

1 My name is Sven Koops and I am providing this submission as an addendum to Robert Johnston's submission of 10 March 2016.

I am a dairy farmer at Saltwater Creek (North Canterbury, Ashley) and together with my partner Glenys Kerr we are running the family dairy farm comprising of several blocks encompassing around 500 ha in total. We are third generation dairy farmers in this area. My son who is taking a strong interest is likely to be involved in the business in the future. The dairy platform is located along the northern bank of Saltwater Creek bordering Pegasus Bay in the east and State Highway 1 in the west. Personally, I hold a Bachelor of Agricultural Science (1st Class Honours) and a PhD in Agribusiness Management, both from Lincoln University. I have held positions with the United States Department of Agriculture (Foreign Agricultural Service), Fonterra Co-operative Group Limited and Ernst & Young. I have a sound scientific understanding of the issues related to nutrient management and I believe to understand the long term implications of regulatory and policy frameworks.

My primary concern in this submission is with the selective application of science and the lack of understanding of the long term negative implications of Plan Change 5. These negative implications I believe extend to the achievement of the Fresh Water Quality objectives of the LWRP. This is important because it will affect my own credibility within the community I live in. I am compelled, hence, to ensure that my reputation as a member in this community is not tarnished.

2 I want to add to Robert Johnston's comments on the Overseer nutrient budgeting software in his paragraphs 2, 3, 4, 5, and 6. I have been using the software since 2010, at a time when we took over the dairy farm. The issues with the program now are in principal the same as they have been in the past. While quite interesting to make comparisons between different input levels such as cow numbers or fertiliser input to determine the relative changes in nutrient leaching, the program seems far less able to make absolute predictions, in fact, it is probably still unable to indicate any meaningful leaching rates at current. I offer two specific examples to illustrate the issue.

- a) In a recent Overseer version change an "irrigation module" was introduced. Under a spade in the ground method (this is the method recommended widely in the past where irrigation timing is determined by the driest soils within an irrigation sector) my N leaching to water is in excess of 120 kg/ha/yr. Compare that with the prior Overseer version where my leaching was below 20. Upon choosing to use the most advanced soil moisture monitoring and irrigation timing and volume methodology in the new irrigation module I again achieved leaching below 20.

The issue here is as follows: Were I to believe the Overseer leaching rate of 120 under the "spade" method, then I could gain an enormous amount of N with the conversion to the more sophisticated method. Given that I have available for irrigation about 3 mm/d/ha over the entire farm, it becomes quickly obvious that the output data from Overseer is absolutely nonsensical. On my predominantly sandy soils I am almost always, during the norwester season, water or soil moisture deficient. Furthermore, my N available for plant growth as suggested in Overseer by switching to the sophisticated approach should yield a lot of additional pasture growth. Again, reality on my farm is that this is not the case.

It indicates to me that in the algorithm of the Overseer software a serious glitch has been incorporated (inadvertently?) when introducing the irrigation module.

- b) I would now like to draw the attention to a recent article in the Dairy Exporter (March 2016) "Finding the missing nitrogen" alluding to work by Dr Ranvir Singh (senior lecturer in environmental hydrology and soil science at Massey University) in which he reports that "Nitrogen loads measured in rivers are significantly smaller than estimates by Overseer",

“The difference in those figures is likely because of the nitrogen reduction process that happens in the subsurface”, “The capacity of land for denitrification is variable”, and “has opened the door to many management questions and has widened the scope for further research”. The research is being (has been) conducted in collaboration with the Horizons Regional Council.

It is in my view very unfortunate that Overseer measures the N lost to the water by assuming that any N leaching past the root zone **will** end up in waterways. Overseer, by design, completely ignores the processes that Dr Singh is researching which appear to operate below the root zone but above aquifers or before water ways, so to speak. For a program that its owners pride themselves on being world leading this research proves to be simply devastating. It represents a very very serious (inadvertent?) omission in what should be a whole system scientific approach and leads to two problems: (i) the N loss predictions by Overseer are in many cases overestimated, (ii) mitigation measures such as good management practices are equally overestimated in their presumed effect, which in itself worsens any cost-benefit analysis.

A cost-benefit analysis is not simply a theoretical construct. It has real consequences. Take, for example, the irrigation module again. A conversion to centre pivot with soil moisture probes would suggest a substantial reduction in N leaching to water vis-à-vis border dyke. However, how certain can we be in the predictive capability of Overseer in reducing the absolute N leaching when aquifers directly beneath farm land that has been border dyke irrigated for 35 years shows N levels in the aquifer at 0.1 ppm (our farm at Tulls Road) and when Dr Singh specifically identifies sub root zone N processes?

