross-section of agribusiness representatives. The aim of the model is to typify an average arable farm for Canterbury. Budget figures are averaged from the contributing properties and adjusted to represent a real arable farm. Income figures include income from crops and stock, off-farm income, new borrowing, and other cash income. Expenditure figures include costs of production, debt, leasing, drawings, and development and capital purchases.

The monitored farms generate more than 50 percent of their income from growing crops. They are generally either more than 75 percent irrigated or are located in usually reliable rainfall areas. Most properties grow a combination of crops, which are grouped in the budget into cereals, small seeds (including grass, clover and vegetable seeds), process vegetables, silage and other crops. Most have some type of stock enterprise as an integral part of the system, for example, grazing, trading and/or breeding stock.

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