B+LNZ Drought Management Regional Case Study - Dargaville, Northland

Case Study Farm: Ashgrove Ltd farmed by James and Janine Parsons, Tangowahine, Dargaville
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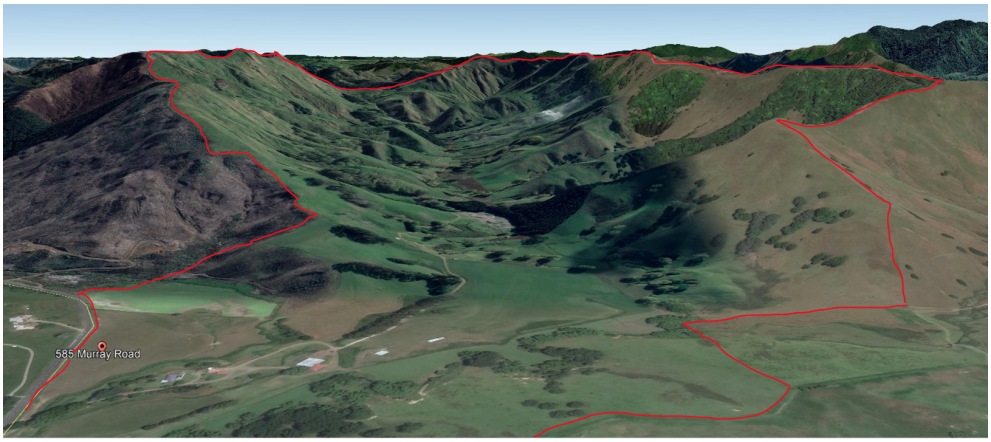
Executive Summary

Ashgrove, a 478ha Kaipara hill country sheep and beef farm, has been severely impacted by the 2020 drought. As the drought extended Ashgrove put several things in place in the autumn to minimise the impact and residual effects on the subsequent 2020-21 financial years' production and profit. This included purchasing and feeding 29t of palm kernel, grazing ewe hoggets off-farm, selling stock early, applying 29t of autumn nitrogen and installing a pump and 25,000L water tank. The result was improved water infrastructure and containing losses within the 2019-20 financial year. Also, beef restocking occurred in late April 2020 rather than November 2020. The subsequent 2020-21 financial year returned a $54,552 higher gross margin through higher production and profit, compared with doing nothing, with little residual effects from the 2020 drought. In addition, Ashgrove is now better placed to handle future droughts with infrastructure and new management practices put in place.

Background

The combination of adverse weather conditions and Covid-19 restrictions have caused major problems for some farmers. This case study examines the issues, Farmax analysis and management options considered and implemented by Northland sheep and beef farmers James and Janine Parsons and their farm staff.

Farm Overview



Ashgrove property boundary in red

Ashgrove is a 478 ha sheep and beef farm with 415 ha's effective, 75% is steep class 6 and 7 hard hill country. Located in Tangowahine Valley, North of Dargaville it typically receives 1600mm of rain per year. The farm has a semi volcanic soil type that is free draining but prone to drying out quickly when insufficient rain. The stock policy is sheep breeding and finishing complemented with bulls and steers in a ratio of 55% sheep and 45% cattle.

The sheep flock comprises 1,300 ewes and 700 hoggets wintered. The bulk of the ewe flock are Coopworth breeding ewes, of which 350 are stud ewes. The Coopworth flock normally lambs between 150% and 160%. The remaining 125 ewes are stud Suftex ewes. Of the 700 hoggets wintered 200 are stud ram hoggets sold in November as flock sires. Commercial sale lambs are sold store at weaning, with the heaviest 30% marketed to the works from weaning through to February supported with 10 ha's of chicory. Surplus ewe hoggets are sold as breeding replacements.

340 cattle are typically wintered. The policy involves 120 bulls purchased as spring and autumn born R1's and finished to the works as R3's from October through to May. 100 R2 steers at 400kg are purchased in July-August and rotate around the hills on modest growth rates with the ewes to maintain pasture quality. These are marketed 11 to 15 months later to the works at 300 to 320kgcw

Total base pasture production is modest averaging 5,100kgDM/ha over the last 5 years. Spring DAP is applied + Ammo in August each year totalling 35kg of N/ha across most of the farm. Providing an additional 300kg/ha of dry matter production to kick start the spring.

