



Ministry for Primary Industries
Manatū Ahu Matua



Sustainable Vegetable Systems

Quarterly Report - Programme Governance Group

Quarter 2, October – December 2020

Contract Agreement Number: 21859

1. QUARTERLY REPORT SUMMARY

Sustainable Vegetable Systems

1.1 Summary of progress during this quarter

Workstream 1 – Controlled experimentation to quantify nitrate leaching

- Literature review in final draft form
- Plant & Food Research (PFR) trials in Lincoln is established with a pak choi crop sown on the 7th Dec.
- PFR Lincoln wheat is currently being grown and monitored with 8 soil, 6 plant and 2 drainage event samples. To be followed by broccoli crop from Feb.
- PFR Hawke's Bay – land is being prepared for first crop of pak choi
- Soil pits to 1.2 m were dug in two distinct regions of each rotation block for soil physical sampling. Samples were taken to 1.2 m depth and were used to categorise the soil physical properties including water retention curves, wilting points, upper water limit, bulk density and soil structure.

Workstream 2 – Regional on farm monitoring

- In this Workstream, inputs and outputs are being monitored across different commercial farms through a continuous period to calculate the nitrogen (N) balance from a range of rotations including vegetable crops. The data will be used alongside Workstream 1 and Workstream 3.
- Nine sites have been selected in the following areas: Pukekawa, Pukekohe, Tuakau, Matamata, Manawatu (two sites), Hawke's Bay, and Canterbury (two sites).
- Each site is following a different crop rotation during the monitoring period. The rotations include vegetable crops of interest for this project such as onions, broccoli, pumpkin, potato, lettuce, carrots, cabbage, spinach, beetroot and peas.
- All sites have had a permanent monitoring area set up, which will be continually assessed for the duration of the project. Each site has been visited at least once to date by staff from The New Zealand Institute for Plant and Food Research (PFR) to demonstrate and discuss data collection with the monitors.
- Data being collected include:
 - Monthly soil mineral N to 60 cm depth (90 cm depth every second sampling);
 - Monthly biomass production and N content of the crop (same time as soil mineral N);
 - Management inputs (especially N fertiliser).

Workstream 3 – Farmer facing tool(s)

- A community of practice has been defined and a meeting held to discuss the modelling priorities and start to identify an approach to the modelling.
- Initial focus will be on testing Overseer with the aim of building confidence in its coefficients and outputs. The data collected in Workstream 1 and 2 are key for this.
- Further modelling needs and approaches will be identified as work proceeds. This will look toward any improvements in predictions, and in particular in developing the farmer facing tool.

Workstream 4 – Developing a change landscape

- A meeting with stakeholders was held to discuss the programme of work.
- A draft stakeholder analysis was developed and presented to the Workstream 4 group for review. From this an approach of how to develop impact and include stakeholders in the process will be developed.
- A design of methodology has been started and is in progress.

1.2 Key highlights and achievements

- Workstream 1. Wheat crop nearing harvest, pak choi crop established at Lincoln.
- Workstream 2. All nine monitoring sites are established, and sampling has begun. PFR visited, 8 of the 9 sites. These visits included useful discussion around tailoring protocols and sampling procedures for each crop and site.
- Workstream 3. Meetings held to start to identify the approach used; initial meetings to define crop coefficients for vegetable crops that at the moment do not have coefficients or use proxies in Overseer.
- Workstream 4. Leaders' meeting held and a draft of stakeholder analysis presented for further discussion.
- The PFR Field operations team has been collecting video and photos as they undertake trial work. They are working on potential internal PFR and external communication of these resources and will connect with the Workstream 4 group regarding communication pathways.

1.3 Collaboration with other programmes (*optional*)

- Real time N-losses – Rural; Professional fund through Our Land and Water, looking at real time measurement of nitrogen losses under vegetable production in Hawkes Bay. PFR and Agrilink is providing data analysis support.
- Residue incubation– SSIF funded (PFR) project looking to quantify the rate of decomposition of different vegetable residues and the rate of nitrogen release from the residues into the soil. Some residues will be obtained from crops in Workstream1.
- Process Vegetable Coefficients – looking to quantify some of the coefficients needed for nitrogen uptake and use by processing crops within Overseer.
- Mineralisable N to improve management – a SFFF project looking to improve the measurement and prediction of the amount of biologically mineralized nitrogen in a field. This pool of nitrogen is a key component for understanding crop nitrogen requirements, together with measurements of mineral nitrogen (nitrate and ammonium).

1.4 Upcoming

- Workstream 1 in Hawke's Bay will be planted with the first vegetable rotation.
- Data from Workstream 1 and 2 will begin to be analysed.
- Crop model coefficients will be evaluated for use in Overseer.
- Stakeholder plan for engagement developed.
- Second PGG meeting on the 23rd February, to be held via Zoom

1.5 Investment (Cash & In-kind)

Investment period	Co-investor contribution	MPI contribution	Total investment
During this quarter	\$0.179m	\$0.804m	\$0.984m
Programme to date	\$0.359m	\$0.804m	\$1.163m

Note: this is the end of the public section of this Quarterly Report