

THE NEXT STEP

INTENSIFICATION OF EAST COAST HILL COUNTRY FARMING

For Kellogg Rural Leadership Programme

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Executive Summary

The meat and fibre industry is the second largest export earner for New Zealand and is a significant contributor to the local Gisborne / Wairoa economy. With the recent growth in the dairy industry and therefore requirement of dairy support land, sheep and beef farmers are being pushed back into the less productive country so intensification of this land needs to occur to maintain growth in regions like the East Coast. There is great opportunity to increase productivity and therefore improve profitability on sheep and beef properties and by doing so this may also help in a number of other important areas, such as; succession viability, attracting skilled staff into the industry and reducing the number of good pastoral farms lost to the forestry industry.

This project sought to identify whether utilising 'spray and pray', as a re-grassing tool on hill country, was an option for all East Coast hill country farmers that were looking to intensify their operations. The advantages and disadvantages of such a management practice were identified, along with best practice advice and whether there was any financial gain to be had. Alternatives to 'spray and pray' were explored for those not willing to take such a risk. Data was collected by surveying 21 Gisborne and Wairoa hill country farmers with a range of financial performance and management abilities and from a variety of locations within the district. The data collected, highlighted some interesting results. Those farmers that currently practice 'spray and pray' were in general well developed, profitable farms with good fertility status and by and large had a higher carrying capacity on average than those that were not cropping/re-grassing.

The most significant finding was that 'spray and pray' was not for everyone. Depending on the farmer's current position and farming ability, 'spray and pray' was not the best productive and profitable option when looking at intensifying some East Coast hill country - other options needs to be addressed first. From the data collected, those that are active uses of 'spray and pray' or those about to start a re-grassing programme through the use of 'spray and pray' in the next 12 – 24 months, are in general quite progressive farmers and their farms are largely well developed, with acceptable subdivision and fertility, ready to take that next intensification step.

Following the analysis, a number of recommendations for farmers were offered. It was recommended that each farmer initially utilises the resources they have available to them (i.e. AgFirst Benchmarking Database for Gisborne/Wairoa) to clearly benchmark where their business lies. Using this information and possibly some independent advice, determine what their key priorities would be from a development point of view in order of priority (i.e. starting with the lower risk, higher returning options first). If the farmer was looking to try 'spray and pray' as a re-grassing tool, planning and preparation, using the experts around them and learning how to manage crops and new pasture species was essential if looking to reduce some of the risk involved – and do not take short cuts, they will only increase the overall risk.



Introduction

Since the Global Financial Crisis in mid-2008, the farming sector can no longer rely on capital gain to make up for poor financial performance in any given year. Now, like any other commercial business, farms need to be profitable to meet bank funding requirements.

At average industry levels of profit, family succession may be seen as impossible and in some cases, even contemplating the idea of succession has been seen as “a form of child abuse” in some farmer’s eyes. One of the initial steps in order for farm succession to take place is to ensure the farm is viable and profitable. If the farming operation is profitable, well managed and well structured, options are created. The ‘family farm’ could potentially become a distant memory if farm profitability is not achieved. No other option then to sell may result and family farms could potentially be swallowed up by large corporates.

There is a significant lack of skilled or motivated employees across the primary industries. To encourage young people to enter into a career in the sheep and beef sector, financial opportunities are key. Improvements in farm profitability would make the sector more appealing, showing a decent living can be made from the hard graft required at times. Profitable farming operations would give the employer the capacity to increase farm worker’s salaries, invest in the training and development of their staff and maintain or upgrade their living accommodation if warranted.

Particularly since the start of the boom of dairy conversions back in 2007, there has been a significant change in land use around the country. Dairy and dairy support has taken up much of the ‘prime’ sheep and beef country. Sheep and beef cattle numbers in New Zealand have dropped 22% and 20% respectively since 2003, while dairy cattle numbers have increased a massive 29% since this time. This is not to say however, meat and wool export revenues are insignificant. The dairy industry brings into New Zealand, \$13.59 billion of export revenue while the meat and wool industry (including hides and skins) brings in \$5.28 billion (year end 31 December 2013 – *Statistics / New Zealand Trade and Enterprise*). In order to continue this growth in export markets, the sheep and beef industry needs to be able to identify opportunities to intensify on this lower class of country as the national economy is reliance on this industry as its second biggest export earner.

From a personal perspective and bringing this project topic closer to home, that is the East Coast district, there is increasing competition from the forestry industry for not only the more marginal sheep and beef country but also land close to main roads and the city’s port. In 2012 a pastoral farm in the Gisborne district was sold at auction to a forester. A pastoral farmer was the second highest bidder. This was the first time this had been seen in this district. Over the last five years a significant area of farmland has been lost to the forestry industry in this catchment. Farm jobs have been lost and local businesses supplying the rural industry have felt the pinch. The local economy is reliant on the success of the farming to bring money into these regional centres for growth. Due to Gisborne/Wairoa locality, the dairy industry is not significant here therefore this district has not been able to reap the rewards during high milk pay-out periods.



Detailed in the table below (up until the EFS or EBIT averages) are the 3 year average of accounts analysis data for the Gisborne and Wairoa districts made up from over 100 sheep and beef properties in the AgFirst Consultancy database. On the following page, from the tax figure on, are figures based on assumptions as detailed either in or below the table. Debt levels are based off a perceived 'comfortable' level of debt in the Gisborne / Wairoa district and land values are based on an 'average' land and buildings value for the district based off comparable sales data.

TABLE 1: AgFirst Accounts Analysis – Gisborne / Wairoa District & Top 10 3yr Averages (2011-2013)

	District	Top 10
Farm Size (ha)	1489	1150
Effective Area (ha)	1142	990
Cash Crop Area (ha)	4	2.7
Average Paddock Size (ha)	14	10
Total Stock Units (su)	10273	9649
Stock Units/hectare (su/ha)	9.0	9.7
Stock Ratios		
Sheep	51%	45%
Cattle	47%	51%
Deer	1%	2%
Other	1%	2%
Lambing Percent*	136%	144%
Calving Percent	86%	88%
Gross Farm Income		
per Hectare	\$778	\$1,055
per Stock Unit	\$86.38	\$109.31
Total Farm Expenditure		
per Hectare	\$503	\$535
per Stock Unit	\$55.92	\$55.69
Effective Farm Surplus		
per Hectare	\$275	\$520
per Stock Unit	\$30.47	\$53.62
EBIT or EFS**	\$313,018	\$517,379

* Lambing Percent - Total lambs/ewes wintered (includes hogget lambing)

** EFS - includes Wages of Management of \$60k & Depreciation



	District	Top 10
- Tax @ 28%	\$87,645	\$144,866
Profit after Tax	\$225,373	\$372,513
Debt***	\$2,311,425	\$2,171,025
Interest @ 7.75%	\$179,135	\$168,254
Profit after Interest & Tax	\$46,238	\$204,259
RoA****	3.96%	7.10%

*** Debt - assuming an average debt of \$225/su

**** Return on Asset - assuming \$770/su Total Value (\$650/su L & B, \$120/su Stock)

RoA = EFS/(Total Stock Units * \$770) x 100/1

Profit after interest and tax is left for school fees, capital expenditure and debt reduction. School fees is a significant cost for many Gisborne / Wairoa farmers as there are no boarding school options in either area. Private boarding needs to be sort or generally children are sent to boarding school to complete their secondary education.

The data above shows a significant difference in financial results from the district average to the Top 10 operators. The EFS (Effective Farm Surplus) is 89% higher for those operating in the Top 10 then those at district average levels. Overall the district average Return on Asset is lower than the main Banks 12 month deposit rates and these farming results include two years of the best results seen in some time (2011 and 2012). Historically the RoA has sat between 3 – 5% for the majority of farms in the district.

The Primary Growth Partnership (PGP) is looking to drive the future market success of the primary industries via a number of PGP programmes; the Red Meat Profit Partnership being one of those programmes. The Red Meat Profit Partnership is a consortium of agribusinesses and the government who have partnered up to invest in the red meat sector to drive sustainable, long-term profits. The programme focuses on supporting farmers in adopting best practice both behind the farm gate and between the farm and processor.

Beef + Lamb New Zealand have identified there is significant variability in profit per hectare within the sheep and beef sector. There has been a substantial improvement in profitability since 1990/91, however there is still a very sizable gap between those top performers and an average operator. Major opportunities to improve have been identified.

A key component to this change is the need to move the focus away from one of price driven to one that focuses on productivity and profitability – where differences are significant and factors can be controlled, as illustrated in Table 2.