The farm is run by two full time labour units to manage a higher than average workload associated with an ongoing development programme and the Coopworth and Suftex sheep studs.

Up to December 2019 stock water was predominately from streams supplemented with a spring-fed reticulated system across 60ha's, additionally another 40ha had a pump reticulated system. A reliable stream flows the length of the farm, even through droughts, although this is largely fenced off and not accessible to stock.

Current situation at 18th April 2020

Ashgrove has experienced very low rainfall since December 2019 with 12mm for January, 3mm for February with some showers bringing 58mm for March. Up to 18th April 30mm of rain had fallen. Corresponding pasture growth rates were very low as a result, the worst months being 4.1kgdm/ha/d for Jan, 0.2kgdm Feb. With some patchy rain in March, growth rates started improving to 11.8kgdm/d for March arresting the decline but not breaking the drought. Consequently, pasture covers have steadily declined over the summer with a small improvement in March.

Month	Rainfall (mm)	Historical Rainfall (mm) Avg	Past' Growth (kgdm/ha)	Past' Cover month end (kgdm/ha)
Dec	84	112	15	1640
Jan	12	101	4.1	1472
Feb	3	149	0.2	1146
Mar	58	147	11.8	1240
Apr		140		

In December 2019, as part of a planned development programme to reticulate water across the farm, the spring fed reticulated water system was expanded. However, the springs previously considered reliable could not keep up through the drought creating significant issues. This was compounded by a concurrent subdivision programme reducing paddock sizes and fencing off access to streams for stock water. Significant time was expended keeping water to stock creating real stress on the team.

The combination of low pasture covers and at times stock water shortages caused ewe condition to decline, replacement ewe lamb and ram lamb growth rates were minimal at 30g/day apart from some finishing lambs on chicory. Bull and steer growth rates started to drop away to 0.1kgLWG/day through February and early March.

Options Analysis

In drought situations there is never just one silver bullet. The market was poor for selling stock, grazing off farm was limited and rapidly being snapped up, the works had a back log exacerbated by Covid-19 safe working practices. Supplementary feed costs were increasing the longer the drought dragged on. Utilising Farmax, three options were explored being 1) purchase of supplementary feed, 2) applying nitrogen and 3) destocking.

1. **Supplementary Feed -** Purchased 29t of Palm Kernel (PKE) on 10th March and feed cattle through the autumn at a cost of $380/t delivered. Total cost of $11,020 (0.42c/kgDM at 90% DM). Price at time of writing is now $423/t delivered. Also purchased 1t of Whole Maize Grain at $525/t to flush 200 light ewes and some Suftex ewe hoggets to achieve target mating weights and improve conception rates.

2. **Nitrogen -** Applying 29t of SustaiN on 20th April at 100kg/ha to boost pasture covers pre-winter. Nutrient cost of $646/t including store charges and a freight and application cost of $200/t with a fixed wing plane. Total cost $846/t or $24,534 ($846/ha). Providing 133.4t of dry matter (18.4c/kgDM at 10:1 N response). Facilitating the purchase of 100 R1 bulls in late April.
3. **Destocking** - Sell 33 bulls to works early at 253kg/carcass weight on 16th March relieving pressure on feed and grazing 260 replacement ewe lambs off farm from 13th Feb until 1st May at $1.50/hd/week.

It is important to highlight the destocking, PKE and Maize Grain purchases were to help feed animals during the drought. The autumn nitrogen application was not a drought management strategy but a drought recovery strategy to enable earlier purchases of cattle and feed stock through the winter and set up Ashgrove for the spring. These interventions collectively result in a pasture curve comparison as shown in **Graph 1.** below:

Graph 1. 24 Month Pasture covers under the two scenarios - 2019 to 2021

The red curve shows pasture cover per ha with "Interventions" and the green curve shows "No Interventions".

