SFF-Fertigation Project

An Advanced Tool for Environmental and Economic Sustainability of NZ Pastoral Farming Systems

October 15th

IrrigationNZ
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Agriculture & Investment Services
Ministry for Primary Industries
Manatū Ahu Matua

Ballance agri-nutrients TOGETHER, CREATING THE BEST SOIL AND FEED ON EARTH

Manaaki Whenua Landcare Research

fertigation systems

MOLLOY AGRICULTURE LIMITED

LINCOLN UNIVERSITY
TE WHARE WĀNAKA O AORAKI

PĀMU FARMS OF NEW ZEALAND

IRRIGATION NEW ZEALAND

Fertigation

Fertigation is the practice of adding fertilisers (liquid or soluble solids) to irrigation water and distributed through the irrigation system. Although not new to agriculture globally, fertigation is more commonly practiced in horticulture and viticulture in NZ.
Fertigation allows smaller targeted amounts of fertilisers to be applied more accurately to meet the crops time of need. Fertigation also allows farmers to better manage nutrient loss risks in dynamic climatic conditions.

"Fertigation gives the farmer the ability to truly control the amount, timing, and risks of their nutrient programmes"-
Steve Breneger. Technical Manager, IrrigationNZ

Project Aims

Fertigation has been adopted globally since the 1970's, some 60-70% of Australia and America's annual agricultural nutrient requirements are applied through fertigation. In a NZ context, fertigation adoption has been limited to predominately horticulture, viticulture, and a handful of leading farmers in an arable broadacre & dairy system.
As NZ is a predominately pasture based agricultural system, which is in complete contrast to countries like Australia and America (who are predominately arable cropping systems), there is a distinct lack of available information on the impacts of fertigation in a pastural farming systems.
The SFF- Fertigation Project looks to assess the overall impacts of adopting fertigation to a pastoral farming system in a NZ context. The 5 key areas of interest are;

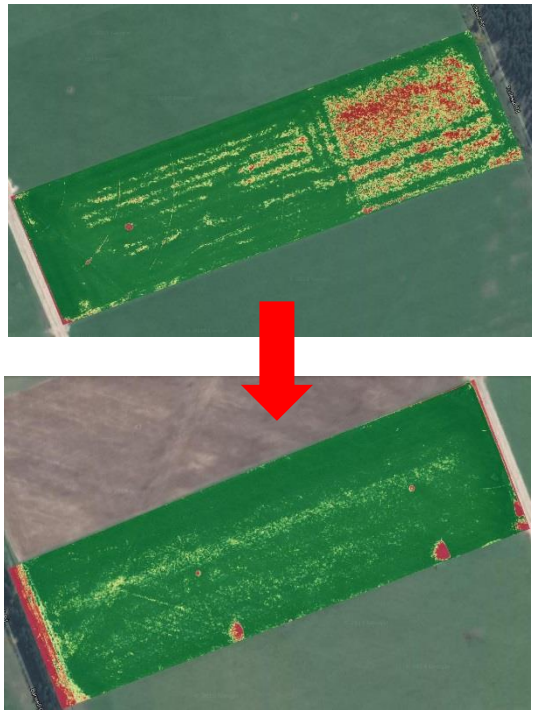
- Loss Rates (How much is lost through various forms), including N leaching.
- Utilisation Rates (How efficient the nutrient is being used)
- Sustainable Reductions (At what Rate can we sustainably reduce nutrients)
- Diversity (With measured reductions can we improve plant diversity)
- Other On-farm benefits of Fertigation

Throwing Solids vs Fertigation

Distribution Uniformity

There are many variables that influence distribution uniformity. With conventional fertiliser spreading application technologies, size, weight, and shape of individual granules significantly impacts the distribution uniformity of the applicator. This was highlighted at the 2016 Precision Agriculture Associations conference held in Ashburton, where Professor Ian Yule of Massey University, highlighted data that suggested even with the best technology fitted to the spreading applicator, the distribution uniformity was significantly impacted by the inconsistency of the granule products.