TABLE 2: Productivity Gap*Source: Beef + Lamb New Zealand Economic Service, Sheep and Beef Farm Survey*

Farm Quintile (profit/ha)	Lamb Price (\$/hd)	Lamb Sales (kg/ha)	Lamb Sales (\$/ha)
20-40% (Q2)*	91.70	44	222.20
Top 20% (Q5)	94.23	103	522.01
Difference (%)	+3%	+134%	+135%

What we often focus on

Where the opportunity is

* excludes lowest 20% of performers

The results above demonstrate there is minimal difference (3%) in return on a per head basis however there is much to be gained on a per hectare basis (134-135% gain). The top 20% of farmers are achieving returns around four times more than the average, irrespective of land class and location. A significant barrier holding many sheep and beef farmers back is the fact 80% of sheep farmers see themselves as being in the top 20%. This is a real issue. If you cannot see the opportunity in front of you, you will not invest in your business to achieve it, and you will not incentivise the next generation to achieve what you have not done.

ANZ conducts the 'ANZ Privately-Owned Business Barometer' survey on an annual basis. It researches the attitudes and actions of New Zealand business owners, including farmers. Near on 780 farmers were surveyed in 2013, including 374 red meat farmers. The survey highlighted 65% of respondents are looking to increase production over the next three to five years and 83% of those intend to do it through increasing pasture and forage productivity.

East Coast hill country farms can often be limited in this area, faced with contour and climatic challenges; vehicle access across some areas of these farms is impossible – how do they re-grass or grow forage crops when there is no flat land available to cultivate and in a region where reliable rainfall can be an issue. The concept of aerial cropping, more commonly known as 'Spray and Pray', is one option that can be used as a re-grassing tool on hill country. This concept is not new and has been successfully undertaken in parts of the district however there can be a large variation in results.

So what are hill country farmers doing on these types of properties to improve their bottom line? In order to intensify to drive production and underlying profitability, do farmers need to look outside the square and look at utilising re-grassing options such as 'spray and pray'? What are the pros and cons and are there certain guidelines that should be followed to maximise results? Is this management tool for everyone? Is it cost effective and are there any alternatives to spray and pray?



Aims and Objectives

The primary aim and objective of the research was to answer the following question;

“Is utilising ‘spray and pray’ as a re-grassing tool on hill country, an option for all hill country farmers that are looking to intensify their operations?”

In order to gain an understanding of the reality of the question asked, the following key points will be looked into;

- Advantages
- Disadvantages / Common Problems
- Best practice guidelines
- Do the gains outweigh the costs?
- Is it for everyone? Why/why not?
- Are there alternatives to ‘spray and pray’?



Methodology

In order to achieve the aims and objectives I set out to, I needed to collect relevant information from both farmers and professionals. I choose to collect this information by a number of methods including internet research, conducting a survey with a number of Gisborne / Wairoa farmers, attending select farm discussion days and talking with farmers and professionals via email, phone and face to face meetings.

Part of my research involved surveying 21 Gisborne / Wairoa hill country farmers. This encompassed a wide range of sheep and beef hill country operations with a variety of ages, farm locations, farm sizes, farm performance, debt levels and management abilities. The reason for taking in a range of farm types and farmer abilities was to see any difference in farmer perspective across this range. Approximately 20% of the respondents were current spray and pray users. I wanted to ensure some farmers currently using this practice were surveyed to distinguish any differences between them and the non-users.

An internet search and contact made via phone and email to local professionals was initially undertaken to bring forward any information pertaining to 'spray and pray'; the advantages, disadvantages, best practices, costs and challenges that would particularly relate to East Coast hill country farms with regard to contour and climate challenges. The professionals contacted were primarily from fertiliser companies (e.g. Balance and Ravensdown) and pasture and seed agents (e.g. Agricom and PGG Wrightson). This helped me build a very broad understanding of the management practice and what was involved.

An initial survey was conducted by Rob and Sandra Faulkner (ex-Kellogg and Nuffield Scholar) to ensure all relevant questions were covered and to gain feedback on any possible changes prior to launch. This survey had to accommodate both those farmers that currently use 'spray and pray' as a re-grassing option and those that do not. Looking back now, an additional question around the cost of the 'spray and pray' through to re-grassing should have been included as a question for those farmers currently undertaking that management practice. This just meant follow up phone calls with those concerned to gain this additional information, however this still did not bring the information to light as costs had not been tracked by any of those undertaking the practice.

The 18 hill country farmers were asked the following questions;

1. What is the size of your current farming operation?
2. What is your winter carrying capacity?
3. What stock policies do you current run?
4. What is your average Gross Farm Income / ha?

Less than \$400/ha

\$400 – \$600/ha

\$600 – \$800/ha

More than \$800/ha



5. What is your farm's average Olsen P levels and pH?
6. If looking to intensify your current operation, what three areas in order of priority would you focus on and why?
7. Do you currently utilise spray and pray in your farming operation? Yes/No
(If No, go to question 8; if Yes, go to question 9)
8. Would you consider utilising spray and pray to intensify your farming operation and why? (Go to question 10)
9. If you are currently using spray and pray,
 - a. what area do you crop?
 - b. what sort of crop do you grow and why?
 - c. what financial gain do you think it provides?
 - d. have you adjusted your stock policies with the introduction of spray and pray? If so, how?
10. What benefits/advantages do you think you would see from the use of spray and pray?
11. What challenges/disadvantages do you think you would see from the use of spray and pray?
12. What are the barriers stopping you from making spray and pray part of your farming system?

These specific questions were asked to help gain an understanding of, not only people's perceptions of 'spray and pray' as a re-grassing tool but also gauge where people were at with their current operations from a stocking, fertility and profitability point of view and if these factors influenced farmers' opinions and decisions.

Through undertaking this survey, I was invited to attend a local farm discussion day that was going to be looking at intensification of hill country through the use of 'spray and pray'. Three local field agents from Agricom and PGG Wrightson were in attendance and lengthy discussion held around the viability and feasibility of this specific farmers' options taking the various factors into consideration.



Findings

Interest rates are on the rise which is a concern for many farmers particularly with the price volatility that has been seen in the meat and fibre sector over the years. Where are farmers going to find that additional revenue to account for this lift in debt servicing costs while still trying to progress and grow their businesses? As mentioned earlier, the focus needs to move from price, of which the farmer has no control over, to productivity, i.e. kilograms of meat and fibre produced on farm annually, a factor that is solely governed by the farmer.

There are a number of different opportunities for intensifying hill country that come at a range of investment costs and risks. The cheapest and most low risk opportunity is through fine tuning the basic farm management practices such as grazing management, pasture management, stock management, animal health, stock policies, etc. Many farmers could make significant production and profitability gains through refining these factors alone and getting their timings right which is a key influence.

The other most common options, which require financial investment, include subdivision, fertiliser application, lime application and pasture renewal on medium hill country (cultivable country but may need some development, i.e. bulldozing, sheep tracks, etc., to get it to this state).

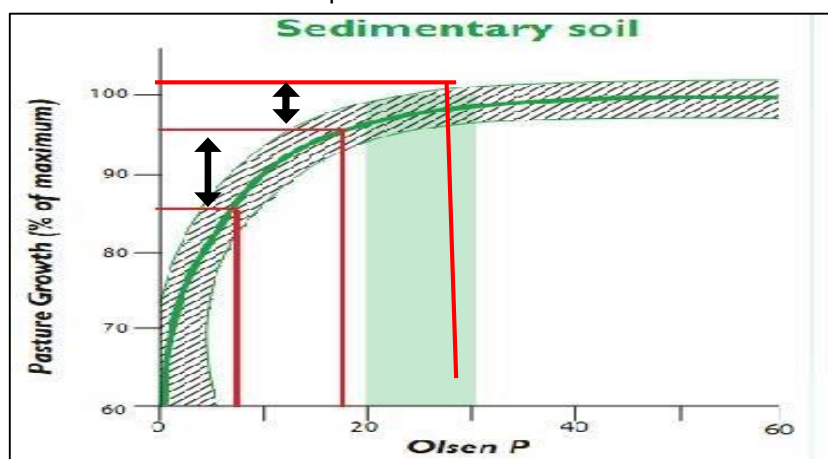
Subdivision provides numerous gains, provided the farm management is adapted to realise the benefits. Increasing subdivision helps soil fertility through the reduction of nutrient site transfer and allowing better use of feed, i.e. manipulating periods where there are feed shortages to periods of surplus growth and apportioning better feed to priority stock. Baker & Associates Ltd (Farm consultancy firm) have analysed the return on investing in subdivision. Taking into account the initial cost of erecting a new fence (7-wire (2 electric) with no battens), maintaining that fence over a 20 year lifespan and interest costs on the initial investment at 7.5%, along with the 5% gain in improved pasture utilisation and 10% gain in pasture quality, the return on investment would be expected to be no less than 27%. This is a high return on investment with only medium risk involved.

Fertiliser application was a key priority many East Coast farmers are focusing on to improve pasture production. So what are the expected returns from applying say 500kg/ha of superphosphate? On sedimentary soils, every 5 units of phosphate (P) above maintenance will lift Olsen P levels by approximately 1 unit so 500kg/ha of super will lift Olsen P by 9 units. Graph 2 illustrates a lift in Olsen P levels up to 20 provides quite considerable growth. Increasing Olsen P levels beyond 20, shows a much lower production response.



