Sheep Farming - Back to the Future

A report for Kellogg Rural Leaders Programme 2010

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Acknowledgements

I would like to firstly thank the Kellogg Rural Leaders Programme and the major sponsors Lincoln University, Deer Industry NZ, DairyNZ, Beef and Lamb New Zealand, Pipfruit New Zealand and Zespri for their support.

Special thanks to the Telford Farm Board and Telford Farm Staff Team for all their support over the last four years and for allowing me to have the time this year for the Kellogg Project.

Thanks also to my family and friends who continue to help sustain the passion and enthusiasm I have for the New Zealand sheep Industry, and have provided valuable feedback and assistance with the compilation of this report.

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Foreword

My background is in Canterbury dryland mixed livestock farming, predominately mid micron commercial ewe flock with a super-fine Merino Stud. I attended Rangiora High School which had a high standard of Agriculture teachers and an adjacent school farm at the time. Subsequently, I gained an Honors Degree in Agricultural Science at Lincoln University followed by a Diploma in Secondary Teaching from the Christchurch College of Education, specializing in Ag/Hort and Science.

After completing my tertiary education I worked for four years for AgResearch, initially as a farm technician on their Mid-Canterbury Winchmore research farm and later as a Research Associate at the Lincoln Campus. My next role was with Meat and Wool New Zealand as the Southland Region Manager overseeing the collection of Economic Service information and facilitation of the extension activities including the three Sheep and Beef monitor farms in the region.

I am currently employed as Farm Director for the Telford Rural Polytechnic, based on a 900ha farm in South Otago. The farm has commercial scale dairy, sheep and deer units and covers a wide range of land-based training for 120 on-campus students enrolled in courses ranging from Apiculture to Equine. Telford Rural Polytechnic also delivers training throughout New Zealand via correspondence, the FarmSafe brand, sub-contracted training providers, and to around 200 high schools through its E-Learning facilities.

The Farm Director's role is to implement the Farm Board of Directors vision for the commercial farms, to liaise with the teaching staff, optimize student training opportunities and oversee the day to day operation of the farm units. The role is largely administrative, with the monitoring of production and financial performance and management of resources (including staff), and the farm's various research projects. The job also allows for teaching opportunities, and making a contribution to the practical farm work when necessary. In addition, I continue to be involved in a range of other roles in the sheep industry including our local sheep and dairy groups, such as the Beef and Lamb NZ farmer council.

Sheep farming has been a big part of my life and is likely to feature strongly in the future. When considering this project it was important for me to identify a topic that I can relate to, have a passion for, and want to put into practice. With the experiences I have had throughout my career to date and my close association with friends and family in the sheep industry, it is clear there are, and will continue to be, some major challenges ahead for sheep farming in New Zealand. Therefore, it is for this reason that I chose to investigate and develop a plan for a long term viable and sustainable sheep farming operation that may also potentially provide a means for retaining and increasing the number of sheep farmers in the industry

Executive Summary

New Zealand Agriculture is renowned around the world for producing excellent products, systems, technologies and farmers. However, the sheep farming industry is nearing crisis stage with profitability reduced significantly over several years, due to low relative returns and rising costs of production, particularly land values. The result has been rising debt levels, a reduction in sheep numbers, and changes in land use. These issues have put additional pressure and stress on the sheep industry and offer less incentive and options for recruitment and retention of people into all areas of our value chain, particularly production farming.

This project stems from the need to develop low cost, easy care sheep farming systems that work alongside nature to ensure relatively low cost of production, low labour requirement and the ability for farmers to be successful across three key areas - profitability, lifestyle and sustainability.

During the year I have been fortunate enough to travel around the world, visiting many sheep farming operations and value chains across the continents. As part of this project I also carried out a literature review, covering a variety of industry reports and discussion documents which have broadened my understanding and appreciation of the challenges the sheep industry faces.

Sheep meat production, under a primarily rotational grazing, pasture only system, as described in this report has been developed after visiting a range of farm operations from low cost easy care to highly intensive, high production systems. It is aimed at properties which are less susceptible to land use change such as South Island hill country breeding and finishing units. The system aims to achieve the three key goals of profitability, lifestyle and sustainability and when analysed financially in 2008/09 values produces a return on capital four times higher than the average farm and when off-farm income is included it also exceeds the return on even the top performing 20% of sheep operations in this category. In addition it achieves the work/lifestyle balance and environmental and agribusiness sustainability that is critical for credibility and strength of our sheep industry.

