DRY MATTER PRODUCTION

AND VALUE ADDING IN A SEMI-ARID ENVIRONMENT

A report for

by Simon Turnbull

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Foreword

Personal Background

I am a third generation farmer, having been at "Mayfield", Warren, most of the last 22 years after completing Year 10 and a Farm Management course in 1983. I was thrown in at the deep end as my father was suffering from cancer. The business at this time was built around self-replacing merino flock and 150 Hereford cows. The irrigation was used to grow fodder.

With the death of my father at a time of high interest rates and a large debt, my brothers and I took the business in a new direction, developing the irrigation for cotton and increasing the area available for dry land farming. The business started to grow when we decided were comfortable with the level of debt and told our bank that we were not going to pay any more principal off the loan, and surplus funds would be invested in the farm**.**

Business

Since completing my Nuffield scholarship 12 months ago. I have put my studies into practice; building a 1000 head capacity feedlot, value adding all my farming production through the feedlot - drought proofing my cattle enterprise and making more money from crops, which are often low yielding as grain due to dry finishes.

Family

Rosie and I have four daughters, all of whom are keen horse riders. The family partnership has been dissolved, so we are now farming solely in our own right. Decision making right or wrong is ours, so are the rewards.

Community

I am actively involved in the school P & C, Picnic Race Club, polocrosse and Local Irrigation scheme.

I see the community involvement as my responsibility to keep a healthy social environment not only for my family but also that of my employees. In our small communities you have to help in areas that might not be your scene, if you want the community to prosper. You will be able to keep staff if their spouse is content, no amount of money will keep your employee if their partner is not happy to be there.

Acknowledgments

Firstly, to my wife Rosie for allowing me to take the opportunity to do the scholarship and study. She had some time with me in Canada which was important to get an appreciation of the level of study involved.

While leaving the farm for that length of time is a challenge, the preparation involved was probably tougher than the study. It did force me to delegate authority and with help of extended partners in the business being our agent, agronomist, accountant and bank manager all went as expected.

Thanks to the scholars and many new friends that I stayed with for their hospitality and contribution to making my study successful.

Canada: Rod Bradshaw, Innisfail, Alberta, who hosted us on our global focus tour, fitting in two weeks of exciting industry in seven days; Chinook Feeders; Art Penkau, a corn grower/feedlot in Manitoba; and Ian McPhadden, dry land cereal farmer in Saskatchewan.

UK: Anthony Hopkins, a drip irrigation specialist and potato grower in York; Paul Hinwood, family feedlot in Midlands, England, and who was the first fellow in the UK that could tell me what his cost of production was (subsidies have a lot to answer for with the motivation of the EU farmer). Tim Downs, an organic dairy farmer; Julie Mate, a rural journalist in Midlands, England, for her help in planning and study structure which proved invaluable; William Crawford, who had a dairy in Ireland; Donald McPherson, who runs "Well hung and Tender" beef in Scotland and John Campbell, an egg producer in Scotland who produces more than 1.1 million eggs per day.

Others to thank are Dr Bob Lee from Kansas, USA, a feedlot nutritionist also advising in Australia, who has been a big part of giving me the confidence to take the farm in a new direction on my return.

Steve Irisk, Garden City Kansas, while we only had a couple of hours together, it was the highlight of all the meetings I had while on the road, he is involved in many businesses, corn, 7000 cow dairy, flour mill and had just, with partners, purchased the local bank. We covered everything from family farming, succession, to selecting business partners and developing business opportunity from the end user back and demand farming - just now the buzz word in Australia.

Thanks to Itoham foods and the MLA in Japan for their hospitality and introducing me to the Japanese culture.

This report is not about what I saw while travelling but what is achievable in our back yard.

Abbreviations/Definitions

Definition of Dry Matter

Dry Matter (DM): refers to the amount of feed remaining after the water has been removed. Because the water content of feeds can vary considerably, all analyses are expressed on a dry matter basis.

Moisture (M): is the amount of water in the feed, varying from 10% in grains and to over 80% for fresh pasture.

Crude Protein (CP): is the amount of true protein (composed of amino acids) and non-protein nitrogen in the feed. Whilst it is desirable to have a high CP, it can be misleading to use this as the sole measure of feed quality.

Digestible Dry Matter (DDM): is the percentage of the feed dry matter actually digested by animals, estimated using a laboratory method which is standardised against DDM values from feeding trials. High quality feeds have a DDM of over 65%, whilst feeds below 55% DDM are of poor quality and will not maintain live weight even if the stock have free access to it.