Analysis by Baker & Associates Limited, of applying 500kg/ha of superphosphate to an area of low production potential (7.5tDM/ha – hard hills/poor soils) and an area with high production potential (15tDM/ha – easier hills with better soil types), both with initial Olsen P levels of 8, factoring in the interest cost on the initial outlay, extra maintenance P costs thereafter to keep Olsen P at these improved levels and taking into account the extra feed grown driving increases to gross returns, would provide a 25 – 35% approximate return on investment respectively with medium risk experienced. Returns from investing in fertiliser if Olsen P levels are at low levels is substantial, however as Olsen P levels rise, returns are less. Returns on areas with higher production potential as also greater.

GRAPH 2: Production Response Curve of Olsen P on Pasture Growth



Improvements to your soil pH through the use of lime can not only produce higher levels of feed but also enhance the palatability of pastures. This second benefit can be a hard one to quantify. On sedimentary soils every 1t/ha of lime applied equals a lift in soil pH by approximately 0.1 units. Like the fertiliser example, if applying 2.5t/ha of lime (to lift pH by 0.25 units) to both a low and high potential area, from a low starting pH, the results are similar to the superphosphate analysis. The higher potential areas with the lowest starting point give the greatest return. Allowing for an increase in the maintenance lime application thereafter, interest costs on the initial investment and factoring in the improved pasture production, the return on investment ranges from 8 – 19% with medium risk involved. Once again, the management of the area needs to alter to ensure all benefits of this outlay are realised.

Pasture renewal on medium hill country, by cultivation, i.e. having to contour the land with a bulldozer, can be seen as reasonably high risk. Many farmers are reluctant to contour their paddocks depending on their soil structure as this can upset the top soil available. On-going costs associated to pasture renewal include higher maintenance fertiliser costs and interest on the initial investment. As outlined by Baker & Associates Limited, an area of land that has been contoured, cultivated, planted in a winter kale crop and then re-grassed, would be out of 'grass' production for a 12 month period. The cost of this is what could have been made off the area if left in pasture. A 26% return on investment could be achieved however the key to achieving this return is through a



change in stock policy. If a simple breeding policy was previously used and is maintained after re-grassing, a negative return on investment is likely (-15%). Management skills need to be able to adjust to a change in policy. If the re-grassed area is not significant, it may be difficult to warrant a policy change to realise the greatest return or in the other respect, if the area is significant which may justify a dramatic policy change from breeding to more finishing, are the existing manager's skills able to handle this change?

The last development option I looked into in more depth was pasture renewal on steeper hill by way of aerial cropping, or more commonly known as 'Spray and Pray'. As land use has changed and sheep and beef has been pushed back into more marginal areas, much of our sheep and beef land is too steep to cultivate therefore the only way to renew pasture on these areas is through over-sowing.

This is not a new concept and has been and still is successfully undertaken by a number of farmers in the East Coast district today as part of their normal management practice however it is a practice many farmers are still very wary about trying due to varying climatic conditions around the district, uncertainty around their potential return on their investment and their limited knowledge of the concept.

We are going to take a closer look at what the advantages and disadvantages are of 'spray and pray', what best practice guidelines are, the costs associated to it and whether these are outweighed by the gains seen, whether it is a method for everyone and whether there are any alternatives to 'spray and pray'.

ADVANTAGES

If successful, there are significant advantages that can be gained from incorporating 'spray and pray' as a re-grassing tool, into your farming system.

As a summer cropping option 'spray and pray' provides the following advantages;

- It is cheaper than buying finishing flats – there is not the capital outlay involved and you get a higher return off a lower investment base.
- Provides flexibility for a store operation allowing some finishing ability – particularly in dry seasons when many farmers are needing to 'offload' which can be a common occurrence on the East Coast.
- Good for preparing ewe hoggets and/or heifers for mating – gives the farmer options without compromising capital stock condition. Can help increase profitability if hogget/heifer mating has not been an option due to suitable mating weights not being achieved.
- Finishing stock can be offloaded quicker as target weights are reached sooner giving other classes of stock more time to be fed appropriately.



- For more drought prone areas (like many parts of the East Coast), a summer crop, can be seen as an 'insurance policy' during these periods, the farmer is able to retain more animals than he or she may have been able to otherwise.
- Reduce worm burden, exposure to droughts and facial eczema for better stock performance.

As a winter cropping option the benefits of 'spray and pray' are;

- Higher winter stocking rates maintained without compromising stock condition under appropriate management. This was evident from the survey, those utilising crops had a higher carrying capacity on average.
- Allows pasture covers to build in advance of set stocking pre lamb and allows the chance to create strategic cattle feed if required.
- Minimises stock movement therefore less pasture damage through the winter.
- Provides extra feed when needed most in each farming system – helps flatten out the feed curve by shifting a spring/summer surplus into the following winter.
- Encourages management to create a disciplined and planned feed management policy.

Another 'spray and pray' option, particularly for drier areas, is to spray an area of land out at the end of spring/early summer and leave fallow before spraying again and sowing an autumn crop. The advantages of a summer fallow option are;

- Retained soil moisture over summer heading into autumn - this will be good for seed once it has struck.
- Good weed control by spraying the paddock out twice with a broad spectrum herbicide before the desired crop goes in.
- Reduced risk of trying to establish a crop in a potentially dry summer/spring.

Other benefits of utilising 'spray and pray' as a re-grassing tool include;

- By re-grassing, you are replacing a low metabolisable energy (ME) feed with one that will potentially yield twice as much and be 2-3 ME units higher over the majority of the year.
- You can hold stock up on crops and take them off as finishing country becomes available.
- Ability to market lambs/stock over a greater time period annually.
- Ability to remove rushes, particularly if drainage issues are also sorted prior to re-grassing.
- Can be used as a pick me up for lighter/tail end stock classes.

DISADVANTAGES / COMMON PROBLEMS

As always, there are potential downsides or disadvantages that can result from incorporating 'spray and pray' into your management system, particularly if the correct process and procedure has not been followed or other factors do not work in your favour. Some of these issues can be out of the farmers control but many can be avoided or at least minimised to a degree.



With regards to the establishment and utilisation of feed crops;

- A poor spray out of grasses could occur. To minimise this problem, ensure the helicopter pilot overlaps when applying the sprays and also the seed. Ask the pilot for the GPS map showing proof of placement.
- Low soil moisture reducing the chances of a good strike. This is a common concern and problem. No one can control what the weather does but close monitoring of the weather and upcoming forecasts may assist in the planning.
- Low soil moisture or drying out of plants after the seeds have struck can be an issue. Once again, this can be out of one's control however monitoring weather forecasts could assist.
- Weed pressure post-strike. Ensuring the new crop is well monitored for weeds and pests so appropriate sprays can be applied will help reduce this risk.
- Insect damage – especially white butterfly in muggy conditions and slugs. Once again crop monitoring is vital.
- If looking at a summer fallow option – there would be no late spring/summer grazing options, you would potentially need to spray more than once if you get a wet summer and you are reliant on autumn rains to establish the crop – if the autumn is dry or cold the crop may not establish well (this can be an issue for any autumn crop establishment).

At the re-grassing stage the following can present issues;

- Lack of soil moisture. An issue with any sort of crop/pasture establishment. Careful planning and monitoring of the weather can help assist here although sometimes failure can be hard to avoid as weather is out of our control.
- Weed pressure. Crop monitoring to identify early signs of weeds will help.
- Contractors (helicopter in particular) coming on time. Always a major issue as the timings of these crops can be the difference between success and failure. A good relationship needs to be had with your contractors so they can fully understand your reasons for urgency at times, etc. Location of contractors may also need to be considered – those contractors handier to the farms location may be more appropriate to use.

The animal health issues that may need to be considered when using 'spray and pray' are;

- Depending on the type of crop/s used, in depth analysis of potential animal health issues will need to be looked into to ensure stock health is not jeopardised in any way – talk to an expert in this area.
- An iodine supplement may need to be given to pregnant stock.
- Ensure pregnant stock is removed from the crop at least three weeks prior to lambing. Over feeding of pregnant stock during late gestation can cause pregnancy toxaemia.
- Teeth wear in stock that have been on crops can increase so be sure to mouth older breeding ewes.
- Not all stock do well on or particularly enjoy crops so the farmer may need to sort through the mob at times and remove those that are struggling.



- Animals with bad feet may struggle due to an increased exposure of wet feet and the uneven terrain.
- Prior to grazing a crop, administering an effective short acting worm drench can help optimise stock performance.

BEST PRACTICE

The key success with any 'spray and pray' option is warm rainfall, if you do not get it the chance of failure is high. The other key factors are slug bait, insecticide, herbicide, fertiliser and sowing rates. Ensuring these factors are correct will get you part way to achieving your desired outcome.