The ability to produce a high quality product using a low cost, easy care but environmentally and ethically robust system should be a draw card to increase the recruitment and retention of people in sheep farming and therefore increase the efficiency and profitability of the whole industry.

I hope you enjoy this report and it challenges the way you see the future of sheep farming.

Introduction:

New Zealand Sheep Industry

History

Sheep were introduced by Captain James Cook and many of the first European settlers as a food source for travelers, and over time the early pioneers began sheep farming across the length and breadth of New Zealand. Historically New Zealand was regarded as being built on the 'sheep's back', referring to the income generated from wool sales, and famous lines like 'a pound a pound' back up the value and impact wool exportation had on the early New Zealand economy. Wool sales were a huge contributor to building a young New Zealand economy in the 1800's, matched only by the vibrant gold mining industry of the time.

Wool was produced for a century in NZ before the first shipment of meat left our shores. However, in the meat industry history book *'A Lasting Legacy',* the sailing of the SS Dunedin in 1882 was described as 'An event that shaped a nation. 'By the late 1800's meat exportation was occurring around the globe in various shapes and forms, including canned, chemically treated and fat packed. However, it wasn't until the early successful shipments of frozen meat across the northern hemisphere that the real potential of global meat trading became apparent.

New Zealand got on board with this new technology and quickly became a major player in the world sheep meat trade. This led to rapid changes in technologies and in particular production systems on farm.

The variety of farm industries in New Zealand has broadened, particularly in the 19th Century. As well as the traditional competition from beef and dairy farming growing, sheep farming now has to compete for resources from industries such as deer, vineyards, lifestyle blocks and tourism.

Current Economics

The New Zealand sheep farming reputation was established on extensive grassland systems with a relatively low cost of production, a clean green image and widespread use of new and innovative technologies. These factors have all combined to make New Zealand the dominant force globally in tradable high quality lamb products. In the 21st Century our low cost of farming is debatable as the costs of resources, (primarily land) and working expenses have rapidly increased. Our key markets however, still see, and are allowed to exploit, the New Zealand product as a cheaper alternative to their locally sourced produce. New Zealand sheep meat product specifications and quality are undisputed as top quality. For example, our chilled, sealed lamb cuts can be opened and repackaged in Wales and still have a longer shelf life than their own locally grown lamb processed that day. The marketing and sales of our product have sadly lagged behind our competitors, resulting in New Zealand farmers being paid less than what the same product is making elsewhere. For example, British farmers receive around 10% more of the retail value of their lamb products than New Zealand farmers, compounded by the increased value of their product.

New Zealand farmers have exhibited a readiness to implement a lot of new technologies into their operations from gene markers to GPS. This has resulted in higher productivity but this has often only been matched by the rising cost of production - which has increased by around 30% over the last decade. To be fair, a large proportion of this can be attributed to fixed costs such as

power, rates and interest. However, the fact that most sheep farmers have only made a positive net result in around three of the last ten years indicates they are not low cost and are slow to change their system to meet financial outcomes. In comparison, the dairy industry is much more responsive to cost of production and ensuring their businesses are financially viable.
(Data supplied from Rob Davidson Meat and Wool NZ, Economic Service)

The Future

The future of sheep farming in New Zealand as we know it is in jeopardy. Land values have increased dramatically, with sheep farms sales value increasing by 300% over the last ten years ($7500 in 2000 to $21000 in 2009 MWNZ). At the same time, long term returns for lamb and wool have not increased - despite a significant rise in the 2009 season. Over this same time period, costs of production have increased. Farm working expenses on average increased around 20%, with sheep farmers experiencing a 20% reduction in gross farm income. Therefore the overall result in EBIT/ha is a slump from over $500/ha in 2000 to around $150/ha forecast for the 2010 year. David Carter, Minister for Agriculture in his speech of May 2009 summarised the situation by stating that 'Farmers are business men and women who run complex operations, often in a difficult environment of high asset value, high turnover, low margins and in a climate they can't control'. Overall this paints a bleak picture for sheep farming, as in terms of a viable business, sheep farming is known for a low return on capital compared to other land use options. In 2000 the return was 6.6% which has reduced on average down to -0.1% over the last ten years. It is therefore a very difficult and high risk option for young people to enter into the sheep industry.

Mc Dermott et al summed the sheep industry situation well when they stated that "There is an urgent need for a new leader to emerge to drive the required industry change. They will need both vision and personality, because they will certainly need to challenge the status quo..."