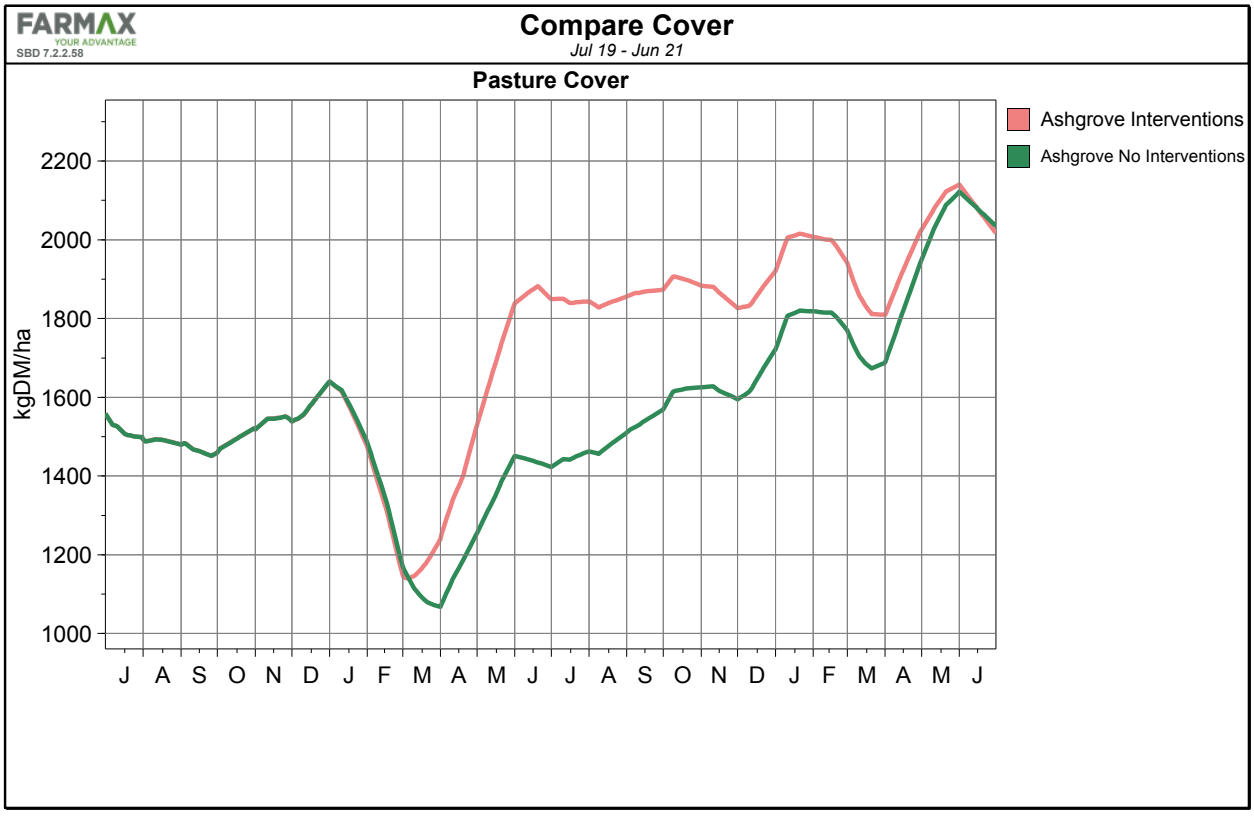


Table 1. 24 Month Gross Margin Comparison - 2019 to 2021

The interventions resulted in a better financial result over the two years of $55,403. With virtually all of this being realised in the 2020-21 financial year. This is explained in more detail later.

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Compare Gross Margin

Jul 19 - Jun 21

			Ashgrove No Interventions	Ashgrove Interventions	Difference
Revenue	Sheep	Sales - Purchases	713,815	713,911	96
		Wool	44,900	43,242	-1,658
		Capital Value Change	-56,357	-23,354	33,002
		Total Sheep	**702,358**	**733,799**	**31,441**
	Beef	Sales - Purchases	200,517	222,569	22,052
		Capital Value Change	-71,401	-29,668	41,734
		Total Beef	**129,116**	**192,901**	**63,785**
	Crop & Feed	Capital Value Change	7,000	7,000	0
		Total Feed	**7,000**	**7,000**	**0**
	Total Revenue		**838,474**	**933,700**	**95,226**
Expenses	Crop & Feed	Conservation	6,240	6,240	0
		Forage Crops	8,000	8,000	0
		Purchased Feeds	0	11,100	11,100
		Regrassing	16,000	16,000	0
		Nitrogen	78,142	102,676	24,534
		Off-Farm Grazing	0	3,003	3,003
		Total Crop & Feed	**108,382**	**147,019**	**38,637**
	Stock Costs	Animal Health	56,000	56,000	0
		Shearing	24,853	22,118	-2,736
		Total Stock Costs	**80,853**	**78,118**	**-2,736**
	Interest on Capital (livestock & feed)		58,540	62,462	3,921
	Total Variable Expenses		**247,776**	**287,598**	**39,823**
Gross Margin			**590,698**	**646,102**	**55,403**

