

AG HUB AUTOMATED RECORDING AND PLACEMENT FOR FERTILISER AND EFFLUENT

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Ag Hub is a modular online farm management system that collects and displays automated data. A key strength of Ag Hub is the ability for farm data to be stored in one place. Multiple users can log in and view the data from anywhere with internet access. The foundation of Ag Hub is an accurate GPS map. The focus of this paper is the Ag Hub Fertiliser and Effluent module, and how combined they provide visibility of the overall macro-nutrients applied.



Figure 1: visual representation of the modular based Ag Hub system.

Ag Hub Fertiliser

In this module finalised Ballance fertiliser recommendations are imported automatically to Ag Hub along with soil test history. Plans for additional applications can be manually created for capital and nitrogen fertiliser, non-Ballance customers can enter their fertiliser recommendations into Ag Hub this way.

Orders are placed to the Fertiliser spreading company directly from Ag Hub. The spreader receives an email with product details, application rate, purchase order for product, and a placement map highlighting paddocks for application.

Once fertiliser has been applied the GPS proof of placement (POP) is automatically matched back to the order in Ag Hub, at the same time the applied date is automatically set. Nutrients applied are recorded by paddock and the POP verifies job completion.

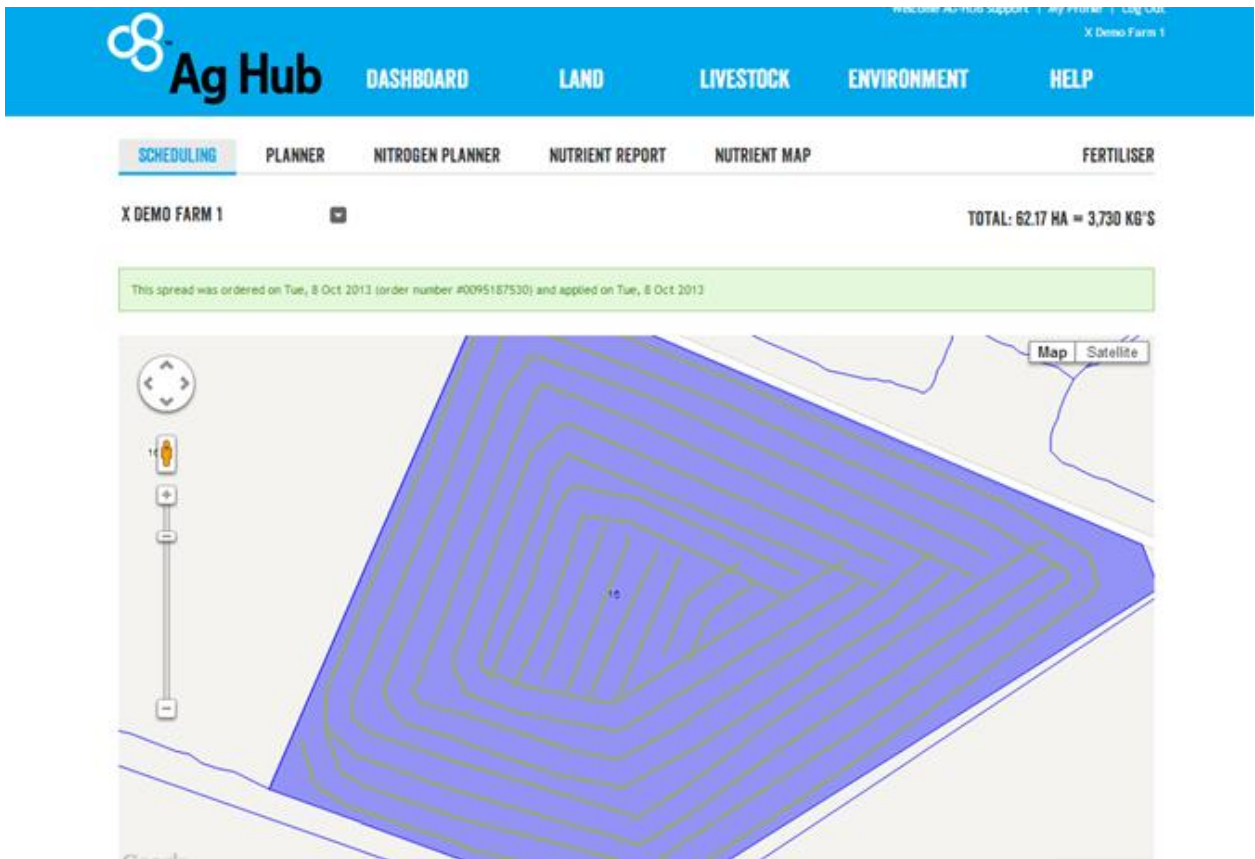


Figure 2: Proof of placement GPS lines for a fertiliser spread are automatically imported and matched back to paddocks selected in the order.

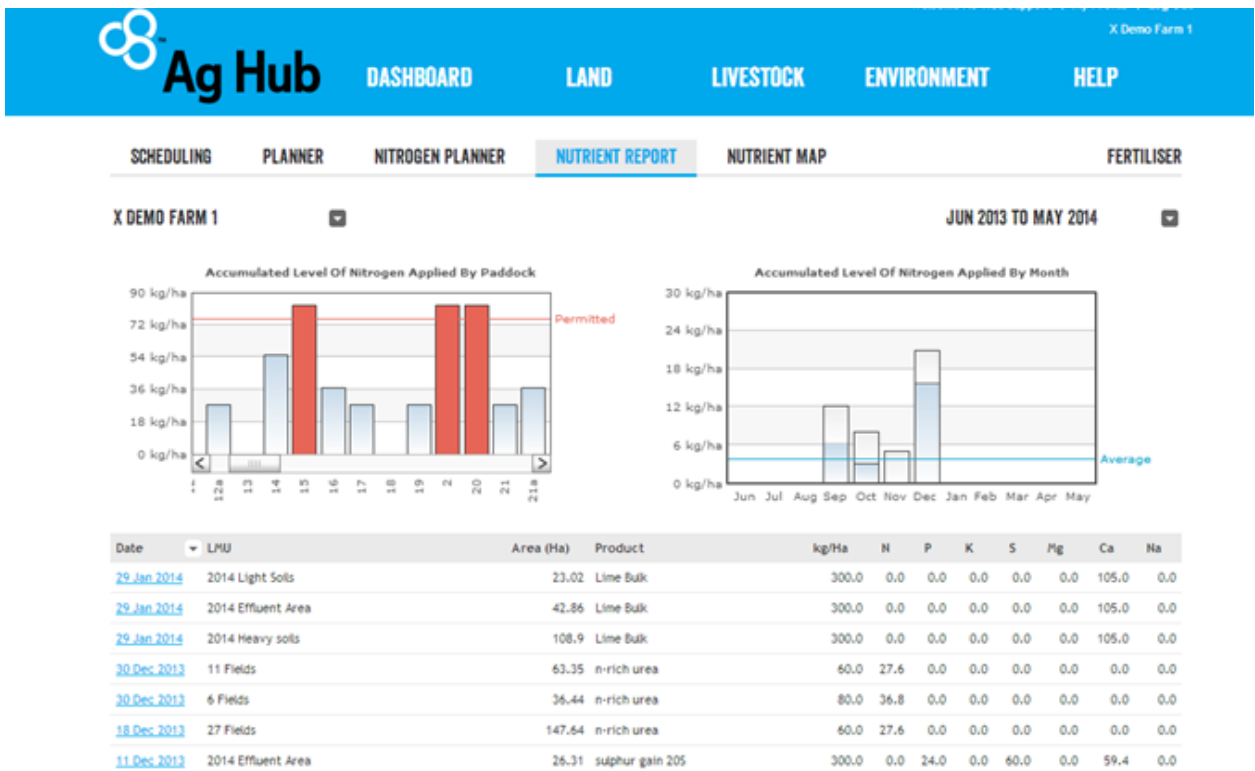


Figure 3: Information for applied fertiliser nutrients is collated and graphs updated.