Project Concept – A Back to Basics Approach

The concept behind this project was to outline an option to encourage and retain farmers in the sheep industry. Within this concept was the primary goal of developing a competitive model for sheep farming in the future. An important aspect of this was to design a system to ensure management of financial risk. The relatively low income generated from a sheep business when measured as return on capital, requires a system which reduces costs, especially the labour requirement (to allow off farm income), while still optimizing economic performance on the sheep system.
There is little to be gained by reporting on the traditional models of sheep enterprises, as this can be debated at any local farm discussion group or monitor farm. What this project does focus on is describing a novel system that will optimize the conversion of grass to saleable lamb at the *lowest possible cost*, while still achieving the three key objectives of **profitability, lifestyle and sustainability.** The strategy I used for this project was to work with a farm as a blank canvas, assuming that profitable sustainable lamb production is the goal, and work backwards to establish the optimum low cost system.

To achieve this, I believed a back to basics approach was required.

Project Outline

This project is comprised of four components.

- ✓ The first involved the development of a vision for a sheep farming operation with simple clear objectives.
- ✓ The next stage was to research and discuss current operations and options
- ✓ The third stage was creating a farming recipe which met the objectives.
- ✓ The fourth and final stage covers the implementation, monitoring and control of the system so that success is achievable.

Following on from implementation, it would be important to evaluate the operation against the original objectives and look for opportunities to make improvements.

Once the big picture vision of the project outline was established, a literature review of various reports including previous Kellogg papers, reviews on the sheep industry by authors such as Fennessy et al and Mc Dermott et al was carried out, followed by a number of meetings and interviews with a wide range of people involved in various aspects of the sheep industry.

This project is for the development of a 100% sheep farming business. Therefore alternative land uses, such as dairying and deer farming have not been considered. In addition, alternative on-farm options such as cropping, selling feed, and dairy grazing have not been considered either.

For the purpose of this project these alternative options have been disregarded as they invariably add complexity and detract from implementing a low cost and simple sheep system[1].

Vision

For all of history sheep have eaten grass, and a well fed and ethically treated animal will strive to produce and grow at its biological optimum for its own survival. It is the farmer's role to ensure there is adequate pasture management to ensure quality and quantity is presented to the animal at the right time to ensure production targets are achieved. Many of our current methods, technology and systems have developed over the years and are 'just what we do'. However I believe we have become too complex in our operations by adding unnecessary costs and in fact have taken our eye off what really matters - converting grass to meat. A 'back to the future' approach may be the answer.

Farming Systems

As previously mentioned, this year I have travelled extensively throughout a large part of the agricultural world on a Nuffield Scholarship. This study programme has allowed me to compare and contrast sheep farming systems and meet with farmers, those involved in the service and processing industry, and consumers.
New Zealand is revered for its pasture management, use of new technologies and business sense. Our marketing and sales leverage is falling short of achieving sustainable prices for our high quality lamb products compared to our competitors. In addition, our perceived low cost of production is no longer reality, particularly with the huge increases in New Zealand land values. Our main competitors in the UK and Europe are producing lamb under high capital and expenditure systems, characterized by out of season production, with poor pasture utilisation and reliance on grain feeding to achieve desired performance. New Zealand still has a lot of production potential to realize from low-cost, pasture-based systems and this is still likely to remain as our major competitive edge. Many of our rising costs have come from fixed costs (rates, insurances etc) but we have also fallen into the technology trap with cropping, re-grassing, capital expenditure and animal health treatments increasing our costs of production.

There are three main types of sheep farming systems in New Zealand, particularly evident in the South Island. The first is the extensive high country stations; predominately store stock and wool production with little competition from other land uses. The second system is the highly intensive, (high rainfall or irrigated properties) breeding/ finishing properties which are under increasing threat from alternative land uses. This project discusses options for the third farm system, which is the semi intensive hill country/ dryland properties which I believe in the future will be the home of sheep farming in New Zealand. The plan is to describe a simple low cost system, which will offer the opportunity for off-farm income, lower financial risk and ensure

[1] It is noted however; that a good agribusiness manager will be aware of and reactive to the opportunities presented by these alternative land uses and options and will review the operation objectives.

sustainability of the triple bottom line, with the end goal of encouraging the recruitment and retention of sheep farmers.