Decisions Made and Why

Collectively the three interventions modelled above were enacted and result in a break-even Gross Margin for 2019 -2020 – see **Table 3.** But more importantly higher pasture covers by 427kgdm/ha at 30th June of 1850kgdm/ha see **Graph 1.**

While there was $39,184 of extra cost due to feed purchases, applying nitrogen and off farm grazing, a revenue increase of $40,035 offset the increased costs. It is important to note this was largely non-cash revenue with a value increase from more and bigger beef animals on hand at 30th June, expressed as "Capital Value Change" in **Table 3.** The purchase of 100 R1 bulls in late April while stock was still cheap made a large contribution to this. This is shown in the Beef Capital Value Change. Also expressed as greater liveweight on hand at 30th June 2020 in Table 2. Whilst there is no real financial benefit shown in the 19-20 year, the financial benefit is captured in the 20-21 financial year, see **Table 3.**

Table 2. Animal Liveweight on Hand at 30th June 2020 Under Different Interventions

	No Interventions	Interventions	Liveweight Increase (kg lwt/ha)
1st July 2019 Opening Liveweight (kg/ha)	517	517	0
30th June 2020 Closing Liveweight (kg/ha)	420	482	62

Table 3. 2019-2020 Gross Margin Comparison

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Compare Gross Margin

Jul 19 - Jun 20

			Ashgrove No Interventions	Ashgrove Interventions	Difference
Revenue	Sheep	Sales - Purchases	397,045	420,454	23,409
		Wool	23,092	23,517	425
		Capital Value Change	-89,201	-104,099	-14,898
		Total Sheep	**330,937**	**339,872**	**8,936**
	Beef	Sales - Purchases	142,857	87,435	-55,423
		Capital Value Change	-95,064	-8,541	86,522
		Total Beef	**47,794**	**78,893**	**31,099**
	Crop & Feed	Capital Value Change	0	0	0
		Total Feed	**0**	**0**	**0**
	Total Revenue		**378,730**	**418,765**	**40,035**
Expenses	Crop & Feed	Forage Crops	4,000	4,000	0
		Purchased Feeds	0	11,100	11,100
		Regrassing	8,000	8,000	0
		Nitrogen	38,124	62,658	24,534
		Off-Farm Grazing	0	3,003	3,003
		Total Crop & Feed	**50,124**	**88,761**	**38,637**
	Stock Costs	Animal Health	28,000	28,000	0
		Shearing	12,467	12,467	0
		Total Stock Costs	**40,467**	**40,467**	**0**
	Interest on Capital (livestock & feed)		31,578	32,125	547
	Total Variable Expenses		**122,170**	**161,353**	**39,184**
Gross Margin			**256,561**	**257,412**	**851**