Ag Hub Effluent

The nutrients applied from effluent are automatically recorded. GPS enabled irrigators send placement data to Ag Hub and pump operating times are recorded. Nitrogen, phosphorous and potassium test values from effluent samples are done at regular intervals. The concentration of these nutrients in the effluent are used along with the spreader's swathe and pump flow rates to automatically calculate volume and depth of applied effluent and estimate the nutrients applied. These records provide an audit trail.

The visual proof of placement effluent maps that are displayed for both the season to date and for the previous 12-months from the date viewed provides a meaningful picture of the distribution of nutrients applied. This visual display can highlight spreading behaviours that could be improved e.g. spreading more often at one end of a paddock resulting in higher overall nutrient loading from effluent in that area.

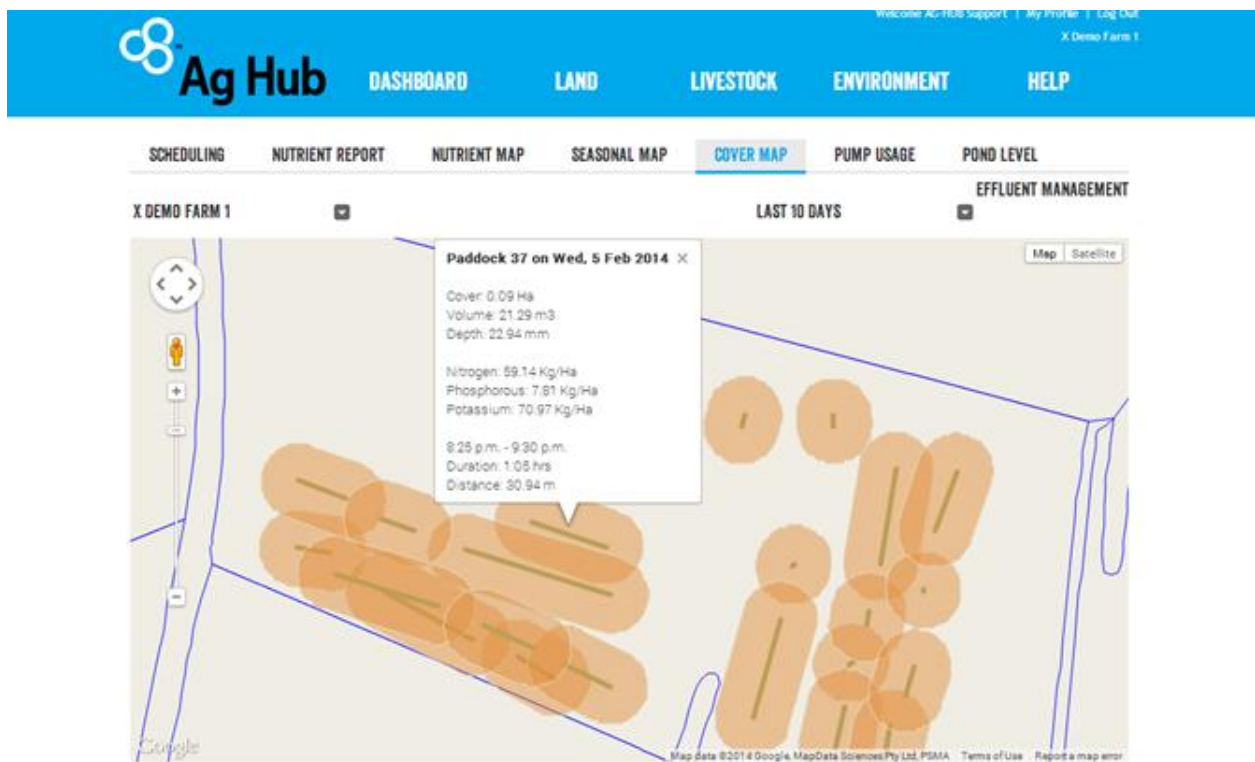


Figure 4: Proof of placement for effluent spreading is recorded in real time.