Metabolisable Energy (ME): is the feed energy actually used by the animal, calculated from DDM and expressed as mega joules per kilogram of dry matter (MJ/kg DM). ME is the most important figure. It is used to calculate whether stock are receiving adequate energy for maintenance or production.

Acid detergent fibre (ADF): estimates the cellulose and lignin content of a feed. The lower the ADF the higher the DDM (and ME).

Neutral Detergent Fibre (NDF): estimates the total cell wall content in a feed, and is the most useful measure of fibre content currently available.

Water Soluble Carbohydrates (WSC): is a measure of the total soluble sugars, which are present in forage. These sugars include glucose, fructose, sucrose and fructans, and are almost completely digestible.

Converting from “Dry Matter” to an “As Fed” basis: All feed test analyses are expressed on a dry matter basis. However, in the paddock, you will need to calculate the amount of feed supplement to use on an “as fed” basis. For example, if a sample of oats has an ME of 11MJ/kg DM, a CP of 9% (on a dry matter basis) and a DM content of 90%, the “as fed” values will be: ME = 11x 90% =10 MJ/kg feed CP = 9 x 90% =8% CP in feed.

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Executive Summary

The cattle industry in Australia has been likened to the US in the 1960's - with huge opportunities of growth in the future. I want to be part of that growth. We farm in an area with unreliable rainfall for crop production, but the capacity to produce high yielding hay and silage tonnage in spring. Water allocations can no longer be relied on and I felt the potential for our property was in livestock production by value adding to the crops we could consistently grow – hay and silage and some grain – through kilograms of beef.

The challenge for me was to utilise a 400 mm rainfall and unreliable seasons to create a 12 month profit centre. I had to learn how to reduce risk by value adding to our cropping system and suspected that value adding would best come from beef production – something we had traditionally carried out in a paddock situation.

Nuffield and the GRDC gave me the opportunity to study systems which would minimise the effects of drought while value adding and becoming a low risk farmer in what is considered a higher risk region.

We are able to grow crop with loads of potential but, without finishing rain, the result is average. Is there a point in time that we should bring these crops in and use them to complement another enterprise? How does this compare to taking the crop to maturity?

I studied dry matter production systems and value adding using beef production focusing on it in terms of a return per hectare.

When travelling through Ireland and the UK I looked closely at silage production, visiting universities and research stations with particular interest in growing a complete stock feed ration.

From there I travelled extensively through Alberta, Saskatchewan and Manitoba in Canada. At Lethbridge, Canada, there are one million head of cattle on feed within 50 miles of the city. The rainfall in this area was only 10 inches (250mm) plus about 4 inches (100mm) on beneficial snow. (In our region average rainfall is 400-600ml and in later years has been less than half). My time in the US was in the Mid West visiting a number of feedlots, universities, Pioneer Seeds and Monsanto.

Our competitors in the US and Canada also have droughts, but theirs is every year and it's called winter. They have learnt to overcome it and we have to as well.

Some districts that compete in international agricultural markets can have as few as 100 growing days a year. In comparison, in our district we have only 30-60 days when pasture or crops won't grow. Our growing season is fantastic, with only a few weeks of the year where we will not get growth but our limiting factor is moisture. Moisture challenges have been largely overcome with no-till farming but the continuing question is "when will the season start and when will it cut out?"

Since returning I have built a 1000 head capacity feedlot, using all last year's crops as the feed source instead of waiting for harvest and hoping for a decent yield. From the start of the feedlot system, at the end of 2005, to now we have only had 150ml of rain and we have turned off 3000 head of cattle, double our traditional production.

The focus of our cropping system has now changed from aiming to produce grain, to giving priority to high quality silage. Silage potential is first priority in all planning, both of varieties and rotations, followed by the potential for hay production, grazing and finally, grain.

Originally I felt hay would be quite important, but now I see the greater value of good silage and the use of baled straw and hay has become one of the lesser components. Grain gross margins become more respectable when you add the value of the straw to the equation.

Our silage is generally cut from a cereal/vetch mix and the selection of the paddock is important due to the weed challenge on the property. However, the focus still remains on moisture management practices with controlled traffic and no-till farming essential to maximizing dry matter produced per millimetre of rain.

Even with high grain prices, I can still make a profit in value adding through beef production. Correctly made silage, which can have up to 20 per cent grain in the roughage, helps keep the grain volume down in a ration.

The other advantage to the system is weather damaged or poor quality grain has a ready market in my own enterprise and I can value add to what would be a discounted product elsewhere.