I cannot rid myself of the suspicion that political considerations are mandating which research is considered helpful in promoting the regulatory changes aimed for by ECAN when (a) Overseer does not consider N processes below the root zone, and (b) actual N levels in aquifers are not considered either, or only if they are elevated.

Investments in irrigation infrastructure are underway everywhere in Canterbury with a clear expectation that water quality will be affected dramatically and positively. In other words, we as a society expect from the changes made that water quality outcomes will significantly improve. It is my view, supported by ECAN scientists and also my group of fellow farmers in the area, that the expected improvements in leaching as a result of good management practices will not materialise to the degree expected.

At this point I will provide additional commentary and expand on Mr Johnston’s point 13.

3 Plan Change 5, while at face value appears to tighten the rules even further, in fact softens the current rules and raises the level of unfairness between high leaching and low leaching operators. It is once again suspected that the big dairy farming lobby through Fed Farmers, Dairy NZ, Irrigation companies etc. has been able to protect its peers and ensure it can continue to operate virtually unchecked. The problem is that in a few years time Plan Change 5 will look like a Pyrrhic victory. It simply provides more time to those that have to have high stocking rates and high production objectives because of past investment choices. The outcome in the next review cycle will be that dairy farmers are still not doing enough and the wrath of society will hit hard, even those that have a much lower leaching profile. Why am I so certain of this?

I predict that Plan Change 5 is softening the currently operational LWRP. Plan Change 5 is likely to slow the progress towards the Fresh Water NPS if not allow further degradation in the meantime.

Through the use of good management practices Plan Change 5 will not allow a reduction in N leaching by reducing stocking rates and fertiliser inputs, two of a small group of the alleged biggest contributors to N leaching. This is non-sensical and results in a very unfair situation. Through the introduction of the GMP Baseline, high leaching farms can continue to leach highly provided they apply good management practices, whereas low leaching farms **have** to apply good management practices also, but with no ability to increase their leaching profile, even if all good management practices and possibly more are implemented. Furthermore, the ability or incentive to reduce stock numbers or fertiliser input in lieu of implementing all good management practices to reduce leaching has become almost irrelevant in Plan Change 5. This situation is unfair punishing those that have been running much more sustainable extensive stock operations or those that are prepared to simply cut cow numbers, which is a 100% sure way of reducing N leaching. That is, those farms that have been operating frugally, utilising New Zealand's climatic advantages for growing pastures. Even though they will have to implement good management practices they can never increase their leaching profile, e.g. **not** from 10 kgN/ha/yr to 15 kg N/ha/yr, whereas those leaching at 30 or 40 or more **can**...This is a matter of gross unfairness. But it gets more sombre....

The reality of good management practices should be sobering to those that are expectant of considerable improvements. A sustainable milk plan or FEP incorporating good management practices is a paper exercise, mostly. For example, Dairy NZ has been paying consultants NZ\$1,000 to develop a plan for each dairy farm. The exercise takes 1 day and judging by my dialogues and my own experience with neighbours requires almost no significant changes to operations. Some processes may need changing but by and large things will continue. Transposing that situation onto 80% of dairy farmers will mean that the N loss reductions **will** be in a similar smallish magnitude – not the big reductions society is asking for.

What will this mean to N leaching? Well, if we assume that N leaching is bad now, and if we assume that farms with high baselines can continue with current stocking rates and fertiliser applications, then good management practices will do little to turn the N leaching story around. So my forecast is that the situation will not improve materially. This would indeed be a serious outcome because Zone Committees at the next review cycle will be inclined to put the spotlight on dairy farmers again – and rightly so and more so!

In fairness to those operators that have been operating sustainable operations for family generations, showing low leaching profiles, not pushing their operations towards the limit of zero marginal economic returns, Plan Change 5, as it stipulates its GMP baseline and adds additional questionable resource consent triggering scenarios, should not go forward without addressing the shortcomings of Overseer and the favouring of large intensive dairy operations.

Is this really the prediction that can be reliably made. As per a recent conversation with an ECAN scientist----'The Europeans have been struggling with this problem for two decades and no matter "how they skin the cat" the only solution that is sure to yield results is to restrict inputs. New Zealand will likely come to the very same conclusion in due course.'

My life as an operator would be made easier if I had input restrictions applied. I would look for pasture species that responded better to N fertilisers, I would look for cows that produced more and leached less. Currently, my estimate is that every dairy farm will spend NZ\$20,000 p.a. in new costs - -,compliance, auditing and "paper work" cost and this before any capital investment that might be required. Multiplied by say 10,000 farmers we have an annual pool of NZ\$ 200,000,000. And that is for the dairy sector alone-- money spent on compliance when it should be spent on science!