Listed below are a few points, considered to be best practice, worth considering when looking to undertake 'spray and pray'. Remember each farm is different – different soils, fertility, contour, pasture species and weed species, so gain advice from experts. Every 'best practice' approach will be specific to the individual farm – no one process and procedure fits all.

- Planning! Start planning these crops 12 months in advance of spraying out to ensure fertility, drainage, water, fencing and any changes to stocking policies have been addressed and sufficient knowledge has been gained about the process. This will be a key learning period for any farmer. Aerial cropping requires significant investment and the profitability of the cropping programme is in the detail so start small and get experience before taking on big land areas.
- First step – get a soil test completed!
- Talk to an expert(s) in this field, preferably someone that has helped with 'spray and pray' in your local area so well aware of the local risks.
- Determine the key crop sowing dates for your local area. This will depend on the farms climatic conditions.
- Determining the best crop species for the targeted area will help provide the preferred growing environment for that crop which may result in heavier yields. E.g. bulbs like swedes thrive in the heavier marshes, rape prefers the faces and ridges or alternatively mix it up, put a bit of turnip seed into a summer rape mix and let nature take its course.
- Expect a range in crop yields.
- If pastures are dominated by native plant species, a two crop programme appears to be more successful to prevent weeds and natives re-emerging.
- The big benefit of establishing a crop in the spring is that you are sowing into a rising soil temperature instead of a cooling one. In dry areas however, lack of soil moisture could override this benefit.
- In drought prone areas, a summer fallow approach with crop/grass establishment going into the autumn may be more successful with regards to available moisture.
- If the dry is a potential concern, then establishing a crop like rape or kale would be most suitable from a spring perspective. Tonic (plantain) and clover is also relatively easy to establish – similar to brassica.



- The basic rule of thumb is to apply half to twice as much seed again as you normally would if planting with a direct drill, i.e. Tonic Plantain at 10kg/ha becomes 15-20kg/ha and brassica goes from 4kg/ha to 6-8kg/ha. The field emergence/germination is always lower with aerial over-sowing as the seed is applied to an environment where only a portion of it may have seed-soil contact (hence the need for rainfall).
- The seed generally takes in moisture from wet soil, if it is in contact with it, or when sufficient rainfall events occur the seed will absorb moisture from that. If there is no moisture in the soil or the seed is in contact with air (i.e. sitting on the soil surface), the seed will either dry out as fast as moisture is being absorbed or it will be made sterile by atmospheric conditions (i.e. sunlight and wind).
- High application rates of non-coated grass seed may be a better option in marginal soil moisture environments, however if significant rainfall is unlikely, you would not want to risk the seed germinating and then dying.
- Coated grass seed is slightly more expensive than uncoated seed however germination will only occur if there is significant moisture to break the coat. It will also be spread on the paddock more evenly because it is heavier.
- After the second spray, seed should be flown on immediately. There does not appear to be any benefit in waiting for die back.
- After seed application, 'hoof and tooth' the paddocks to work the seed into the soil but only do this in the dry and for no more than 24 hours. Do not 'hoof and tooth' in wet conditions.
- Monitor your crop establishment – frequently assess the cropped area to see what is happening with weeds, bugs and the crop strike across the paddock on the varying terrain. Being proactive is far more productive than being reactive.
- Established new grasses will grow more grass which means increased grazing ability. Increased grazing's should theoretically result in higher kilograms of meat and fibre per hectare produced off the re-grassed area therefore higher fertiliser application rates are required to keep the plant performing and persisting. Nitrogen is mainly required. This additional on-going cost needs to be factored into your forward budgets from the outset. If you cannot afford to maintain and feed these new grasses the old grasses will start to outcompete the new and all gain will be lost.
- New grasses not only need additional 'feeding' to keep the plant performing and persisting, they also need to be grazed appropriately. Overgrazing, particularly if the summer goes dry, will often cause these new grasses to die out. With no new grass seed in the soil the paddock reverts to the old pasture species. Letting these new grasses go to seed in their first or second season can be a useful way of ensuring more persistence in a variety of seasonal conditions over a longer term.
- Rotational grazing will also help avoid overgrazing.
- Finally.....there are NO short cuts!



DO THE GAINS OUTWEIGH THE COSTS?

Always seen to be the deal maker or breaker – am I going to see a justifiable return on my money spent if I decide to crop/re-grass my hill country? This question is a difficult one to quantify as each scenario is specific and outcomes can vary significantly. Re-grassing should however be seen more as an investment, like fertiliser, rather than a cost.

Preparation prior to cropping and re-grassing is key and it is the cost of this preparation that can heavily influence the amount of capital phosphate based fertiliser required to increase soil fertility to its desired level before starting the programme.

A guide for the initial sowing may be;

1. Spray out – aerial application – with Roundup + Penetrant + Insecticide. Ensure there is adequate pasture mass for spraying (3 – 7cm in length). The amount of chemical required will depend on whether you are spraying out old pasture or crop, e.g. old pasture may require 5 - 6 litres/ha whereas crop may only be 3 – 4 litres/ha. The water rate used can also have an impact on application cost. A higher water rate can improve the likelihood of a better spray out however this does come at an increased cost.
2. After spraying, fly on seed, e.g. prill coated Tonic (plantain) at 20kg/ha + Metarex (slug bait) at 5 - 6kg/ha + 150kg/ha DAP (Di-Ammonium Phosphate – a cost effective source of Nitrogen if Phosphorous is also required).
3. Post emergence weed control (broadleaf and grass control) – aerial application.

The above guide may cost approximately \$800 – 900/ha in total, depending on contractors and supply costs. The isolation of the Gisborne / Wairoa district can result in higher costs in some areas of the procedure than what may be obtainable in other parts of the country. These costs also do not allow for the capital application of fertiliser that may have needed to be applied in the preparation.

To establish a second crop, e.g. a brassica crop, establishment may range from \$500 – 650/ha, while going back into a perennial pasture may be in the vicinity of \$800 – 900/ha once again.

On-going costs will occur as mentioned earlier. Crops may need to be sprayed for weeds on a regular basis therefore \$150 – 200/ha should be put aside for weed sprays annually. New grasses will grow more grass of a better metabolisable energy value but to ensure these grasses persist, they need feeding and appropriate management. An allowance for additional fertiliser application to at least maintain maintenance levels needs to be incorporated into the budget on an on-going basis.

The financial benefit of the crop – crop – grass, pasture renewal programme, depending on crop yield, may not often be seen until the second crop or re-grassing step. In the first year, the initial winter crop yield may only be equivalent to the yield of an existing brown top pasture over a period of 12 months. On a positive note however, the winter crop will have a higher metabolisable energy value, so will be of greater value than brown top pastures that grow most of their production in the



spring, at time a time you generally have a feed surplus. Winter crops are more likely to balance your annual feed supply and demand curve which should allow improved control of spring grown pastures, keeping them in a quality vegetative state which in turn should result in increased animal performance. In the following year, if the summer crop and new grass species strike and grow well, then the costs on a cents/kgDM (kilogram Dry Matter) basis will be significantly reduced.

The investment cost of such a practice needs to be determined on a case by case basis depending on the programme used, i.e. type of crop, cropping program, initial soil fertility, etc. The key is to determine your costs/kgDM over the length of the cropping programme, your returns on a cents/kgDM of feed, plus estimating what the additional pasture production from the new grass over future years may be and factoring this in also.

IS IT FOR EVERYONE? WHY / WHY NOT?

Does the management practice of 'spray and pray' suit all farms and farmers? From the research I have undertaken it appears 'spray and pray' is not for everyone, depending on the farms current productivity and profitability.

Every farm and farmer needs to be looked at on a case by case basis to determine whether 'spray and pray' would be a worthwhile investment. The farmer survey that was undertaken highlighted the fact many farmers are at various stages of their farming careers and many farms are at varying levels of production, development and profitability.

Many other farm development options are lower risk options compared with that of 'spray and pray' therefore they tend to take priority before moving to higher risk investments. Subdivision is one of the key development projects on any farm and is often one of the first options to consider when looking to intensify. If stock cannot be contained and feed controlled, the feed cannot be utilised to its full potential – subdivision helps with this control. Soil fertility and pH is another key area that farmers saw as one of their top three development priorities. This is an area that helps drives productivity and is an inaugural part of any farming operation but it is also an area that needs consistent and continued focus as it improves over time and is a very gradual process. Until an appropriate level of subdivision, soil fertility and pH was reached, 'spray and pray' may not be the most suitable option for intensification as further preparation needs to take place first to lessen the risk associated to this investment.

There may be some areas of a farm that are more available, accessible and generally more productive, to look at intensifying before other areas. These areas should be focused on first as the risk versus return on your investment would generally be better. From a pasture renewal point of view, those lower lying areas, particularly areas of the farm that are cultivatable by tractor gives a higher return provided management practices and stock policies can change.