Consumption by an animal is the same regardless of whether it is the correct or incorrect ration – it's in my hands to make it the best ration. **It doesn't matter what kind of farmer you are – whether you are running cattle, sheep, growing grain – you need to be able to source or produce dry matter. You can't farm without it.**

Introduction

Being in what is considered a marginal area 400ml annual rainfall my aims were:

1. To find out an economic way of storing our good seasons, so as to create a season that is 12 months long that is sustainable in our semi arid regions.
2. Value adding my primary produce that would normally have a large freight bill to get it to a railhead and limited marketing and storage options.
3. Using stored crops through a supplementary cattle feedlot system. Creating the ability to produce 12 months of the year without seasonal influence.
4. Compare cereal production to value adding on farm, expressed as a return per hectare.
5. To find a crop that is as close to a full livestock ration.
6. Identify economical systems of processing, handling, storage and feeding the dry matter.
7. Aim to get a “Retail price for a wholesale product”.

THE RESULT

To establish a 1000 head beef cattle feedlot on Mayfield where we could value add to our own cattle or those bought in using our own silage and grain production to take cattle to a level suitable for the specialised finishing feedlots, who are happy to pay a premium for a quality animal.

Dry Matter Production Systems

Yields used in these exercises are long term average for North West NSW, 400ml rainfall area.

1. Grain and Straw

- Grain 2 ton/ha with stubble straw at 1.2 ton/ ha
- Limited number of markets outside

With traditional grain handlers, the farmer is generally the one getting handled.

2. Hay

- When stored out of the weather there is little deterioration in quality
- When being fed in a paddock there is often a lot of waste
- Transportable so tradeable

Large square bales 4 tonne / ha

3. Haylage

- Expensive due to plastic and the amount of handling involved
- The plastic has a limited life, est. two summers
- Advantage is it is transportable
- Only opening what is going to be used
- Transport distance limited due to high moisture percentage

Baled silage 30% moisture 330kg bale wrapped in plastic

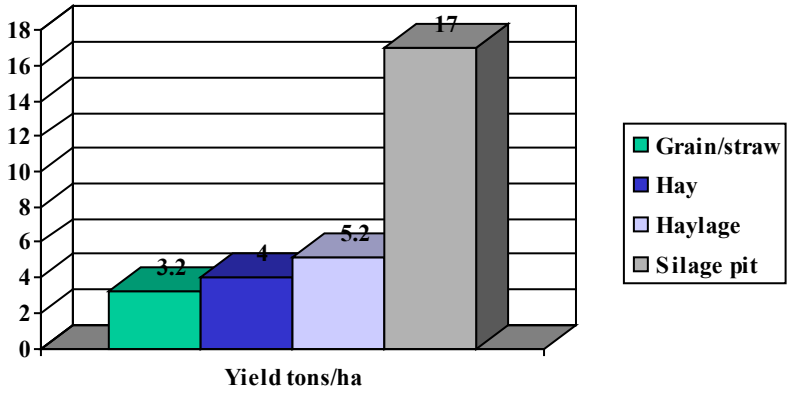
4. Silage Pit

There are 3 definitions of pit silage

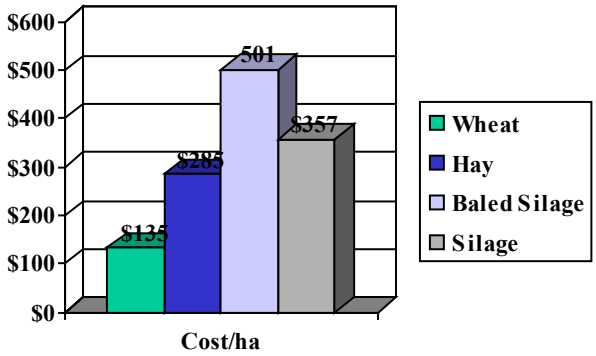
1. Familiar one is <u>pit</u> in the ground covered in dirt or plastic and tyres
2. Between two walls sometimes referred to as <u>clamped</u> can be covered in plastic
3. <u>Buns</u>, mounds above the ground again covered in plastic. The drawback is the limited distance of transportation.