Table 4. 2020-2021 Gross Margin Comparison

FARMAX YOUR ADVANTAGE SBD 7.2.2.58

Compare Gross Margin

Jul 20 - Jun 21

			Ashgrove No Interventions	Ashgrove Interventions	Difference
Revenue	Sheep	Sales - Purchases	316,770	293,458	-23,312
		Wool	21,808	19,724	-2,083
		Capital Value Change	32,844	80,745	47,901
		Total Sheep	**371,422**	**393,927**	**22,505**
	Beef	Sales - Purchases	57,660	135,134	77,474
		Capital Value Change	23,662	-21,126	-44,789
		Total Beef	**81,322**	**114,008**	**32,686**
	Crop & Feed	Capital Value Change	7,000	7,000	0
		Total Feed	**7,000**	**7,000**	**0**
	Total Revenue		**459,744**	**514,935**	**55,191**
Expenses	Crop & Feed	Conservation	6,240	6,240	0
		Forage Crops	4,000	4,000	0
		Regrassing	8,000	8,000	0
		Nitrogen	40,018	40,018	0
		Total Crop & Feed	**58,258**	**58,258**	**0**
	Stock Costs	Animal Health	28,000	28,000	0
		Shearing	12,386	9,650	-2,736
		Total Stock Costs	**40,386**	**37,650**	**-2,736**
	Interest on Capital (livestock & feed)		26,962	30,337	3,375
	Total Variable Expenses		**125,606**	**126,245**	**639**
Gross Margin			**334,138**	**388,690**	**54,552**

Below we explore the decisions and how they brought about an improved result:

1. Purchase of 29t of PKE and 1t of Whole Maize Grain

   Livestock were starting to go backwards with low covers and poor-quality feed. Selling large numbers of stock was not desirable on a depressed market. The PKE purchase enabled the cattle to still put on weight at 0.5kglwg/d while held in paddocks with minimal pasture apart from roughage and good water. It also kept a forward mob of steers on track to slaughter in July, which would ease pressure on late winter and early spring pasture. The Whole Maize Grain, whilst a small quantity, enabled the tail of the ewe flock to get a lift and achieve a higher overall conception rate and less empty ewes at scanning, therefore more lambs weaned in Dec 2020. Those ewes fed maize grain were putting on 120gLWG/d in March when fed 200g/day of maize grain with pasture. Flushing ewes, achieving a rising plane of nutrition prior to going to the ram, is a proven method of increasing conception rates.

2. Applying 29t of SustaiN on 21st April

   The nitrogen application by plane of 29t was the cheapest form of feed at 18.39c/kgdm based on a conservative 10:1 response for hill country. While tempting to save some cost by applying the easy country with a bike spreader the speed and timeliness of the plane was preferred to get the nitrogen on in preparation for rain. The extra drymatter this nitrogen grew, enabled the purchase of 100 R1 bulls in late April while prices were still depressed with the drought. And ability to feed existing stock better through the winter and achieve higher income in the 2020-21 financial year. See **Graph 1.**

3. **Selling bulls early and grazing off ewe hoggets**

   33 R3 bulls were sold on 16th March at low carcass weights and 260 ewe hoggets grazed off farm from 13th Feb to 1st May. While feed could have been brought to carry these animals on farm, these additional mobs of stock were creating more pressure and management complexity by being on farm. Covid-19 supply chain and market impacts were still unknown at mid-March so on balance a cautionary approach was taken, and the bulls sold. Both these initiatives relieved a lot of pressure on the team and feed demand. It also aided the pasture recovery in the autumn and ewe hoggets achieved better liveweight gains by grazing off farm.

Other Decisions Made:

1. Under sowed annual ryegrass into chicory in mid-March rather than spraying out chicory given the autumn feed shortage.
2. Delayed tupping of ewes by 1 week to 31st March to try and build condition, the alternative was considered to bring tupping forward but flushing with maize grain would not have been an option as was started too late. The team backed themselves rightly or wrongly that autumn rains would come also to assist in flushing ewes. Rams also to be left out for three cycles to pick up any late cycling ewes.
3. Organised sale of surplus ewe hoggets that would normally carry through till November
4. Identified forward mob of steers and bulls and fed palm kernel to finish by July. Rest of cattle put on a long slow winter rotation.
5. To alleviate the stock water concerns a high-pressure water pump was purchased plus a 25000L holding tank and pipe at $8,000 total investment. This supplemented the spring fed reticulated water system by pumping from the stream. This eased significant stress on the team and the more reliable water improved stock performance by being able to graze paddocks more effectively. Because this was a capital expenditure item it has not been included in the gross margin analysis.