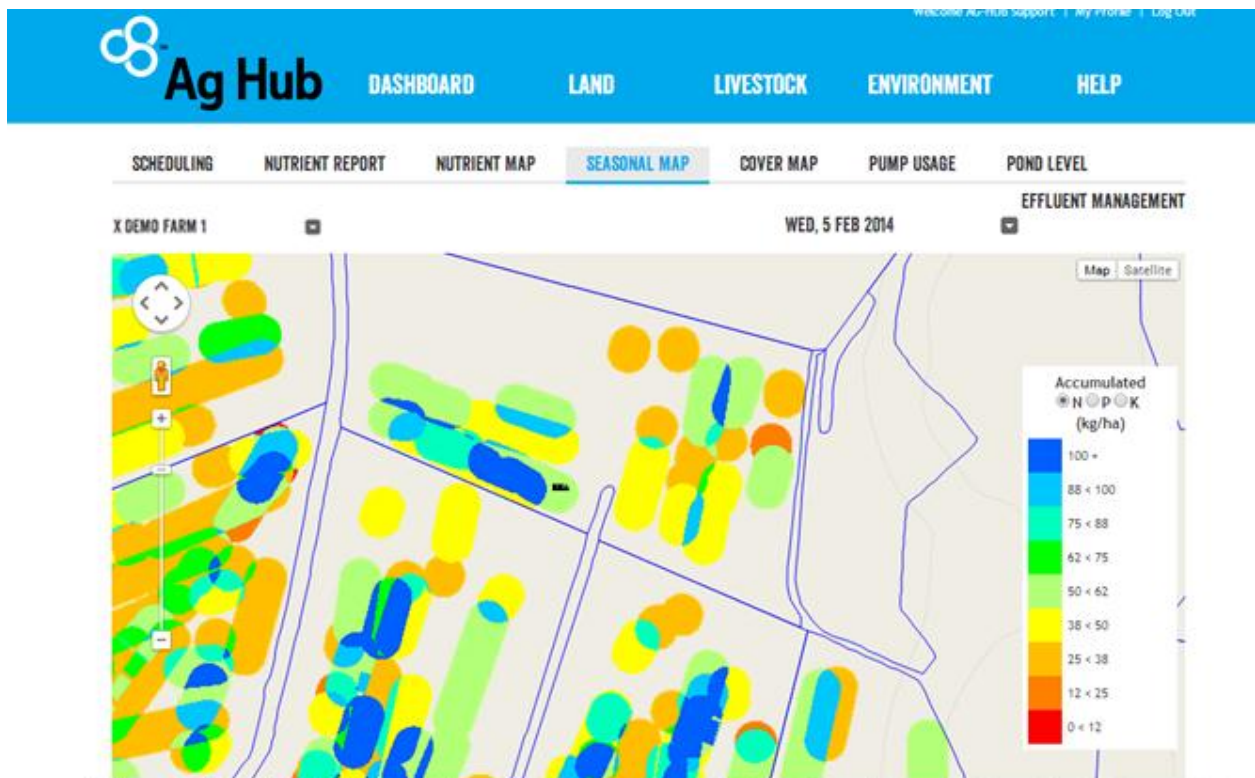


Figure 5: Visual representation of the distribution of nutrients applied from effluent

Ag Hub Nutrient Management

Collected information from the effluent and fertiliser modules are displayed as a table by paddock with a column on the table to report the combined nutrients applied by paddock for the season. This table report was developed to assist users to meet their reporting requirement to regional council, and is used for improved accuracy of information imported to the overseer model. Within the Ag Hub nutrient management module, paddocks on the farm map are coloured according to the aggregated level of applied nutrients.