Research and Key findings

Current Sheep Farming Situation

In addition to my overseas travel and comparisons between sheep farming systems, processing and consumer requirements I also undertook a variety of research within New Zealand. Statistics from the physical production and economic performance of sheep and beef farms throughout New Zealand over the past 50 years from Meat and Wool NZ (and its predecessors) Economic Service, have been collected and analysed. This provided the best source of production and financial trends and comparisons in the sheep industry. Their reports are based on Farm Economic Performance, ranked on Earnings before Interest and Tax per hectare (EBIT/ha). In 2009 the top quintile of farms (in class 6- hill country breeding and finishing farms) showed some interesting features. Their income was boosted by the fact they produced and finished more prime lambs, a higher component of trading beef or dairy grazing than average also added to their gross farm income.

Surprisingly, the higher EBIT farms had similar costs to the lowest ranked farms, particularly in terms of stock units per labour unit, illustrating again that even the top farmers in New Zealand are not focused on low cost or efficiency but more reliant on production and high product values. Solely based on the economic figures it is therefore difficult to establish what the higher ranked farmers are doing differently. In my opinion, it is likely to be the attention to detail, especially in aspects such as stock health and feeding, timing of operations and pasture management. These factors are very difficult to quantify but are probably the main areas where management impacts on the physical business. Unfortunately, as in most cases, there is no silver bullet to success. Secondary features such as breed, and drafting precision will also enhance the value of the saleable product and the top managers will be extracting additional value from their business in these areas as well.

In addition to the analysis of the production and financial records, I visited a range of farm operations from highly intensive finishing properties to extensive high country runs. My roles with groups such as the Beef and Lamb NZ monitor farms and regional discussion groups provided many opportunities to discuss and debate the major challenges for sheep farming and plan some solutions. A key visit to note was to the high producing, low cost system North Canterbury sheep system run by James Costello. The monitoring, production and financial performance information and discussions have been critical to the make-up of this report. Drafts of this report and many discussions have also been mulled over with research and extension personnel from organizations such as AgResearch, Telford and Beef and Lamb NZ.

The Evolving National Flock

The national sheep flock has changed considerably over time to cope with the changing markets and challenges from other industries. The specialist wool Merino breed dominated the early importations of sheep to New Zealand but with the onset of frozen shipping the breed declined in

popularity with a proliferation into the Romney breed, which still today makes up 40% of the national flock.
A second major shift in breeding and selection occurred as a result from increased consumer diet awareness and avoidance of high calorie foods. As a result meat marketing moved away from promoting 'fat' lambs to producing 'prime' lambs, and this was incentivized through the carcass grading and payment systems in the 1990's. Producers reacted by shifting away from the early maturing Southdown type terminal breeds to the Suffolk and Poll Dorset types, whilst also selecting larger and leaner lines within these breeds. A visual difference is seen across all breeds in New Zealand in that they are now longer and leaner than historically.
In the last two decades importations of new exotic breeds has again seen a large shift in the gene pool, Texel, East Friesian and Finnish Landrace breeds have been used to produce a range of 'composite' breeds. The hybrid vigour and individual characteristics such as high fecundity, high meat yield and high milking ability have lifted the ceiling for production potential. Traditional breeds such as Romney have responded by selecting heavily for these traits as well, in order to be competitive in the growing specialist ram sales market. There has been a large reduction in the national sheep flock; competing land uses and low returns have contributed to the national flock reducing by around 30% over the last decade (32 million sheep in 2007) and the number of sheep farms also reducing significantly. However, despite the reduction in ewe numbers, there have been large productivity increases in the industry due to improvements in genetics and management so that over the last decade the amount of lamb for export has remained the same.

Recipe – A Sustainable Sheep System

Farm design

I believe a sustainable sheep system in the future will require the following:

- A Location not overly challenged by alternative land uses in an area where it is difficult to change land use (and therefore likely to have relatively lower land values). Location in a hill country region characterized by cold winters and hot dry summers
- A medium- large scale operation (approx 4000 stock unit enterprise)
- Self-contained unit in one parcel of land to minimize the risk of complexity and spread of internal and external parasites and pests from neighbouring properties
- A basic but effective layout with a lane system for moving large mobs of stock
- Permanent subdivision catering for long rotations of up to 150 days in summer on 3-4 day shifts. Therefore around 50 permanent paddocks of similar size are required
- Suitable water supply to each paddock that will service a large mob of up to 4000 ewes at one time
- Yards and holding area that are easy to use and large enough to contain the whole flock in holding paddocks adjacent to the yards for efficient handling
- A woolshed operational in the intermediate period but anticipated that in time would become redundant.