Precision chopped, rolled in a pit at 60% moisture

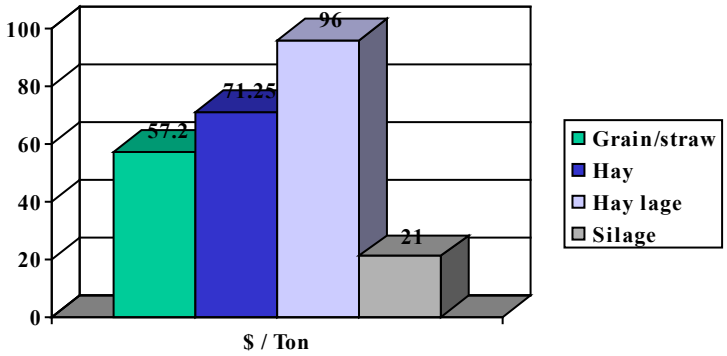
Yield Comparisons of these Systems



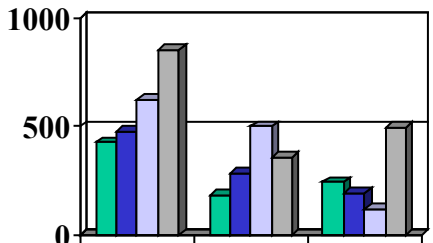
Production Cost Comparison



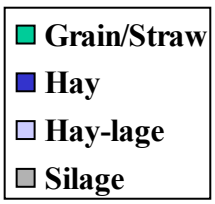
Cost/ton of Produce



Farm gate value



	Gross	Cost	Net
Grain/Straw	426	183	243
Hay	480	285	195
Hay-lage	624	501	123
Silage	850	357	493



Value/ton

Grain $165 / tonne, straw $80 / ton

Hay $120 / tonne

Hay-lage $120 / tonne

Silage pit $50 / tonne

Kilos of beef produced per hectare at a conversion rate of 7-1

(Conversion rate: kilos of dry matter required to produce one kilo of beef)

	Yield kilos / ha	Moisture %	(M)	(DM)	Kilos of beef per ha @ 7-1
Grain	2000	12%	240	1760	**Conversion**
Straw	1000	10%	100	900	
				2660	**380**
Hay	4000	15%	600	3400	**486**
Wrapped Silage	5200	30%	1560	3640	**520**
Pit Silage	17000	60%	10200	6800	**971**

Understanding Silage

- Silage has a misconception of stinking. If it has been done correctly it should have a sweet smell
- Aerobic spoilage is an insidious problem in silage management
- 85% of silage problems are moisture related, correct moisture, not too dry
- Successful silage needs to be packed well to exclude air from the silage mass
- Immediate sealing will help keep excess air from spoiling silage
- Weather damage during processing is not a concern due to the time from cutting to packing, two to four hours depending on wilt time required if any

"Aerobic stability" describes the ability of silage to remain stable (and not spoil) when exposed to air. A simple method to measure aerobic stability is to expose silage to air and measure the generation of heat. Heat is produced from spoilage organisms (usually yeasts) that degrade the nutrients in silage. As an example, good quality silage that is stable for 50 hours is better than one that spoils after 10 hours of exposure to air.

When silage is exposed to air, yeasts can degrade lactic acid, which increases the pH and leads to spoiling. Spoiled silage is especially bad when fed to ruminants because it is low in nutritive value and dry matter intake can severely be depressed. Aerobic spoilage in the pit may also lead to the production of mycotoxins, which can result in reduced animal performance.

Some heat occurs from the natural process of fermentation and this should not be confused with heating from spoilage. However, extensive and prolonged heating during the early period of ensiling may be a result of excess air trapped in the forage mass.

Some crops are more prone to aerobic spoilage than others. Silages that contain large amounts of starch (eg corn silage and barley silage) tend to spoil more readily. Silages that are very dry tend to spoil more quickly when exposed to air than those with higher moisture content. High moisture corn also tends to spoil rapidly when exposed to air.

Management factors can improve the aerobic stability of silages. Wilting to the proper moisture content for the specific crop and pit, the correct chop length, rapid filling, good packing and immediate sealing of pit will help prevent excess air from spoiling silage. Good bunker face management and feed-out rate can also help keep silages from spoiling.

Silage additives can help improve the aerobic stability of silages. Organic acid based additives applied at the time of ensiling at 0.5 to 2kg/ton of fresh forage can help to improve the aerobic stability of silages. Anhydrous ammonia can be used on corn silage to improve its aerobic stability. Traditional microbial inoculants improve fermentation but do not consistently improve the aerobic stability of silages. One of these microbes, Lactobacillus burcheri 40788 has marked improved aerobic stability in silages.

Crops that are being used for silage are:

- GS; Grass / pasture Silage
- WCW; whole crop wheat
- WCB; whole crop barley
- HCB; head cut barley, with the aim of increasing the quality and then baling the straw
- Triticale; has good yields due to its harvest ability in big crops
- WCC; whole crop corn
- Cob meal; the corn cob is chopped and put in the pit @ 27% moisture (20-40%)

I only came across one family farm feedlot in Canada that was putting peas in his barley crop that was then made into silage, resulting in being protein tested at 14%. It also helped hold moisture for silage making process. I did this last season with barley and vetch. It tested 11.7% p and 11.8%ME, while it still tested better than barley on its own, with a better vetch population aim to get near the 14%p.