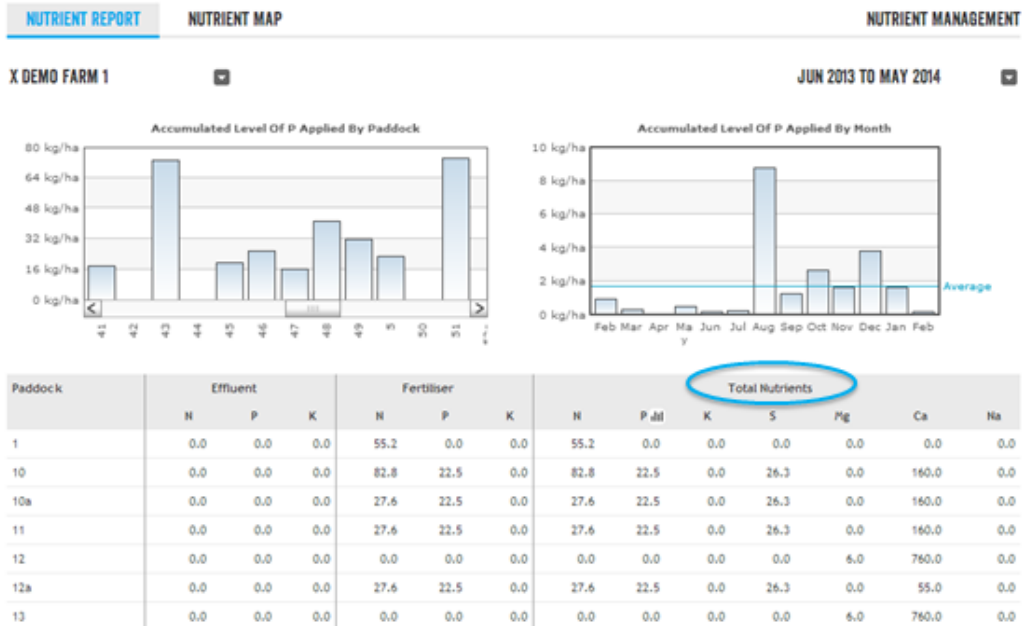


Figure 6: Tables and graphs aggregate applied nutrients from both effluent and fertiliser.