Guidelines

- ✓ Financial management- simple, monitored and updated
- ✓ Pasture - Optimise grass harvested by stock, match feed supply and demand, no re-grassing[2] supplements or cropping
- ✓ Stock – Easy care stock, harvest prime lambs, sell stores when necessary

Implementation

System Design

This proposal is for a low labour, low input 100% sheep operation -a system that can be managed by a single labour unit and will reduce labour required to allow for off farm income. To reduce labour sufficiently, a conscious mindset must be developed to reduce stock handling especially around managing wool and its associated animal health issues, and keeping animal treatments to the bare minimum. The system aims to avoid the production/purchase of supplementary feed and the associated cash, capital and labour costs of feeding supplements. Also to allow stock to express their natural behaviour, especially maternal instincts at lambing without human interference. The animals should be left in the most natural state possible, without procedures such as tailing and ear marking. An EID tag will be necessary under law and should be the only defacement or implant required for the animal. Pregnancy scanning as a non-invasive procedure would still be considered as one of the management tools available.

Along with the three key objectives of Profitability, Lifestyle and Sustainability, there are several other considerations, including increasing meat yield and quality (terminal type breeds), consumer perception, traceability and improvements in environmental aesthetics improvement. There are potential down sides to the proposed system, it could limit production potential, and have a limited harvest season and therefore cash flow. However, I believe that the advantages outweigh the limitations, also, if this system was implemented successfully it could in fact outperform the traditional high performance operations.

Feed supply

The feed supply will be 100% pasture- with a proviso for extreme conditions. The stock class will be kept as simple as possible with no cattle or other stock types present. The ideal would be to have the farm subdivided into sufficient blocks to allow a long summer and winter rotation with 3-4 day shifts. During spring the farm will be set stocked at lambing then boxed up in mobs for late spring rotations.
A high legume content will be critical to be able to achieve high lamb growth prior to weaning. The key to the system will be harvesting as many lambs at, or shortly after weaning, as the pasture management and the environment are not suitable for pushing sufficient lamb finishing quality feed into the summer period.

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[2] *May require initial cocksfoot and sub-clover sowings*

Pastures

The main driver of this pasture system is achieving high levels of subterranean clover that will ensure rapid lamb growth rates pre-weaning. Specialist pasture species tolerant of the dryland environment may have to be established at the start up. It is likely that a cocksfoot and sub-clover based pasture will be the most productive and long-lasting in this environment. The additional workload, cost and associated risk for establishment of summer and/or winter crops such as brassicas will be prohibitive in this system, and in this environment, where dry summers and cold winters make pasture and crop establishment risky.

Pasture Management

The basis of the pasture management is to promote grass production by enforcing a dairy grazing type system where long rotations are used to increase grass production and push feed supply into times of the year when it will be required by stock. The rotations are set up so that after set stocking for lambing the ewes and lambs are mobbed up to achieve around 3 spring rotations of 21 day intervals. After weaning, the ewe lambs are shuttle grazed on large areas ahead of the ewes which are rotated on a 140 day round, then go into a 120 day winter rotation. Pasture quality will be driven seasonally, predominately by the improvement of subterranean clover composition of the pastures. Under these dryland conditions it is not possible to retain pasture quality during summer as the photo below shows. However, if sufficient lamb growth rates are achieved and ewe replacements are grazed ahead of the ewe flock then stock performance should not be compromised.

Fertiliser

Fertilizer levels will be analysed and inputs will be regulated initially through monitoring, and if the economics don't stack up then maintenance fertilizer can be withheld periodically. The cost benefit of using strategic pasture promotants such as Urea, Gibberellic acid will be reviewed annually, especially in periods when pasture growth has been insufficient to operate optimum

pasture covers. In this case bulk dressing of pasture promotants will be applied rather than purchasing supplementary feed. In this system where no cropping or supplementary feed is produced then the pasture monitoring and feed budgeting will be critical and there has been a higher allocation in the financial budget for pasture promotants contingencies.

Stock Performance

Genetics

The maternal ewe flock will not be breed specific. The requirements will be for an easy care ewe that can have relatively high production of saleable lambs at weaning. Ideally, woolless, short tailed with moderate fecundity without flushing (twinning gene would be ideal), good longevity, resilience to parasites and high lamb growth rates. There is not a breed in New Zealand that achieves all of these criteria at the moment. However, these attributes are found within our current breeds for example a White Dorper/ Wiltshire maternal ewe flock with a Poll Dorset/Texel terminal sire. The ewe flock could also be composite including breeds such as those aforementioned.