The whole aim of the crop is to be made at 60% moisture, (as they get dryer, chopping them finer will assist in packing).

- Corn silage can be successfully re-clamped from one site to another
- Oats is not preferred as high stubble to grain ratio, it also increases the cost of making due to conditioning, wilting and raking
- Taking the crop for silage reduces the amount of moisture used compared to taking to full maturity
- Making silage also helps with weed control as seeds are removed from the paddock
- Legume rotations or mixed crops can assist with nutrition requirements

Silage baled and wrapped in plastic

- Bales are able to be used on an as needs basis
- Important to bale in its own juices (no dew or rain)
- Inoculant – from researching contractors they got a 50/50 success.

I haven't used inoculant with baling and have been happy with the product, I would put the success down to baling in it own juice.

- Important to do as little handling once wrapped

- Wrapping in the paddock. While it is quick behind the baler there is a percentage of punctures in the plastic due to putting it back on stubble, also having to handle it back to the stack increases risk of plastic damage

We found it best to bring bales back to a central site so the bales were only handled once into the stack.

- While the plastic is expensive, don't skimp especially on a stalky product
- Convenient to transport although distance is limited due to the % of water
- Plastic usage - 725g / bale, 11.6 kg / ha, therefore, getting rid of the plastic is an issue
- Losses between baling and feeding out 8%
- Design of stack very important, to keep plastic in tack. Birds and even fox's playing on them can cause damage as well as livestock. We found a pyramid style the most effective.

Cost of Baled Silage

Windrowing 14'	$34.00
Baling 5'6'x3x3	$176.00
Wrapping	$144.00
Plastic	$45.00
Growing cost	$86.00
Total $/ha	**$485.00**

This does not include fuel

Yield of 5.2ton / ha = $93.26/ ton

Silage, Pit or Clamped

Storage methods

- **Pit** as it is commonly referred to, as it was originally in the ground and covered with dirt. Ideal for longer-term storage. However once opened drainage is an issue
- **Clamped** – stored between two walls often made out of dirt or concrete. It is also on top of the ground
- **Buns** – the silage is rolled on top of the ground without sides

Paddock Preparation

- We found that standing stubble made it difficult to keep the cutting knife low to the ground as the stubble would tend to ball up under the comb if the ground was moist
- This season we have run a Kelly disc chain over before sowing to flatten the stubble
- In Canada they roll the paddock after sowing up to 4 leaf stage, to roll stones back into the ground that have come up from the freeze and thaw of winter. This also assists in getting all the dry matter, I will do some rolling trials next season.

40' Roller used after having been sown
Standing stubble and moist ground prevented cutting closer to ground level, possibly left 15% DM

Timing

- Crucial to getting the maximum quality in the product
- Barley was the popular crop being used for silage that were reliant on a dry land cropping system
- Many trials and test have been done and the best time is when the grain is at a cheesy stage, the most amount of nutrition and bulk is in the plant
- Doing it at this stage (40%DM) can mean one less machine in the paddock as it is possible to directly cut into the chopper. So a windrower is not required. No wilt time needed
- Here in Australia there is the odd machine getting around with header front adapted to fit a chopper
- A large feedlot near Lethbridge, Alberta, Canada had two John Deere choppers with 30' header combs fitted, two semis per chopper (depending on the distance from the pit), where they cut or part there of 13 000 acres (5260ha) his cost rolled in the pit is $9/ton

Windrowing

- We have used a 14’ mower conditioner when doing the baled silage it was costing $35/ha. Not suitable when in lighter crops due to the raking involved for a windrow big enough for the choppers capacity
- Doing the pit silage the choppers were able to handle a 72’ windrow made by a header with a Mac Don draper front dropping one windrow beside the other, at 17 ton /ha the chopper was only doing 4km/hr. At this speed it was kind on all machinery. Being able to cut a windrow this wide makes it viable to get light crops
- Using a header with a 36’ comb charged $10/ac ($24.70/ha)

Chopping

John Deere and Class are the two main choppers in the industry. Most machines coming into the country are second hand. New machines start at $400,000. There are not a lot of contractors at this stage, although it is growing as the value of chopped silage is recognised.

Contractors in the industry don’t have a problem with distance, as they are set up to travel. They move from north to south with the season similar to the grain harvest.