A farm needs to be at a certain level of production and fertility before the option of 'spray and pray' should be taken into consideration. Water and drainage are another couple of factors that may



need to be rectified prior to undertaking aerial cropping if it is going to result in more beneficial results. As a development tool, to take your farming operation to the next level, your current farming system needs to be at a relatively high performance base already to deliver near on maximum gain.

The other area to consider when looking at a change in management practice is not only the farms limitations but also any farm management limitations. The person responsible for the operational side of the property. This may be an owner or it could potentially be a farm manager. As mentioned earlier, management practices and stock policies may need to change or be reviewed, to achieve maximum potential from a pasture renewal program. The person involved in driving the operational side of the farming business needs to be flexible in their thinking, progressive, open to changes in their farming practices and have the willingness to give new ideas a go. 'Spray and pray' is all about getting your timing right. As one survey respondent mentioned, "if management is more concerned about going fishing in the weekend, rather than getting their crops in at the right time, 'spray and pray' is possibly not the most suitable intensification option for them".

Cost was an area of concern for a number of survey respondents. The investment is significant and as can be seen from the survey results, those who currently incorporate 'spray and pray' into their system, or those farmers that were looking to incorporate it into their systems within the next 12 – 24 months, are generally those farms performing above average from a profitability point of view. The reason for this may be these farmers feel they are financially stable enough to take on more risk financially than those below average operators or it may also mean, these operations are more highly geared so the incentive to drive production is a priority, no matter what the risk. Those operators that are financially not performing may be best to focus on changes to their management practices and lower risk intensification options that will still provide a good return on their money.

ARE THERE ALTERNATIVES?

There are limited alternatives with regards to pasture renewal on hill country that could potentially perform to the same standard as that of aerial cropping if successful. Due to vehicle access being the greatest limitation on this class of country, operations by air are the only feasible way of obtaining a full pasture renewal exercise. There may be some simple but possibly less effective alternatives to getting new grass species on this sort of country however.

A very old practice and one that is still undertaken today by some farmers, is to incorporate clover/grass seed into the mix when applying your fertiliser each year. The most effective approach is to focus on a small area of the farm each year, e.g. up to 10%, not the whole farm as that portion will need to be managed slightly differently to the rest thereafter to improve the strike rate. This is extremely cost effective however results can vary depending on timings of weather patterns. Warm rainfall is still required to get the seed to strike and the other limiting factor is the seed bed will not have been formed as well taking this approach which could also limit a good strike and particularly if management of this area does not alter as discussed earlier.



Another possible alternative is through improving pasture management and increasing the money spent on capital fertiliser, if native ryegrass pastures are present, to grow more of this already established pasture. In New Zealand's native pastures there will generally be some ryegrass and white clover evident in the sward. By increasing capital phosphate fertiliser and nitrogen inputs and through using heavier cattle to break up the turf mat, improvements to pasture composition and production levels can be seen relatively quickly. Spring is the optimal time to get in and break up the turf mat as this is when these low fertility grasses do not like to be trodden and it is also a good time to get the benefit of over-sowing some ryegrass into this pasture by incorporating it into your spring application of fertiliser. As the grazing and treading pressure builds and the soil fertility increases, the ryegrass outcompetes these older, lower fertility grasses as, like white clover, ryegrass will tolerate being trod by livestock. Overtime, as this practice continues and soil fertility increases, the pasture production will improve as it becomes increasingly more dominated by higher fertility grasses. If however fertiliser inputs and treading pressure, particularly through these key periods, is not maintained, there will naturally be a slow loss of legume and nitrogen fertility and reversion back to the low fertility grasses will occur. A key message here is that farmers need to remember, their pastures are a product of their management practices.



Recommendations

- Benchmark yourself against others in your area on a similar class of country to determine where you sit within the industry – are you really in the ‘top 20%’ of sheep and beef farmers? Be honest with yourself as it will be only yourself you are cheating if you are not. This will give you a good starting point.
- Work out your development priorities in order. Maybe look to bring in an independent person or group of people to make an assessment on what areas need focusing on first for improved performance. This may involve feedback from a local discussion group or getting a farm consultant or well-regarded local farmer in to have a look over your property, review your current policies and practices and provide suggestions.
- Be open to feedback, both positive and negative and turn it into something constructive – all farmers can make improvements in one area or another; no one is at the pinnacle.
- For those looking to take ‘the next step’ and undertake a pasture renewal programme – planning is essential. Use your experts (i.e. fertiliser reps, seed reps, etc.) and networks to gain knowledge on the process and determine what method is most suitable to you and your farm. Give yourself 12 months to plan. This will allow time for any preparation to be completed, such as fertiliser application and review of potential changes to stock policies.
- Do not take short cuts! If you choose to take a short cut after being advised otherwise, be accountable for your actions – do not put blame on your advisors. Take ownership of your decisions.
- Do not overlook the importance of learning how to not only successfully establish crops and new pasture species on your farm but also how to best graze these crops/pastures to ensure maximum stock performance and pasture persistence. Be open to change your grazing and management practices.
- Focus on the more productive, easier areas of your property first. You are more like to get a higher return off these areas than the lower productive areas.
- Approach ‘spray and pray’ as a re-grassing tool, as an investment rather than a cost. Try to determine what sort of return you will get from your investment – every farm and area of the farm will need to be assessed on a case by case basis.
- If you are just not a risk taker, ‘spray and pray’ may not be for you. Look at the other, less risky alternatives to intensify.



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Appendix 1: Survey Data

FARMER SURVEY

Surveys were conducted over a broad spectrum of hill country farmers around the Gisborne and Wairoa districts. The answers and summaries below are the results from all those farmers surveyed.

What is the size of your current farming operation?

1. 765ha (600ha eff)
2. 1000ha (910ha eff)
3. 2050ha (1745ha eff)
4. 510ha (456ha eff)
5. 790ha (764ha eff)
6. 1400ha (700ha eff)
7. 1950ha (1700ha eff)
8. 1922ha (1750ha eff)
9. 890ha (720ha eff)
10. 821ha (747ha eff – 62ha cash crop + 8ha margins, 677ha eff pasture)
11. 862ha (660ha eff)
12. 604ha (455ha eff)
13. 640ha (615ha eff) + 200ha winter flats
14. 2170ha (1970ha eff)
15. 807ha (720ha eff)
16. 1042ha (900ha eff)
17. 600ha (520ha eff)
18. 416ha (400ha eff)
19. 700ha (600ha eff)
20. 780ha (720ha eff)
21. 1100ha (1050ha eff)

Properties ranged from 416 – 2170ha (400 - 1970ha eff)

Average property size – 1039ha (861ha eff)

Farm Sizes:	<500ha	4.76%
	500-999ha	57.14%
	1000-1499ha	19.05%
	1500-1999ha	9.52%
	2000+ha	9.52%



What is your winter carrying capacity?

1. 5500su (9.2su/ha eff)
2. 9400su (10.3su/ha eff)
3. 17000su (9.7su/ha eff)
4. 5130su (11.3su/ha eff)
5. 6900su (9.0su/ha eff)
6. 5000su (7.1su/ha eff)
7. 17580su (10.3su/ha eff)
8. 14500su (8.3su/ha eff)
9. 7000su (9.7su/ha eff)
10. 7200su (10.7su/ha eff)
11. 5940su (9.0su/ha eff)
12. 4100su (9.0su/ha eff)
13. 5500su (8.9su/ha eff)
14. 18000su (9.1su/ha eff)
15. 6840su (9.5su/ha eff)
16. 8550su (9.5su/ha eff)
17. 5200su (10su/ha eff)
18. 3550su (8.9su/ha eff)
19. 6300su (10.5su/ha eff)
20. 6120su (8.5su/ha eff)
21. 11400su (10.9su/ha eff)

Winter carrying capacity ranged from 3550 – 18000su or 7.1 – 11.3su/ha eff.

Average winter carrying capacity is 8415su or 9.5su/ha eff.

Carrying capacity per ha eff:	≤9.0su	38.1%
	9.1-9.5su	19.1%
	9.6-10.0su	9.5%
	10.1-10.5su	14.6%
	10.6-11.0su	9.5%
	≥11.1su	4.7%

The average winter carrying capacity of those that utilise 'spray and pray' (Farms 1 – 4) is 10.1su/ha eff, while the average of those farms that currently do not (Farms 5 – 21) is 9.3su/ha eff, a difference of 0.8su/ha eff. That equates to near on 9% (8.6%) more carrying capacity if 'spray and pray' is incorporated into your management practice.

Those operators who are non-users of 'spray and pray' but who's stocking rates are above the average for 'spray and pray' users, are either from a dry belt where summers are an issue but they are able to carry more stock through the winter months, they have cultivated their easier country/flats first therefore utilising crops already or have a very good level of subdivision in place so able to utilise current feed levels well.



What stock policies do you currently run?