Physically the maternal ewe will be large, white in colour, with a short tail, the large size is still user friendly assuming we can achieve wool-less (the intermediate flock will be selected to have no belly wool or points, particularly clear around the rear end). The lambs will need to have good survivability with a strong lamb coat (all now available on SIL).

Good longevity, through getting in lamb and good conformation (teeth, tits, toes) but no culling for these, if they survive and rear a lamb then they select themselves, insistence to cull ill or dry/ wet dry ewes.

Physical Objectives:

1. Short tail length can be achieve through the Finn, Texel and Dorper breeds
2. Meat yield can be achieved through terminal sire breeds, both on maternal and sires families. Poll Dorset or Suffolk will be best for growth rate whereas Dorper and Texel will improve carcass yield and conformation.
3. Reduced fleece cover on the maternal flock- leading to woolless sheep and can be achieved through Dorper and Wiltshire genetics




Photo's: showing the attributes of the different breeds:

a) White Dorper showing the carcass conformation and wool shedding ability
b) Finn showing the tail length and also includes high fertility
c) Texel illustrating the excellent carcass conformation, improving yield and hardiness
d) Wiltshire showing the shedding ability

There are a variety of gene markers and selectable traits available in the ram market, for example MyoMax, LoinMax, Wormstar, and the Footrot test. I agree with Fennessy et al that genetics will play an important role in achieving our sheep production goals. However, I think that a meat breed maternal ewe, woolless with a terminal sire lamb will already have sufficient desirable characteristics that the primary selection should be on the best possible commercial genetics for meat production and not to place any specific selection on these markers. If they are included that is a bonus.

The farm breeding programme will have to be simple and due to the specialty of the breed there will need to be replacements kept. Depending on the ability to grow young stock through the summer period, hogget mating will be decided on a year by year basis. The ewe flock can be drafted so that half of the ewes demonstrating required traits can be mated for production of replacements and still produce a good prime ram lamb. The less desirable ewes in the flock can be mated to meat breed terminal sires. There could be an option to send ewe lambs off farm for grazing or a hogget mating- free grazing system. However, this adds complexity and is likely to require cash expenditure for transportation and grazing fees, so would be best avoided.

Animal Health

The goals of this project are to be profitable, ensure satisfactory lifestyle, and be sustainable. High use of chemicals and animal health products are not likely to help achieve any of the goals. The aim for the ewe flock is to be drench free, therefore 5 in 1 vaccinations are generally cost effective and can be administered relatively easily with low labour. It is likely the lamb crop will need a spring drench during lactation to avoid nemotodirus impacting on live weight gains. In addition, the ewe hoggets will require some vaccination for abortion protection whether they are mated or not. The policy of selling all lambs at weaning, except replacement ewe lambs, should help to reduce the development and effect of an internal parasite burden in the flock. The sheep industry has a big issue around the marketing and cost of anthelmintic treatments. While I acknowledge large areas do have issues with drench resistance on farm, the vet industry and

chemical companies have used unnecessary leverage against farmers. It was only a few years ago farmers were told there were no new drench families in the pipeline and it would be more than 10 years to develop any new active families. In the meantime we were encouraged into overly priced dual and triple combinations as our only option, many of which have now been superseded by expensive new products. Caveat emptor!

Contingency Plans

The farm system is based around pasture supply meeting the feed demand. Therefore strict pasture management, rotations and rationing will be necessary to compensate for no supplementary feeding. Because of the absence of crops and different pasture types to modify the feed profile, there is an opportunity to use growth promotants such as Nitrogen based fertilisers and Gibberellic acid to ensure sufficient pasture is available when required.
In the case of significant deficits, there will need to be other contingencies to cover for events such as snow, or drought. Ideally these would be low volume, high quality, and long life products such as a silo of grain that can be used as and when required. Hay will also need to be kept on hand in the advent of snow where stock cannot graze pasture to mitigate any animal welfare issues.

Environment

The system described is likely to enhance the environmental robustness of sheep farming. The focus on selling all young stock except replacements early in the season will reduce the need for chemical control of internal and external parasites, lessening the risk of chemical resistance. While the levels of fertility and in particular nitrogen use are similar to conventional farms this system avoids cultivation, cropping and re-grassing programmes which are often the hotspots for nutrient and soil loss and the subsequent impacts on water quality. Native gullies will be retained to allow for shelter and shade, with additional plantings of native, easy care, low cost shelter belts to enhance the already pleasant scene as shown below.