Chop Length

- The silage is precision chopped, cutting it to a length of 13-19ml (1/2-3/4")
- Being chopped short means that when it is put in a mixer no more processing required only mixing action
- At this length stock find it difficult to sort from grain in the feed trough
- Dryer silage you can shorten the chop length to assist with packing

Storage and Packing

- Rolling with tractors is the common way of packing the silage
- Pushing a layer out of about 6-8"s is the best way of ensuring good compaction
- You cannot over roll it
- **Packing is the key to success**
- Plastic is used to cover the silage, it reduces deterioration of the silage
- Plastic covering? In a bun style storage system it cost about $1.50/ ton, in a clamped set up should get the cost to 40 cents / ton. The amount of plastic required varied on the size of pit, statistics from "The Grange", Ireland, have pit silage at 4.7kg / ha compared to wrapped bales of 21kg / ha. The amount used in the pit system varied by 50% due to pit size
- Tyres on top of the plastic important to keep air contamination to a minimum and so reduce deterioration. They need to be touching if done correctly. Silage can still hold colour to where the tyre has laid, if rolled well. Half tyres or tyre walls are the most effective, complete tyres will hold water and a good habitat for snakes

- The aim is to keep wastage to a minimum. 10% in 1000 acre = 100 acres. If storage were 100% effective you could grow 100 acres less, this would help the bottom line
- I did come across a number of growers that didn't cover their pits as they considered the cost of the plastic to be similar to the loss of quality from deterioration
- While you do get a black crust where the pit is exposed to the air it is still able to be fed

Inoculants

- Improve fermentation
- Nutrient availability
- Improve aerobic stability

New inoculants are able to combine all three.

Cost; there are products on the market from $1.50 - $3.00/ton. I used both this last season, the dearer product will ensile within a two-week period.

- Application is by ULV (Ultra Low Volume) of 10ml / ton of silage
- 200 grams of inoculant will treat 250 ton of silage
- They are generally applied as the crop is shot out the top of the chopper through a spray nozzle
- Pioneer Research Iowa USA has 20 000 bacteria fingerprinted. They are then selected for the crop most suited. All strains are naturally occurring
- At room temperature the bacteria will live for three years. They had just tested a product from Australia that was five years old and it was still OK

Best Practice for quality retention

At a dairy in Ireland

Silage Pit design and handling

- The width of the face that you work from is important. You need to be able to get across the whole face within a week. This reduces deterioration. It starts to spoil once it is exposed to the air.
- A "Sheer Grab"is preferred for the smaller operator. It cuts out a biscuit with a three sided blade, reducing air getting into the stack. Photos as above are at a dairy in Ireland. He is standing in front of pasture silage. It has been extremely well packed due to being a fine pasture.
- Using a bucket loosens the stack and air can go back in as far as two meters. It could be a week before that feed goes to the feed bunk. The quality of silage would have significantly reduced by this time.

Feeding out

- Precision chopped silage mixes easily into the ration
- Being precision chopped reduces the ability for stock to be able to sort their ration, so less likelihood of cattle developing acidosis
- As it is a fresh feed it needs to be fed out as required
- In hot weather, early morning and late evening feeds have seen us maintain weight gains under extreme heat
- In winter you would have no trouble getting away with one feed

Cost of silage in a average season 17 ton / ha

	$ Ha / ton		$
Windrowing	$24.70	1	$24.70
Chopping	$15.00	17	$255.00
Growing Cost	$86.00	1	$86.00
Total / ha			**$365.70**
$/ton wet	**$21.51**		
$/ton dry	**$64.54**		

Cost of silage in a light crop 2.5 ton / ha

	$ Ha / ton		$
Windrowing	$20.00	1	$20.00
Chopping	$28.00	2.5	$70.00
Growing Cost	$86.00	1	$86.00
Total / ha			**$176.00**
$/ton wet	**$70.40**		
$/ton dry	**$211.20**		

Silage production, in a year such as 2006, offers another economically viable alternative for light crops. In many cases crops in this area were not heavy enough for dry hay or grain production.

This is this year's scenario, hay and barley grains are at $300/ton. Silage made on an hourly rate, chopper $500/hr, chain bed truck $120/hr plus fuel.

Growing costs included, if not cut as silage, it would have been a failure and economic loss.