1. Sheep breeding/finishing
Beef breeding/finishing
Deer breeding/finishing
Dairy Grazing
2. Sheep breeding (all terminal) – finish 2/3rd, store 1/3rd
Breeding cows – 2/3rd progeny finished, heifer replacements retained
500 Bulls (Friesian bought as 100 day calves & home bred – ½ finished before 2nd winter, rest store before 2nd winter)
3. Breeding ewes
Trading steers – finish to 600kg+
Farm off ewe lambs and get back as two-tooths
Some winter lamb finishing
Small number of dairy heifer grazers
4. Dairy cow and dairy heifer replacement grazing
Bull Beef
Sheep breeding, including carrying through replacements
5. Breeding ewes & replacements – prime or store lambs
Breeding cows, buy in replacements as R1yr – progeny to 2yr old, prime or store
6. Traditional breeding – 60% cattle, 40% sheep
7. Breeding ewes
Breeding cows
Bull finishing
8. Sheep & Beef breeding, producing own replacements
Mate hogget's and yearling heifers
Sell lambs finished and store
Kill surplus heifers and sell steers store at 18mths
9. Sheep breeding
Heifer trading and finishing
Bull finishing
10. Sheep breeding and finishing
Cattle breeding and finishing
2yr cattle trade
Maize (milling) cropping

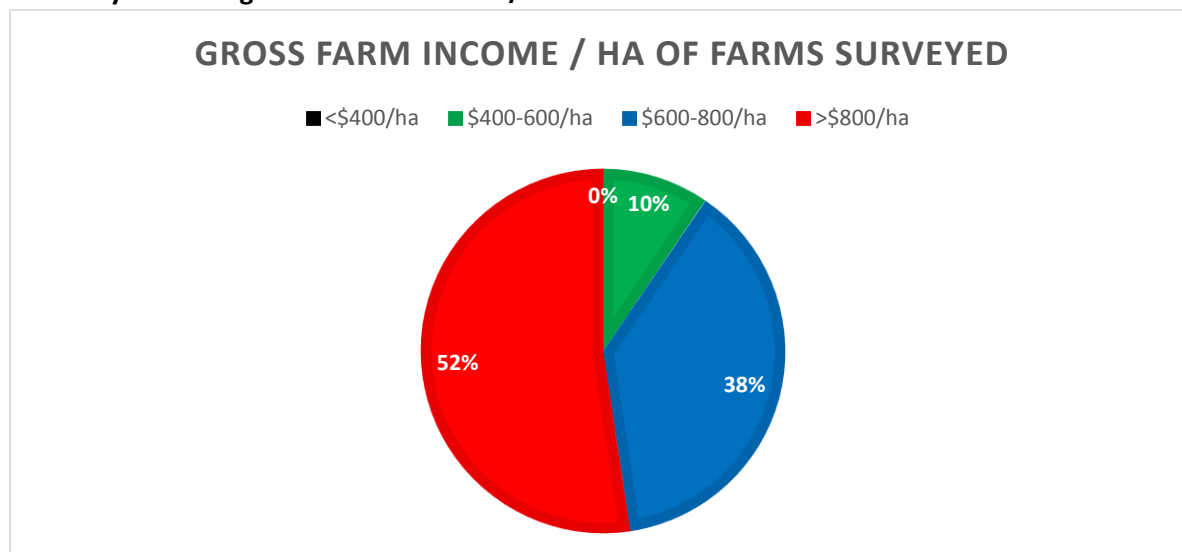


11. R1yr & R2yr Bulls trade to kill in summer/autumn
Breeding ewes all terminal sired, buy in two-tooth's
All lambs killed
12. Sheep & Beef breeding
Try to finish all wether lambs
Sell top weaner steers, rest store at 18mths
13. Coopworth breeding ewes, all lambs fattened
Weaner bull fattening, sold to dairy industry
Winter lamb fattening
14. Sheep and beef.
15. 60:40 Sheep and beef breeding unit.
16. Cattle stud – South Devon & Hereford
Commercial herd, 18mth steers and heifers sold store
Self-replacing herd, yearling heifers mated
Romney coopworth self-replacing flock
All lambs fattened
17. 60:40 Sheep to Cattle breeding unit
Try to finish all stock
Lambing 150% and also lamb hoggets
18. Breeding ewe flock, mate replacement hoggets
Purchase VIC cows and weaner heifers and steers to finish around 2yr old. No replacement heifers.
19. Sheep breeding and finishing.
Trading bull beef.
20. Sheep and cattle breeding and finishing.
21. Cows, steers to 18mths
Ewes, replacements
Dairy Heifer Grazing

There appeared to be a large focus on finishing and dairy grazing within the operations for those 'spray and pray' users.

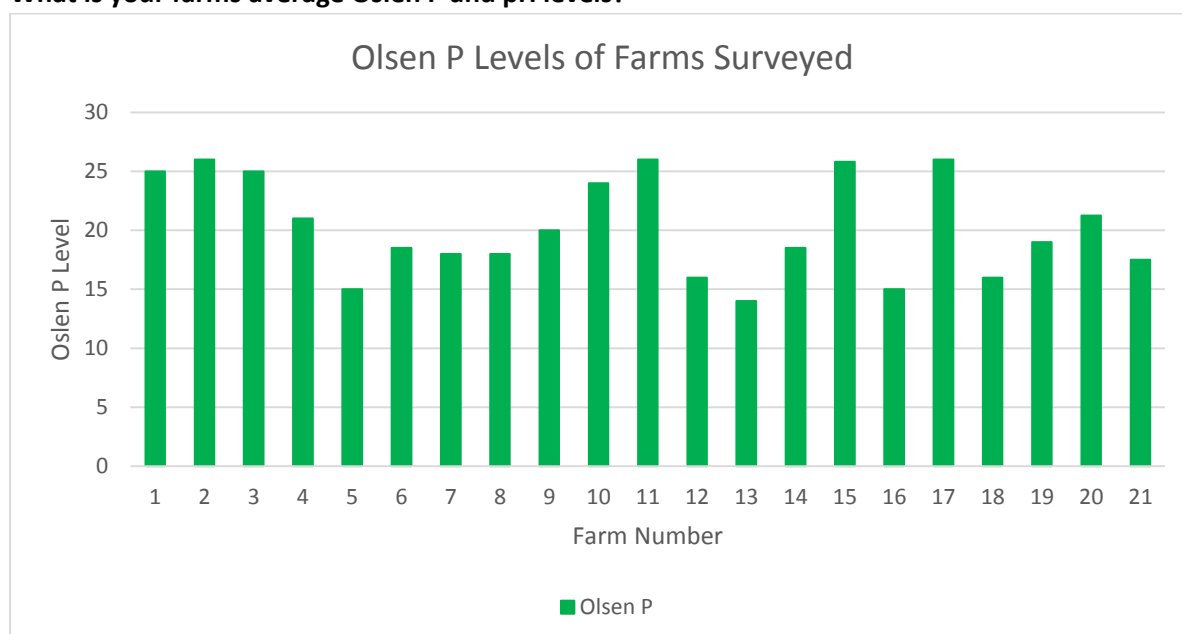


What is your average Gross Farm Income/ha?



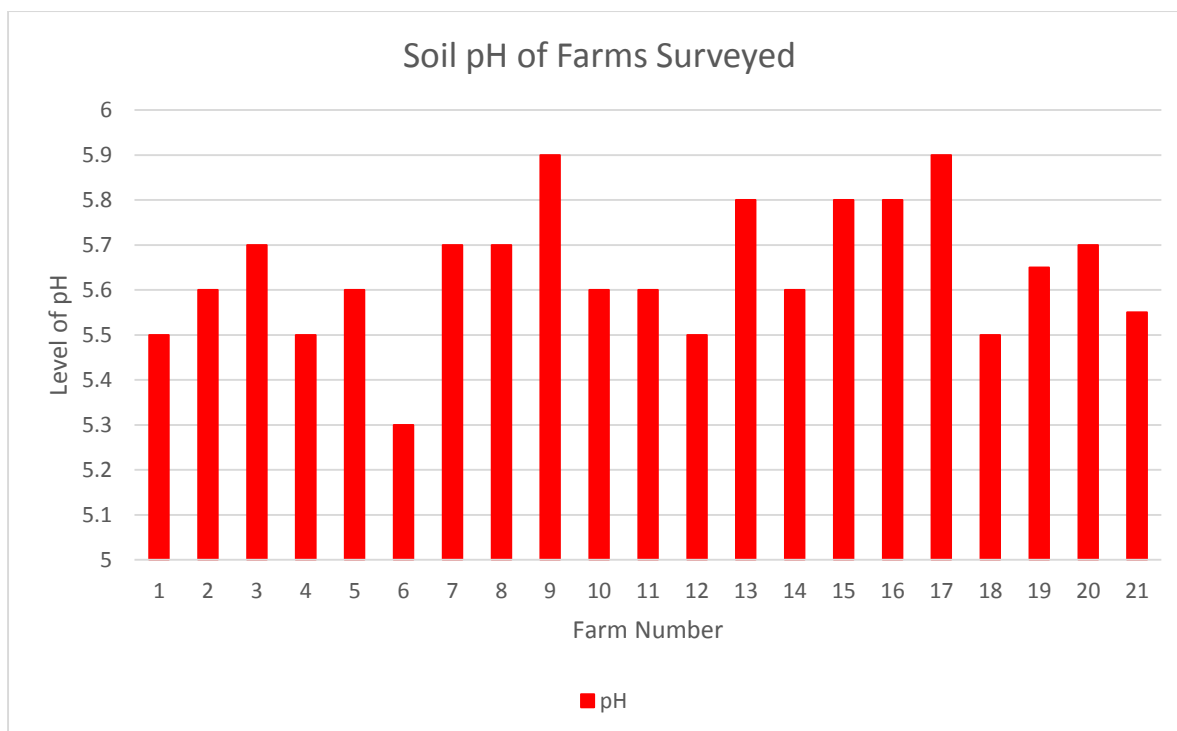
The average three year Gross Farm Income/ha for sheep and beef farms in Gisborne and Wairoa is \$778/ha, therefore just over 50% of those farms surveyed were above this average.