There are limitations to this system which would include rotational grazing of large mobs during wet conditions, mitigation such as putting stock into tree blocks or grazing areas with soil types less prone to erosion will need to be implemented.

Monitoring

Monitoring is the key to any business and agribusiness is no different. Accurate financial and feed budgets will need to be developed and updated regularly. Additional information such as soil and herbage analysis, Liver biopsies, blood tests can also be done but these will need to be justified and unless a production issue is apparent then they should not be undertaken. It is likely the farm will be entered in a farm analysis model such as Stockpol. This will allow limitations and options of the system to be investigated. Pasture monitoring and pasture prediction models would be an advantage as pasture production is the foundation of this system.
Additional monitoring such as pasture production (DM/ha), ewe reproductive performance, meat production/ha and ewe longevity, lamb survival and growth rates would all be interesting areas to record for benchmarking purposes.

Financial performance

There are three clear objectives for the financial performance of this system. Firstly, to achieve high stock performance to optimise on-farm income. Secondly, to reduce working expenditure to reduce the amount of cash expenses and the requirement for bank overdraft facilities, and thirdly, to drive labour requirement low enough to allow off-farm income.

Financial Budget

This farm system has been compared and contrasted alongside the group average and top 20% (EBIT/ha) class 6 South Island hill country sheep/beef breeding and finishing properties for the 2008/09 financial year. I think this low cost system will need a high level of management capability that in the short term will require input and skill comparable to a farmer operating in the top quintile but the physical description has been aligned with the average farm data.

The first objective is to optimise gross farm income, and the proposed system has gross farm income 15% and 25% lower than then average and top 20% farm groups respectively.

However the second goal is to reduce total farm expenses, and the proposed system achieves costs of only 50% of gross farm income - which is 10% lower than the top economic producers and 30% below the group average. Therefore the proposed system produces a net result of $160,542 which is significantly higher than the average farm of $75,305, but still behind the top 20% which returns $170,801. The overall return on investment for the farm derived income is 2.4% which is equal to, or slightly higher than the top 20% of farmers and four times the return of the average sheep farmer.

The third goal of this proposed budget is the prospect of off-farm income, and as the proposed system could be run on as low as 0.3 labour units compared to the approximately 1.7 labour units for the other systems – this presents a large opportunity.

Even using figures for the average New Zealand wage, once the additional income derived from off-farm income is added, then the proposed system achieves a return on total capital of nearly 4%, which is an improvement on 2.4% for the top 20% and significantly higher than the 0.65% for the average farm.

This is where I believe the sustainable future of sheep farming lies for hill country breeding and finishing farms and not through increased intensification and higher cost systems.

Action Plan[3]

Below is a suggested action plan for someone considering this type of sheep farming system.

1. Select a suitable scale farm
2. Develop a simple calendar of farm operations
3. Complete financial budgeting and monitoring
4. Carry out feed budgeting and monitoring
5. Review subdivision to assist rotational grazing
6. Retain meat breed ewe lambs, aim for short tails, woolless, easy care ewes
7. Re-sow necessary areas of the farm with cocksfoot and sub-clover
8. Ongoing review and remedy of financial and physical performance to achieve goals

Conclusion

New Zealand Agriculture is well regarded throughout the world but has been through, and will continue to go through significant challenges. Sheep farming in particular has struggled financially in the last decade which has resulted in land use changes, as well as a reduction in the industry's critical mass and its ability to recruit and retain skilled personnel.

The current model for successful sheep farms relies on maximizing production through the use of new technologies, labour and input. These tend to increase the cost of production and financial risk. The proposed sheep farming system provides some options for optimising farm income, reducing costs of production and reducing labour requirements to provide an opportunity for off-farm income. The focus is producing high amounts of saleable lamb at low cost of production.

As previously stated, the industry report by McDermott et al described the sheep industry situation well with the statement "There is an urgent need for a new leader to emerge to drive the required industry change. They will need both vision and personality, because they will certainly need to challenge the status quo…"

The proposed system certainly challenges the status quo where the most profitable farms tend to have the highest labour, resource and time inputs. If implemented well, the 'back to the future' system would achieve the three key objectives of this project- a sheep farming system with profitability, lifestyle and sustainability.

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[3] The action plan sets out steps towards achieving the objectives of profitability, lifestyle and sustainability. Each situation will be different and an agribusiness expert should be utilized before committing to any new business venture.