Cost of feeding a 500kg cow on straw and silage

Feed Cost / head / day

Weight	500
2.8% consumption DM	14
Kilos As fed @ 65% DM	22
Feed Cost per day	$1.60
Total cost/week	**$11.20**

Ration	$/tonne	Mixed %	3000kg mix	Cost
Silage	$50	75%	2250	$113
Straw	$100	20%	600	$60
Concentrate	$320	4%	120	$38
Lime	$240	1%	30	$7
	Total %	100%		$218
	3,000		One ton	$72.70
			Cost/kg	$0.07

Number of days a Cow 500 kg at 2.8% of body weight can be fed for off one hectare

	Yield Kilos / ha	Moisture %	(M)	(DM)	Number of days @ 14kg / day
Grain	2000	12%	240	1760	
Straw	1000	10%	100	900	
				2660	**190**
Hay	4000	15%	600	3400	**243**
Wrapped Silage	5200	30%	1560	3640	**260**
Pit Silage	17000	60%	10200	6800	**486**

Guide to Water Requirements

Crop	Yield(t/ha)	mm/ha	ML/ha	ML/t of yield
Grain crops	Grain yield			ML/t of grain
Grain Sorghum	4.7	259	2.6	0.55
Maize	6.3	452	4.5	0.71
Wheat	3.4	394	3.9	1.15
Forage Crops	Dry matter yield			ML/t of DM
Lucerne	7.9	681	6.8	0.86
Forage Sorghum	5.6	168	1.7	0.30

Wheat requires 117mm / ton of grain per hectare.

Finance

Agribusiness Banking; Royal Bank of Canada

While in Canada I was fortunate to have a day with four Agronomic Managers, from one of their leading banks. It provided an insight for both parties.

Bearing in mind through the US and Canada a big percentage of the farms are rented or leased. This is also on the increase here in Australia. However our banks lending structures are not set up for this scenario.

General operating or working capital loans; Banks will provide financing for general operating expenses. Royal Bank policy is that these loans should not exceed 65% of annual operating expenses. These are usually secured by a general assignment of current assets (grain, feed, livestock etc). In some cases they will mortgage land to secure operating lines of credit. Interest rates run from prime rate, currently 4.25% up to prime + 5% (very rarely), depending on the financial strength of the borrower.

Feeder cattle and stocker loans; Will finance feeder and stocker (grass) cattle up to 75% of the market value of the cattle. These are revolving loans set with a maximum amount. Security is by way of a general assignment on the stock.

Interest rates are similar to general operating loans however large feedlots often borrow by the way of Bankers Acceptances. This method of borrowing requires that funds be borrowed in large blocks (minimum $500,000) for a period not less than 30 days. The rate is usually **1-1.5% less than the prime rate**.

Breeding Stock Financing; Provide funds for the purchase of breeding stock by the way of term loans with a set principal payment. These loans are usually over five years but they can go as long as seven years if the client is purchasing bred heifers. Security is by way of a general assignment on the stock. A bit of a premium is added to the rate of term loans (.25 to .5%) and another premium is added if the client is paying less frequently than monthly.

Machinery Loans; Banks provide 75% of the purchase price of equipment. This is done by term loans with repayment periods from five to ten years. Five years are most common but will finance new "big ticket" items (headers, large tractors) over 10 years for good clients. The terms are much similar to breeding stock loans and security is usually by way of specific items being financed.

Mortgage Loans; RBC will provide mortgage loans for a variety of purposes. Most common is the purchase of land or construction of buildings. They will lend up to 75% of the value of the real estate and permanent buildings. In the case of specialised buildings (dairy & poultry barns) it is restricted to 65% of the value. Repayment periods can be up to 25 years and the interest rate can be floating or fixed from any to ten years. Fixed base rates currently range from 4.9% for a 1 year term to 6.9% for a ten year term. A premium is added to these base rates depending on the financial strength of the client and payment frequency.

The overall consideration in providing any sort of term debt is the client's ability to repay the loan based on historical financial performance of the farm plus projections. RBC doesn't want to own the security pledged so they make every attempt to ensure the client will be able to make the payments with reasonable allowance for risk.

"The first money lost is the client's".

Challenges to overcome

Droughts

I have always considered our district as being "permanent drought, broken up by short seasons".

With this in mind the silage system keeps seasonal fluctuations to a minimum, giving us a twelve month profit centre.

One thing you can guarantee in Australia is that there will always be another drought.

Government policy, environmental restraints and conservationist

Government policy; we have to be involved with the ideas; consulting on a draft is too late.

Environmentalists; they are in the news everyday with more time and money than us.

Water, land clearing and animal welfare are just a few.

The California Farm Bureau is having success with educating the environmental 'Do Gooders' on what is really happening on the ground, finding middle ground and mutual beneficial solutions rather than going head to head through the media and government.