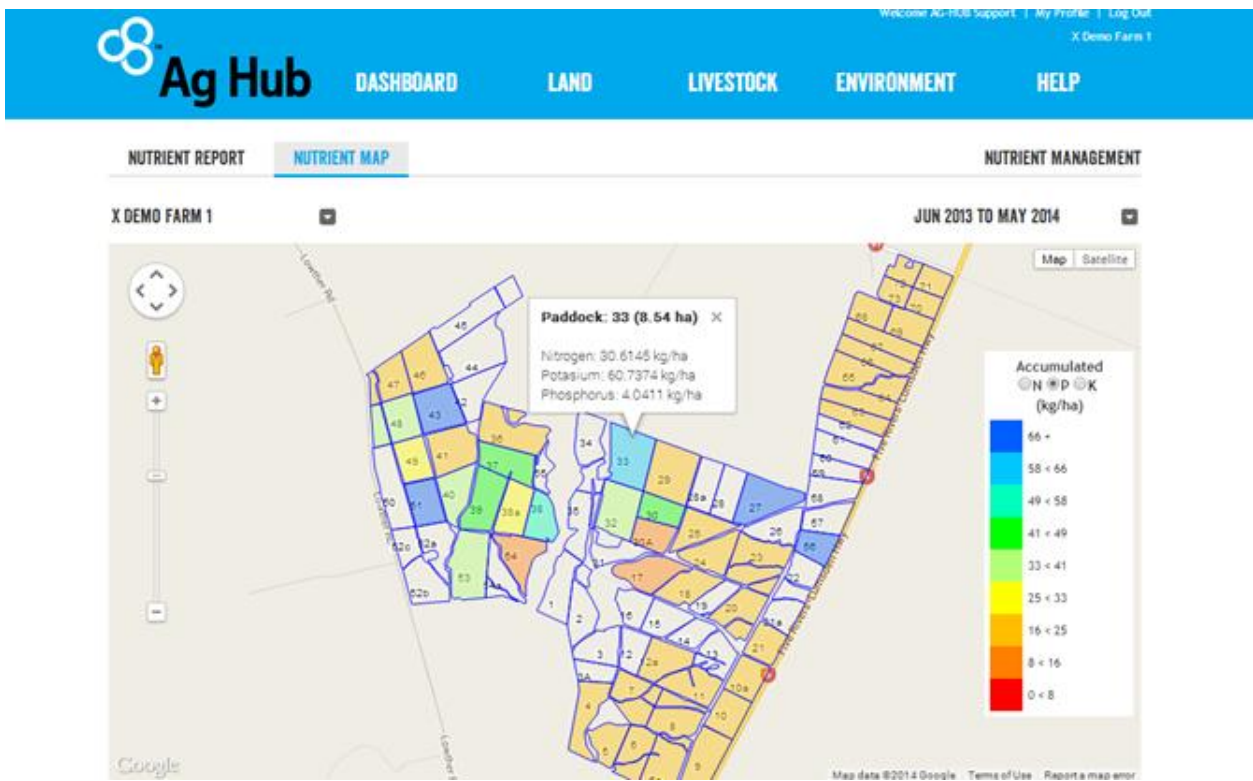


Figure 7: Visual representation of overall applied nutrients from effluent and fertiliser

Some of the benefits from using the Ag Hub Effluent and Fertiliser modules are highlighted in the following two case studies...

Case Study One:

Farm name: North South Farms

Location: Five Rivers, Southland

North South Farms is a corporate dairy farm managed by FarmRight. It comprises 450 ha (effective) and milks 1250 cows at the peak of the season. Production for 2012/13 was 394,316 kg MS not including calf milk; the target this season is 400,000 kg MS. Cows are wintered on the platform.

Integrating the full suite of Ag Hub modules into existing farm management systems has significantly improved compliance recording, decision making and KPI monitoring for staff and management on a large herd dairy business in Southland. The system has become such an integral part of farm decision making that the business is continuing to look for new ways of applying it to further improve farm management.

North South Farms first investigated Ag Hub three years ago as a way of improving and automating data collection and recording for its effluent irrigation system. This information is required for compliance with regional authority regulations, and includes not only rates, volume and timing for every effluent application but also placement, relative nutrient loadings and soil moisture content.

In the words of operations manager Neil Mitchell, "we used to have to write everything down, and it wouldn't have been anywhere near as accurate." With two travelling irrigators (a Plucks and a Cobra) now linked to the Ag Hub Effluent Management Module, every effluent application on the farm is GPS tracked. Effluent pond levels are constantly monitored. Speed and rate of application is automatically recorded and integrated with effluent nutrient test results, existing nutrient levels on 130 ha of effluent paddocks and soil moisture status to maintain accurate, real time soil nutrient maps as well as historical records. "This is probably the biggest benefit for us with Ag Hub," Neil says. "It means at any time, we have proof of placement for effluent for Environment Southland." And because he can access all the effluent data from anywhere, at anytime, management from a distance is much easier.

Today North South Farms uses Ag Hub to record and monitor everything from individual cow live weights, daily pasture growth rates, rainfall and even milk vat temperatures.

Ag Hub has simplified several routine farm processes, saving time and building an invaluable bank of live data which allows Neil to make pro-active decisions based on what's really happening on the farm at any one time. It also provides a comprehensive overview of current farm performance and production.