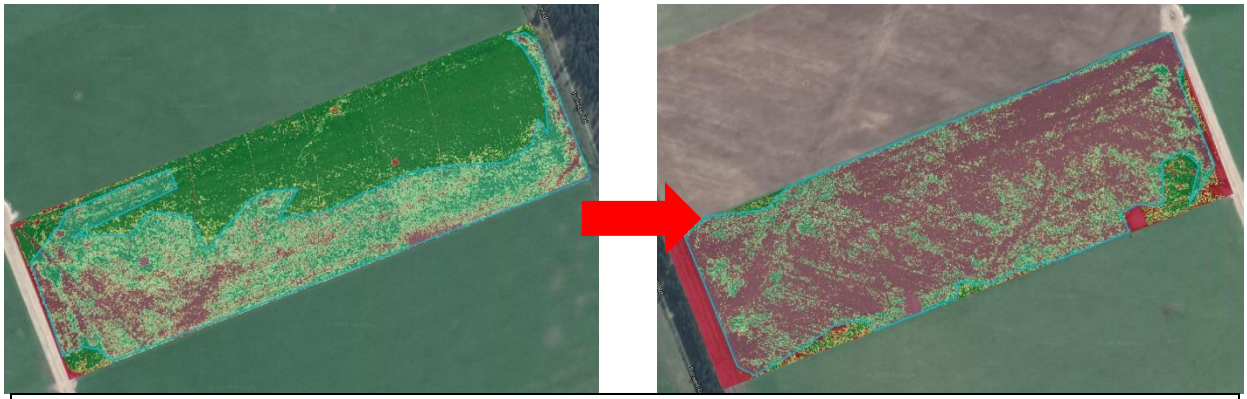
Fertigation has the benefit of every drop of water sprayed from the irrigator contains a consistent amount of fertiliser greatly increasing distribution uniformity potential.



PAMU NVDI imagery showing excellent coverage by fertigation cf truck in top image

Plant Diversity

Plant species diversity is critical to achieving sustainable on-farm outcomes. By actively reducing nutrient inputs, plant species diversity will increase. Beneficial species like clovers should become a greater population within the farming area contributing the farms ability to further reduce their nutrient requirements over time.



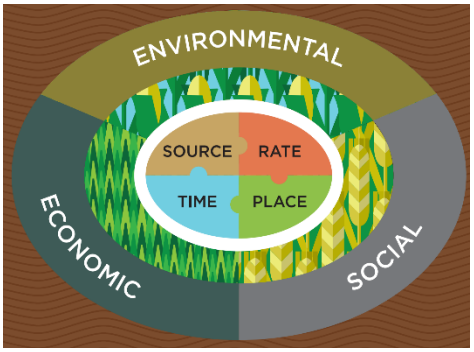
PAMU NVDI imagery showing pasture composition, Truck applied (L) less clover (purple colour) compared to Fertigation (R) picture predominantly clover. No bloat cases.

Dynamic Risk Management

One of the biggest challenges facing farming trying to achieve Good Management Practice is managing their risks in a dynamic climate. The best made plans are always fraught by mother nature. Poorly timed nutrient applications can have loss rates of greater than 30%, these are costly to both the profitability of the farm and its environmental impact.
Many conventional fertiliser applications are a compromise between crop need and availability, applying larger amounts of fertilizer to fit within a schedule that may not be ideal for managing risks.

Fertigation allows farmers to apply the right amount of nutrients based on crop time of need, and strategically schedule the timing of the application to reduce the risk to the environment. This has significant implications during the shoulder season management.
Fertigation can apply ultra-low rates of Nitrogen per hectare per day, greatly improving both the effectiveness to the crop and significantly reducing the risk to the environment.

This can be summarized as the 4 ‘R’s.
The right Source, right Rate, right Time and right Place.
This has been used in USA for the last 10 years to help farmers increase their N efficiency.
It promotes Good Management practice (GMP) to achieve agricultural systems goals whilst minimizing field nutrient loss & maximise crop uptake
Fertigation is one of the key tools that allows the farmers to achieve their GMP’s.



Conclusion

Through the SFF- Fertigation Project, IrrigationNZ and its project partners aim to prove, through a combination of small scientific small plot trails, larger scale trails and on-farm monitoring and measurement, fertigation as an advanced tool to assist irrigating farmers greatly reduce their environmental footprint whilst maintaining farm viability and sustainability.