What is your farms average Olsen P and pH levels?



The Olsen P levels of those that are currently utilising 'spray and pray' within their farming system, have a higher Olsen P on average than the other farms. Of the five 'non-spray and pray' farms with Olsen P levels relative to those 'spray and pray' farms, two out of the five are looking to try their hand at the practice in the coming 12 – 24mths, indicating there are no barriers holding them back while the other two are either focusing on other development tasks first but may look into 'spray and pray' in the future or indicated they would be an early 'second adopter'.





The average soil pH of the first four farms, those that undertake 'spray and pray', are relatively low. This may highlight a potential opportunity here although these figures are the 'farm average' therefore the farmers may have rectified the soil pH's on those areas they are currently cropping or looking to crop to mitigate this risk. With an increase in soil pH crop yield potential may be increased.

If looking to intensify your current operation, what three areas in order of priority would you focus on and why?

First Priority:

1. Fertiliser & Lime – currently marginal Olsen P's and pH for intensive production. Other nutrients, especially Potassium, Sulphur and Magnesium are also low/marginal.
2. More finishing through crops – so not to sacrifice the breeding efforts to give someone else the cream in finishing.
3. Fertiliser – focus on lower tested areas and lime on lower tested pH areas.
4. Lime – concentrate on this over the next couple of years in particular – 150-200T/yr.
5. Water – allows full utilisation of existing resources, efficiency increases, allows more consistency in stock policies.
6. Fertiliser
7. Fertiliser – lift Olsen P levels in all paddocks.
8. Grow specialist pastures/forages on limited areas of easy country – finish more lambs bred.
9. Lucerne and plantain planting – drought proofing.



10. Develop summer hill country for summer brassica regrassing rotation – inject high quality feed into bottom 50% of replacement ewe lambs to target hogget scanning >120% (>80% wet); flush tail end ewes to achieve 200% scanning. Permanent pastures would then be able to be direct drilled with tetraploids to grow out weaner heifers for mating in a 7yr rotation through brassica.
11. Fertiliser – lift P levels in order to carry more stock.
12. Fencing – contain the stock to eat the grass more efficiently.
13. Fertiliser – lifting P levels closer to 20 to increase pasture production, running high fertility Coopworth ewes now giving us 150-160% lambing and lifting pH to 6.
14. Fencing up bigger paddocks.
15. Fertiliser – Olsen P levels not high enough on breeding country.
16. Cash cropping (maize) – allows for a good return per hectare whilst doing a regrassing program.
17. Intensify the flats, river terraces and alluvial fans
18. Capital Fertiliser – to raise the Olsen P to around 20 so as to boost grass growth particularly coming out of winter and dry spells.
19. Fertiliser – address any fertiliser issues.
20. Fertiliser application to increase feed production.
21. More summer crop – drought insurance when finishing lambs and to help overcome facial eczema.

Second Priority:

1. Regrassing/cropping with cultivation on easy land and spray and pray on steeper country – existing brown top pastures don't support high stock production.
2. Higher finishing weights – make the most of the already bred animals, it's not just about numbers.
3. Continue to regrow some poorer areas where we will get the greatest gain compared to status quo.
4. Further leasing for cropping (currently cropping neighbours lease) – need 60-70ha of crops, can do about 40ha on home block (kale).
5. Fertility – produces more grass of a suitable quality more evenly through the seasons. Given that water is now available to harvest it.
6. Fencing
7. Cultivation of easily accessible country (removal of rushes) – increase the productivity of the total effective area.
8. Lift fertility – on steeper/poor performing soils to lift production and prevent scrub reversion.
9. Fencing – maintenance catch up.
10. Increase subdivision – using single wire electrics for cattle to improve utilisation.
11. Spray and Pray – for better sward of pasture.
12. Fertiliser
13. Fencing – put in more single wire electrics giving us more pasture control as now running less cows.



14. Cutting scrub and spraying blackberry.
15. Develop more country and subdivide it.
16. Subdivision and spray and pray – improve pasture quality which will improve stock performance (kgs of meat and wool per hectare).
17. Intensify the easy/medium hill country.
18. Look at a liming program to release any locked up phosphate and raise the pH.
19. Regrass – improve my levels of sward.
20. Fencing/Subdividing to utilise extra feed.
21. More fertiliser at top block (newer block).

Third Priority:

1. Fencing – on underdeveloped parts of the farm to increase pasture/stock feed allocation control as a prerequisite for priority one and two.
2. Improve pasture species – P and pH have been addressed and subdivision is near optimum, next improve pasture quality.
3. Forestry – put some marginal areas into forestry.
4. Adjusting stock classes/policies – having flexibility and more productive policies.
5. Kg of product/ha – given adequate fencing, focus on dry stock to lift kg to sell, will improve profitability given that \$/kg is fairly constant, can be accomplished with stocking rate increase also.
6. Pasture quality
7. Intense subdivision – reduce paddock sizes in order to manage grass quality more efficiently and allow for the introduction of fodder crops.
8. Continue to build better infrastructure – satellite yards, laneways, more subdivision, better water supplies, further reduce weeds and scrub.
9. Fertiliser – maintain production levels, adjust pH for crop.
10. Small increase in winter feed crops – increase late winter/early spring feed supply.
11. Convert to dairying – higher returns.
12. Increase lambing percentage.
13. Pasture renovation – regrassing easier country. Putting in summer lamb crops and sowing down in high production clover/grass or plantain.
14. Buy or lease some easy country to be able to fatten all stock, cattle and sheep.
15. Heifer or hogget mating.
16. Reticulated water – water quality will help animal health (better weight gain, pregnancy weights, etc).
17. Intensify the steep hill country.
18. Nothing.
19. Fencing – maintain existing fences, create sub-division if necessary.
20. Fine tuning stocking policies.
21. Swedes for winter.



Biggest priorities were based around lifting fertility (Oslen P and pH levels) and cropping / regrassing / improving pasture quality, followed by fencing / subdivision.

Do you currently utilise 'Spray and Pray' in your current operation?

Farms 1 – 4	Yes	19.05%
Farms 5 – 21	No	80.95%

Would you consider utilising 'Spray and Pray' to intensify your farming operation and why? (Farms 5-18 only)

5. No
6. Yes
7. Yes
8. Yes maybe – to improve pasture quality (I will do the cultivatable areas of the farm first).
9. Yes – where terrain makes it impossible for tractor work. We have done a successful crop in the past and propose to do so again once we have completed current programme.
10. No – cost/benefit/risk profile outside acceptable levels.
11. Yes – plantain looks good for high growth weights.
12. No
13. Yes – I have heard of good results on Gisborne hill country.
14. Yes – to help develop ineffective country.
15. Yes – because flats get too wet.
16. Yes – I am considering spray and pray – it's a good investment towards my hill country. New pastures on flats increases production therefore new pastures on hills will do.
17. Yes – in areas that it is not practical or impossible to use a direct drill.
18. I have used this method a couple of times to bring in rushy country. I don't have a policy of cropping but go straight back into grass. One block was 4ha, the other 12ha.
19. Yes – are currently using traditional cultivation methods but are going to try a bit of spray and pray in pockets.
20. Yes – if I had sound data to back it up.
21. Yes – but have been advised that my hills are too steep, with sheep tracking making it too difficult to get seed onto the face of the hill. Some easier hill, but worried cattle may damage the soil too much when grazing the swedes in winter. Have 200ha of flats so have just kept forage cropping to this area for simplicity.

Of those farmers that currently do not utilise 'spray and pray', 82.4% would consider it / have used it in the past as an intensification option.

If you are currently using 'Spray and Pray', (Farms 1 – 3);

- What area do you crop?