Practical Considerations:

- Feeding out PKE was a new management practice at Ashgrove. Cattle weren't used to eating it but after a week caught on quickly. PKE was not fed to sheep over concern with the high copper levels. Storage was in the tractor shed, which fortunately had a block wall 1 metre high on 3 sides and the tractor was parked outside. Feeding out became a daily routine with a tractor bucket load of PKE carted to each 70 head mob of cattle, steers and bulls were mixed to achieve bigger mob sizes. Once cattle were trained the PKE was left in piles on the ground and utilisation was very high given there is no mud in a drought. 350kg bulls were receiving 4kg to 5kg per day and growing at 0.5kg/lwg/d.
- Application of Urea with a plane or helicopter is at risk of not providing the full benefit as relies on rain to stop volatilisation. But using products like SustaiN (Urea coated with Agrotain) is far more stable and will largely sit there until rain arrives. Secondly once it rains it is hard to get a plane or helicopter as they are in high demand, so the decision was made to go early. While it is better to apply N as a growth multiplier to rapidly growing pasture, the showers of rain through March and April had greened the farm up, albeit still with low covers.
- Training ewes to eat Whole Maize Grain took time locked in the yards – some good B+LNZ info on training sheep is available in their Extreme Dry-Management Factsheet. Training needs to be done at least a month before tupping as initially they will lose weight. Post tupping this strategy can be used to lift a tail in the ewe flock. Be careful introducing grain as easy to kill sheep while their rumen is adjusting.
- Cash was readily available as Ashgrove deliberately maintains some headroom on its' mortgage, so funds can be drawn down quickly rather than having to seek an extension to the bank overdraft. The alternative is going to the bank to get an overdraft extension, but farmers often procrastinate doing this resulting in important decisions being deferred. For some farmers this can be emotionally draining, and seeking approval takes extra time.

Other Points

- Act early – selling stock at a discount is painful at the time but brings peace of mind once done.
- If you must choose, feed stock better at the end of winter not the start. It requires less total feed as you aren't maintaining a heavy animal through winter. You can only do this with long grazing rotations. Long rotations can be achieved by bigger mobs or splitting paddocks up with electric fencing. Generally a combination.
- Investment in water infrastructure and a reliable water source is a high priority for farmers. The traditional approach of stock drinking directly from dams or streams have shown this year to be unreliable.
- Most farmers have a shed they could repurpose to store grain or palm kernel. Palm kernel is a cost-effective feed in a drought and usually readily available. Whole maize grain is grown locally in Northland, so a good option compared with barley which is generally carted in from out of region. Maize grain can be purchased and stored in half ton bags.

Winter and Spring Plan – The Next Steps

The focus now is to realise the financial and production goals for the next year. As pasture recovers across the farm with the late autumn rains it is vital that a long slow grazing rotation to build and preserve pasture cover is put in place.

Apart from a forward mob of steers and bulls to be supplemented with palm kernel and slaughtered in July, all other bulls and steers will be set up behind sticks and string hot wires for the winter, involving two long rotations of 80 then 60 days. Winter live weight gains will deliberately not exceed 0.5kglwg/d. Come September, aided by an August application of DAP and Ammo, a shorter 30-day spring rotation begins on well-groomed quality feed with target live weight gains of 1.1kg/day. As pasture growth rates improve in October and November so does the rotation length shorten, and cattle growth rates improve. November and December are when the bulk of the bulls will be marketed to the works. Importantly the older bulls and steers are always the priority over younger R1 bulls. If any mob needs to suffer a lower live weight gain due to winter and spring pasture growth rates not meeting expectations, it will be the animals furthest from slaughter. This ensures the bigger finishing animals can be grown at optimum and marketed at their set time to relieve pressure on the farm going into summer.

All ewes including the stud ewes will be mobbed up from early May and placed on a 100-day rotation for winter, with leader and follower mobs. Leader mobs rotating ahead of the main mob of ewes will comprise 2ths, and light mixed age ewes identified through regular condition scoring. After pregnancy scanning triplet ewes will be put ahead in the leader mob also. The target is to maintain a minimum condition score of 3 for lambing starting 28th August. Whilst the Suftex ewe hoggets will be flushed on grain and tupped, the Coopworth ewe hoggets will not be put to the ram this autumn. This will reduce winter feed demand and increases the likelihood of achieving their target 2 tooth mating weight in 2021.

Pasture covers will be regularly measured and modelled on Farmax and should target spring pasture covers look at risk, additional nitrogen will be applied through winter on the bull cell systems. And the annual pre lamb DAP/Ammo application will be boosted with higher amounts of Ammo (nitrogen mixed with sulphur).