It is most suited to larger scale properties, particularly in the South Island hill country where breeding and finishing units are likely to remain the back-bone of the sheep meat production industry. It is also likely to reduce the environmental footprint by reducing cultivation and cropping practices.

The key actions required are selection of a productive yet easy care ewe flock, that are woolless and don't require tailing. Subdivision and water supply is also necessary, to allow for long mob rotations which negate the requirement for supplementary feeding and cropping.

I hope you have enjoyed this report and make the most of the opportunities that the sheep industry offers farmers now, and in the future.

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Appendix 1- A Farm Income Comparisons

Class 6	**Unit**	**Top**	**Average**	Kellogg
Effective Area	ha	317	466	466
Total Labour Units	No.	1.78	1.70	0.3
Open Sheep	No.	2,299	2,908	3728
Stocking Rate	SU/ha	9.8	8.3	8
Sheep:Cattle SU Ratio	%	72.2	71.9	0
Ewes mated	No.	1,944	2,315	2796
Hoggets mated	No.			559
Lambs from ewes	No.	2,604	2,944	4194
Lambs from hoggets				336
All Lambs tailed	No.	2,720	3,011	4530
Lambing	%	133.9	127.2	1.5
Hgt lambs % all lambs	%	4.3	2.2	0.07
Lamb Prodn	kg	48,215	50,401	72472
Lamb Loss	%	2.0	2.0	2.0
Sheep Loss	%	6.5	5.0	5.0
Wool net before freight		27965	33,843	0
Shearing Expenditure		12310	14939	0
Sales Prime Lambs	No.	2,065	1,718	2265
Sales Prime Lambs	$/head	92.94	87.32	87.32
		191,921	150,010	$ 197,759
Sales Store Lambs	No.	189	643	1359
Sales Store Lambs	$/head	65.68	66.88	66.88
		12,414	43,024	$ 90,880
Sales All Lambs	No.	2,254	2,361	
Sales All Lambs	$/head	92.31	82.64	82.64
		208,067		$ 188,519
Sales Ewes	No.	28256	28256	33000
		260,556	255,133	321,639
Other Farm Income (beef etc)		162,764	127,052	0
Gross Farm Revenue	$	$ 423,320	$ 382,185	$ 321,639
Gross Farm Revenue	$/ha	$1,335.39	$ 820.14	$ 690.21
Off-Farm income				$ 69,300
Total Income		423,320	382,185	$ 390,939

Appendix 1- B Farm Expenditure Comparisons

Total Expenditure	252,519	306,880	161,097
Total Expenditure	796.59	658.54	345.70
Total Expenditure	61.1	81.3	**0.501**
Wages	15,425	16,319	3500
Animal Health	10,841	14,101	5000
Weed and Pest	6,372	9,339	3500
Shearing	12,166	15,364	0
Fertiliser	37,758	42,793	32000
Lime	2,086	4,366	3728
Seeds	6,318	7,377	1500
Vehicles & Fuel	22,466	24,171	13980
Electricity	2,615	2,940	2796
Feed & Grazing & Irrig	11,488	18,300	1000
Cultivation/Sowing	5,005	6,207	2000
Cash Crop	922	2,339	0
R & M	16,192	17,806	11000
Cartage	2,764	5,727	1500
Administration	9,529	10,122	9320
Insurance & ACC	6,004	7,102	7456
Rates	8,210	8,332	9320
Interest	40,497	47,569	40,497
Rent	10,505	15,965	0
Managerial Salaries	0	1,785	0
Depreciation	25,354	28,855	13000
Total Expenses	252519	306880	161097

Appendix 1- C Farm Expenditure Comparisons

Net result	**170,801**	**75,305**	**160,542**	
Off Farm			$ 69,300	Incl off-farm income
Total net result			**229,842**	Minus mgmt wages
Farm Profit Before Tax	164,590	71,335	160,542	
EBITR	215,556	134,823	201,039	
Econ Farm Surplus	119,407	36,903	138,059	207,359
Capital Value at open	4,554,663	5,284,551	5,284,551	
Total Assets at close	5,048,645	5,695,791	5,695,791	5,695,791
Current Liabilities at close	74,998	79,233	50,000	
Term Liabilities at close	359,023	487,195	487,195	
Reserves at close	440,812	486,952	486,952	
Net Worth at close	4,173,812	4,642,412	5,158,596	
Equity at close	82.7	81.5	90.6%	
RoR on TFC at open	2.6	0.7		
RoR on Total Assets	**2.37%**	**0.65%**	**2.42%**	**3.64%**