Labour

- Labour is the common problem the world over. The US and Canada have the Mexicans to help with their manual labour. Their governments have put in place a seasonal work visa, which seems to be going along okay. However there are still 20 million illegal immigrants in the US. They had big ideas recently to clean the illegal workers up, but when it was pointed out that there would be no labour to harvest the crops it went no further.
- The UK and Europe are able to draw on Eastern Europeans to fill their labour needs. They would do an eight day week if it were possible.
- Staff retention was an issue also. I did come across some unique ways of overcoming the problem

  To overcome this we have initiated;

  1. Performance incentives
  2. Bonuses - staff tend to stay for the bonus then hit the road
  3. Bonus - calculated monthly by way of turnover, however it is given out at a rate of 1/3 per month, so at any one time the employee has some bonus owing. If he leaves it is not redeemable
- Getting staff in rural areas
- Money is not the only requirement staff are looking for in a job
- Recognition, self satisfaction, responsibility
- Housing for spouses needs to be up to a standard, happy spouse, happy home
- Need to have a productive socio environment (we are all responsible for this)

Market Demands

- Consistent 12 month's supply and the customers are not interested in our supply problems
- Stay in touch with consumer wants for quality, through improved supply chain communication
- Traceability, in Japan 75% of consumers have confidence that the traceability is there while only 10% have actually used the equipment

- Find out what the market wants and is prepared to pay, then produce it knowing what your margin at the beginning is, hence reducing the risk.

Conclusion

Net returns from a high value forage beef system are greater than cereal production in a semi arid climate.

A semi arid climate maybe isn't that arid as some might think, when with average seasonal conditions a silage system can achieve, 235ml (940points).

We live on the driest continent in the world. Is this really a disadvantage?

In Australia, drought is always around the corner. Prepare. The Northern Hemisphere (our market competitors) has a drought every year – its called winter!

We have been busy patting ourselves on the back for being the most efficient farmers in the world but is our isolation holding innovation back?

We are third world in getting the best value out of our primary produce.

We will not be here in five years with current commodity prices. We have to do better than breaking even, even this is going backwards as everything still depreciates. It's not putting up new fences and new paint on the tractor it's educating the family or creating a business that someone can see a future in.

Forage quality critical

The better dry matter quality, the more economical it becomes. It is not only the maximum tonnes produced but the amount of digestible fibre, protein and ME.

Silage system takes the seasonal risk out of a stock enterprise at the same time as value adding a cropping enterprise.

A ration of silage and straw can be an economical ration alleviating the need for de-stocking in dry times.

Rotational crops, legumes can be used for soil nutrient benefits, so helping with the spiralling cost of fertilizers.

Manure can be returned to the paddock helping to reduced inputs and improve organic matter.

Silage is also a cost effective weed management tool removing seed population from the paddock.

Value adding done on farm gives more control on commodity price. Primary producers lose control of price at the farm gate and cash flow (pressure) is generally the determining factor for when this occurs.

Positive Spin offs

Regular cash flow.

Retail price for a wholesale product.

Financially able to employ staff to help share the work load.

Staff comes with families which all add to the social fabric of rural districts.

Would you have help on the farm if you could run at full capacity year in year out?

Once you have a sustainable supply there is opportunity for other allied businesses to set up in the local area i.e. packing plant, feedlot.

Prepare; Australian farmers in arid regions tend to reduce stocking rates as the season dictates, then either breed back up or restock at unrealistic market levels.

The scholarship made possible by Nuffield and GRDC has shown me that Australia has fantastic opportunities in the rural industry and I can be part of that growth. If we don't get in and have a go international investors will.

Finance; We have a good relationship with our bank and they are progressive in the agriculture sector however they still have some distance to go, as does the rest of agricultural banking in Australia to catch up to what is available overseas. They are a limiting factor on growth.

RBC will lend

- 75% on cattle value
- 75% on unprocessed grain
- 50% on silage, hay and processed grain

Banks need to see themselves as a partner in the business and form relationships with those they want to be in business with.

Grain farmers need to recognise the whole value of what they produce as they grow their crops.

"Get past grain on the brain".

Technical support

Quality Silage Systems

www.silage.net

Distributors of inoculant and technical support as well as help with rations

Riverina Stock Feeds

www.riverina.com.au

Makers of dry feed mixes and suspension supplements

References:

Water requirements

EA Oelke & RL Thompson, University of Minnesota, USA

Understanding Feed testing

Adapted from "FEEDTEST" Hamilton Vic

Royal Bank of Canada

Sales Manager- Agriculture Markets, AB South

Understanding Silage

Quality Silage Systems

Yield and Cost of production charts

From 2005 and 2006 seasons at "Mayfield" Warren NSW