1. 10-20ha
2. 25ha
3. 40-80ha
4. 60-70ha



- **What sort of crop do you grow and why?**
 1. Brassica, swedes or kale to provide bulk winter feed.
 2. Swedes and plantain (put in as permanent)
 3. Use a crop rotation – have winter crops of kale, swedes or rape. Crop depends on where it is, i.e. if it is a wet paddock we use swedes for better utilisation, or rape if we want to put lambs on the paddock, etc. We plan to do more rape crops to do more winter lamb finishing. This is because rape is a very quick grower and handles bug infestations better than swedes. Summer crops used are Hunter brassica and rape again. Finally we go back into permanent pasture in autumn.
 4. Kale for winter grazing. Generally try and do as much of the paddock with the tractor as possible and do the gullies, etc with the chopper for best results.

- **What financial gain do you think it provides?**
 1. Haven't quantified this but the crops have been a major benefit in the last two dry years.
 2. \$1200/ha.
 3. The crops themselves barely cover the costs of the exercise if extra spraying is needed for bugs, etc. However, the new grasses far out-perform the old ones so the benefit is more here than in the crops themselves. Also this is very hard to quantify in \$/ha terms, but is substantial.
 4. No idea although the crops wouldn't make much, it's more the regrassing into newer pasture species.

- **Have you adjusted your stock policies with the introduction of 'Spray and Pray'? If so, how?**
 1. No
 2. Not really, except cut back on overall su to concentrate more on kg/ha production.
 3. Yes – with cropping we can focus a large amount of stock on a small area in winter time, allowing more space for lambing ewes. We have also increased ewe numbers because of this. It also allows more winter lamb finishing and our cattle are finished a lot earlier than before we started putting them on crops.
 4. Yes and No. Now utilising it more for dairy grazing through the winter so policy has changed since we changed to grazing.

It is obviously very hard to put a figure on the perceived financial gain from utilising 'spray and pray' as a regrassing tool. As mentioned above however, the general consensus is that the gain is not actually in the crops but the regrassing, being able to produce higher producing pasture species of a higher quality. There also appears to be an advantage in altering stock policies to accommodate this management change and make full potential of it. The type of crops grown appear to be those that can benefit the farmers stock policies, such as winter feed crops for dairy grazing or rape for lamb finishing, or those that are best suited to the area being cropped.



What benefits / advantages do you think you would see from the use of 'Spray and Pray'?

1. High quality finishing feed in summer and transferring a spring surplus into the following winter.
2. Improved tonnage, ME and palatability.
3. Regrassing of marginal areas – it is cheaper than cultivating, soil structure is not compromised as much as with a tractor, moisture retention in the soil is better in dry seasons.
4. Regrassing benefit, it's a cheap crop....if it works, you get a bigger lift in production from regrassing a hill block then a flat paddock, relative to what you had to start with.
5. None.
6. Paddocks that cannot be ripped up would be able to establish a rye grass pasture and get rid of any weeds and native grasses.
7. Spring application, provided there is sufficient rainfall, would allow for the finishing of lambs that would otherwise be sold store.
8. To introduce more productive pasture species.
9. Higher producing pasture and crops on the hill country, wiping out weeds such as rats tail and barley grass, putting very drought proof legumes onto hard NW facing slopes.
10. Small increase in summer feed from over sown brassicas vs ryegrass/clover which only does 10-15kgDM/ha/day Jan-Mar.
11. Cheap way to get a desirable species introduced such as plantain.
12. More modern grasses which are supposedly able to increase production.
13. Higher gross production with higher ME, higher stocking, better fattening ability.
14. Better quality feed and more stock.
15. Hold up young stock on crop to feed breeding stock better in winter, being able to carry more su's through.
16. Better pastures will grow more quality dry matter, new pastures are more drought tolerant.
17. To increase production – stock away to works faster.
18. An economical way to sort out rushy and weedy areas.
19. Improved pastures with higher ME levels which will result in better live weight gain of stock.
20. Better pasture composition.
21. Winter feed to get cattle through winter in forward condition.

What challenges / disadvantages do you think you would see from the use of 'Spray and Pray'?

1. Risk of crop failure with dry weather, dependent on helicopter, wind and weather.
2. Very weather dependent and occasionally challenging to get a chopper at the optimum time.
3. They are more risky with rainfall needed soon after seed application to get a good germination. They also tend to have a slightly lower crop yield than a traditionally worked paddock. Certain bugs are more prevalent than in worked soils.
4. Variation in crop yields, weather risks, more chance of failure due to high risk nature, can't set stock on new pastures.
5. Opportunity cost of land out of production, the longevity of the new species, especially if other inputs and / or management hasn't changed, risk of failure given costs are all upfront.



6. Weather and timing, getting the right operator (helicopter), fertility levels would have to be at a level to hold the rye grass and clover sown. If worked would estimate our main paddocks could stock 30% more.
7. Timing of rainfall – from October onwards can often see a lack of moisture.
8. High risk, variable results around the district so far, weeds, needs soil P, pH, water and subdivision to be optimal first.
9. Weather, it must be wet for a spell after spreading the seed. Organising the helicopter and (BIG issue) having it arrive at the right time. The seed bed (germination) is riskier in this type of programme so we may end up with nothing.
10. High cost, plant establishment, weed control, persistence. If you were able to spend the money on seed, chemical, capital fertiliser, etc., you might as well cultivate (where possible) to get the ground to the point where you can maintain ryegrass via direct drill. Clover populations can be maintained by broadcast over sow.
11. Might be more of a weed problem because the strike may not be 100%.
12. Weeds.
13. Risk of weather, i.e. dry in the spring.
14. Weather and weeds.
15. Climate, more expenditure.
16. The risk of a bad strike at \$1000-1200/ha it is a large expense, timing is everything! It would be a challenge to take that area out for a long period.
17. In the front country the chance of failure is increased with the risk of lack of rain after planting or germination. Hill country with sheep tracks on it will be far harder to get a good result, have to get chopper to do any follow up sprays/slugs.
18. Results are variable with the weather and residual pasture length playing a big part in the success of the project.
19. The weather, weeds – by disturbing the ground, encouraging weed germination.
20. Environmental factors could be a disadvantage in terms of potential failure of crop.
21. Once back in grass, needs to be grazed with sheep only for 12 months.

What are the barriers stopping you from making ‘Spray and Pray’ part of your farming system?

1. N/A.
2. N/A.
3. N/A.
4. N/A.
5. Think factors in Q.6 need to be completed first, therefore consider Spray and Pray to be the last development tool to be used, as previous ones have a lower risk profile.
6. Cost, fertility levels, knowledge of the whole process and getting over the first hurdle and trying it. If successful, no problem to progress to doing a paddock per year (30-40ha).
7. None, lack of knowledge on similar country.
8. Lack of confidence that I would get a pay back, I’ve got easier country to do first.
9. Weather risk, priorities – we are just starting a programme of pasture renewal, we are doing the best land first which is tractor country. Financials – staged approach. Can’t take too much land out at once – feeding current stock and getting this years’ income.



10. I'll be a fast second adopter – not first guinea pig, yet to see cost benefits that stack up favourably enough in our area. I also have plenty of hill country that could be cultivated so I am focusing on that first.
11. None!
12. Other things to do first.
13. None.
14. Will be using spray and pray for the first time this autumn.
15. More cost, got other development to do.
16. I am currently developing scrub, blackberry, gorse and fencing currently these are my priority. It is only a matter of time when I start a spray and pray programme.
17. We will try doing some next autumn. Spray out 1 December, leave fallow over summer, spray out again 25 February – plant in plantain/clover mix, fertiliser, slugs, pray..... Planting will be done both ways to ensure coverage. pH was addressed 12mths in advance.
18. Experience tells me that many of the new grass cultivars don't seem to have great persistence in a northerly aspect in this country. Also some of the bigger leafed plants such as plantain and chicory don't seem to tolerate thistle sprays well. My philosophy is that the money would be better spent on fertiliser and running classes of stock which will eat the existing grasses which have adapted to these conditions.
19. I will try a little bit in the next couple of years and take it from there.
20. I am not convinced it would work and have higher priority expenditure at the moment.
21. Cost and my farm budget is too tight to take any risk.

Thirty five percent of those currently not using 'spray and pray', believe they have no barriers stopping them from taking the next step of pasture renewal through this method. Some have already planned to undertake the practice in the next 12mths.

The major barrier was seen to be other development taking priority, e.g. fertiliser, pH, fencing and scrub/gorse/blackberry clearing being the main focus. This is a very relevant barrier as this development is seen to be lower risk but also they are areas that need to be addressed prior to taking up 'spray and pray' to help reduce one's exposure to a failed crop/regrass.

The other areas that were perceived as barriers included cost and the uncertainty as to whether the farmer would see relevant pay back. Lack of confidence that the practice would work on the farmer's type of country was also a valid concern, particularly in northerly facing, drier areas of Gisborne and Wairoa.