The Fertiliser Management Module uses recommendations from Ballance Agri-Nutrients field staff for each management unit to simplify and standardise the email ordering of different fertiliser products and to record applications, including proof of placement through

GPS mapping. "Instead of sifting through different maps all the time, we can see everything at a glance - what's been recommended, how much has been applied compared to recommendations, when it has been applied and what the current soil nutrient status is."

Would Neil farm without Ag Hub now? "No. We're gaining so much data on so many aspects of the business now, and we're watching those little triggers like soil moisture, rainfall, temperature and grass growth so much more closely that we can make decisions pro-actively. This is a relatively low input farm, so we need to be able to respond quickly when conditions change.

Case Study Two:

Farm name: Bayswater Dairy Ltd

Location: Otautau, Southland

Bayswater Dairy is an equity partnership with a land area of 250 ha effective leased and owned. Total production in 2012/13 from a peak of 790 cows was 287,000 kg MS. Bayswater budgeted 310,000 kg MS from a peak of 750 cows for 2013/14 and as of mid November was trending towards 320,000 kg MS.

Ag Hub is improving environmental monitoring, financial performance, and peace of mind for those involved in a dairy equity partnership. Precise recording and automatic data collation save time and money, make farm management more effective and efficient, and ensure the business remains proactive rather than reactive both now and in the future

Bayswater turned to Ag Hub in April 2012 as a way of future proofing its dairy effluent management system. There have been no compliance breaches on the property and it is not located in a sensitive area. However, the partners were aware of the importance of public perception regarding effluent irrigation, and wanted a system to fully record and document all effluent applications.

Bayswater can irrigate approximately 170 ha of its land area with dairy effluent. Before Ag Hub, providing details of any one specific application would have been a matter of guesswork, says variable order sharemilker and equity partner Edwin Mabonga.

"Now it is much more specific. We know exactly how much we're putting on, we know the value of what we're putting on, and we have proof of placement for every application. Having such accurate, comprehensive documentation is 'brilliant' when it comes to training and monitoring Bayswater's three full time staff, Edwin says. "It's also become one of their KPI's."

Another significant benefit is the cost saving on conventional fertiliser associated with knowing the exact nutrient value of each effluent application.

One reason Bayswater Dairy chose Ag Hub in the first place was that it is not limited to effluent management. The farm now uses a large suite of other Ag Hub modules to monitor and record.

Because the Fertiliser Management and Effluent Management Modules are automatically linked, Edwin says the business has saved a surprising amount of money on conventional fertiliser applications. "When we order fertiliser now, the system already knows how much nutrient has been applied to each paddock via effluent, and calculates the amount of fertiliser required accordingly." He uses the example of one paddock which already received 35 units of N/ha in dairy effluent to illustrate this. At a price of \$700/tonne of urea, subsequent adjustment of the amount required to meet fertiliser recommendations by Ballance Agri-Nutrients field staff would equate to a saving of \$22/ha.

Having an accurate record of soil moisture levels through the Soil Condition Module makes it very easy to decide when effluent can be applied and when it cannot. "I don't have to try and guess what point the soils are at."

Would Edwin farm without Ag Hub? "No, I wouldn't, because the regulations around farming are getting more stringent, and that is going to continue in the future. But even if it wasn't for that, I'd still want to use it. It just makes things easier. It's a tool for farming smarter, not harder. And the beauty of it is that it is live all the time. I could be on a beach in Bali and check it, and you can't get much better than that..."

In Conclusion:

Ag Hub is a smart precision agriculture tool that automatically records the application of nutrients from both effluent and fertiliser. Users have found Ag Hub simple to use and to be a valuable farm management tool. Ag Hub provides real time information to facilitate evidence based day to day decision making, as well as reporting at a high level to provide an overall picture.

Future direction:

During the study it was identified that the ability to automate reporting against a Nutrient Budget would add further value to the data being collected.

References:

Ag Hub (2014) *Ag Hub in Action* retrieved from <http://www.aghub.co.nz/ag-hub-in-action>