Nuffield Farming Scholarships Trust

A NATIONAL FARMERS UNION MUTUAL CHARITABLE TRUST AWARD

Dairy Farm Expansion

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Contents

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Introduction

My study topic of dairy farm expansion came about from my experiences of expanding my own farm and the problems I have encountered along the way. I began my farming career full time in 1988 after I graduated from Harper Adams Agricultural College. However I had been heavily involved in the farm from the age of 12 when my father suddenly died of a brain haemorrhage. My mother had to take over the running of the farm and included me in the decision making processes early on .

When I came home from college the farm had 85 cows and 80 sheep and was run as a typical upland livestock farm. Following the trends at that time Holstein genetics were introduced promoting higher yields. Grassland was reseeded to improve pasture quality allowing more stock to be kept. The increased stock came in the form of dairy cows as these were felt to be more profitable and suited to my style of farming. As a result the sheep flock was sold to allow my full attention to be focused on the dairy cows. Throughout the 1990s cow numbers were steadily increased by converting the self feed silage pit to more cubicles and a feed passage and then the erection of another shed with more cubicles and loose housing. The milking parlour had been extended and 2 silage pits had been built.

By the year 2000 we had a herd of 170 cows but any further expansion would require a major change. The milking parlour could not be extended any more, it was becoming tired and was not good enough to attract the better staff to work for me. I developed a plan to put up a completely new building to house a new milking parlour and handling system along with a new calving area. This was to be followed later with a new cubicle shed allowing 300 cows to be milked. The new milking parlour building was finished in 2002 allowing herd numbers to increase to 240. In 2005 the new cubicle shed went up and a herd of 120 cows was purchased. We also had the unexpected opportunity to take on a 15 year FBT on the next door farm allowing us to grow the extra forage required rather than buying it in, which was in the original business plan.

It was at this point that things started to go wrong. My assistant herdswoman got pregnant and left to live on her boyfriend's farm. I employed a second east European worker and also took on another English general farm worker in addition to my herdsman. The extra staff proved difficult to manage and our herd performance started to suffer. In 2006 my Herdsman left to take over the running of his family's farm. Our culling rate shot up to 42%, the milk price dropped to 17ppl and we had high borrowings. It felt as if everything was falling apart and I had expanded too far.

I soon began to realise that there was more to managing a larger herd than I had

bargained for and was finding this out the hard way. It took me 6 months to get a suitable herdsman in place and by summer 2007 I had a new Polish worker and an English school leaver who are both still with me today and I was able to leave them to run the farm with my Mother while I undertook my Nuffield travels.

My study on Dairy farm expansion aimed at investigating the different methods needed to manage the larger scale of dairy farm and to give recommendations to the many farmers who are expanding their own dairy businesses so that they do not endure some of the problems that I had.

Countries visited

USA

I spent 4 weeks in October 2009 travelling 4500 miles around mainly the Mid West of the USA. The farms that I visited ranged from 85 cows right up to 8000 cows but all had begun as small family farms. The vast majority of US dairying takes the form of confinement dairies where the cows never go out to graze and are housed 365 days of the year. Some young stock may be reared in outdoor feedlot style operations.

At the time of my travel milk prices in the USA had been well below the cost of production on most farms I visited. This was the main talking point at the Alltech Global 500 Dairy conference I attended in Lexington, Kentucky. It felt unusual to be sitting in a conference with dairy farmers from all around the world who had suffered massive price drops whereas those of us from the UK had only had a modest price fall of about 12%. When questioned on this I was quick to point out that the UK had not had the high prices that other countries had enjoyed in the boom times of 2007/2008. This was to become a common theme of my travels to the 4 countries I visited .

There were several common themes I found on US dairy farms. Without exception on any farm I visited with over 400 cows, they were all bedded in deep sand filled cubicles. This was felt to be the gold standard by the owners I spoke to and they believed the improvement they got in cow comfort and reduced mastitis challenge was very important when managing large herds. Another common factor found on US dairies was the Hispanic workforce. On larger units Hispanic labour would typically make up in excess of 80% of the workforce. A noticeable difference I observed since my previous visits to the Mid West in 1996 and 2003 was that the Hispanic workforce are now taking more senior roles on the farms. It was not uncommon now to find Hispanic herd managers. On one farm I visited in Kentucky that had 1500 milk cows plus young stock and 10,000 acres of crop land there were only 3 US employees other than the 4 family members on the farm. The other 40 staff were all Hispanic.

Many of the farms I visited had undergone rapid increases in cow numbers over the last 10 to 15 years. This was particularly evident in Michigan where I visited 3 farms that were run by Dutch farmers who had come to the USA in the mid 1990s. All had come from family farms of less than 100 cows and now one of them was milking 1100 cows and the other 2 had just over 2000 each. They had all followed the same model of buying a relatively small farm (less than 200 acres) and putting new dairy buildings on it but contracting out the supply of forage to local crop farmers. The crop farmers were able to cut their fertilizer use by using manure from the dairies and welcomed the alternative market for the crops right on their doorsteps. The present high prices of corn(maize) and soya were now starting to put a strain on these deals. As a result these dairy farmers were now starting to buy and rent land on which to grow their own forage crops to try and insulate themselves to some degree from volatile feed prices.

A noticeable difference between US and UK dairy farming was how aggressively (in a technical way) cows were managed. Farmers realized that fertility and yield were major drivers for profit and pushed both very hard. Almost all large herds were milked 3 times a day with milking parlours only empty for short periods to allow for washing down. Heat detection was often a problem in the large herds and fixed time breeding using the

Ovsynch program was common place. This would see all cows synchronized using hormone injections to come on heat on the same day of the week. Technicians would then come in and serve around 100 cows on just one day of the week on a farm of around 1000cows. Feeds such as blood meal, tallow and meat and bone meal, which are banned in the EU, were often used. Along with relatively cheap maize silage and maize grain, cows could be fed for less cost than a similar specification ration in the UK could be produced for. A consequence of pushing hard for milk yield was the relatively high annual cull rate of between 35 and 40% on the farms I visited.

Australia

I spent one week in the state of Victoria which is responsible for 65% of Australia's milk output. There were more parallels with UK dairying than I first thought there would be. Australia's annual production is 9.4 billion litres and falling (against our 13.4 billion litres and falling) and their predominant cow breed is the Holstein Friesian using many of the same bulls that we do. Annual yields are 5750 litres from 1.5 tonnes of supplementary feeds. Milk purchasers were 60% private companies and 40% farmer co-ops but the percentage sold to co-ops was falling as it is in the UK.

Over 90% of production in Victoria is exported (Australian average 45%) and consequently the farmers were receiving a near world market price of approximately 21pence per litre.

One of the main areas I visited was the Shepparton area in Northern Victoria. This was in the centre of the Murray Golbourn irrigation area. Dairy farming here was totally reliant on irrigation to grow fodder for the cows. There had been a drought for the last 10 years and water allocations had been cut from 200% to as low as 26%. In 2010 the allocation had risen to 53%. This had severely affected the profitability of dairying in this region and output had dropped by 33% over the last 10 years. There had been very little investment in farm infrastructure and many dairies were starting to look a little shabby as a result. Farming practices had changed to cope with the lack of water. Perennial ryegrass could no longer survive so annual ryegrass was now sown along with fodder crops such as sorghum. Cows were kept outside all year round but supplementary feeding with mixer wagons was common place, mostly in the summer when it was too hot to utilize irrigated pasture economically and in the winter when growth slowed down. Wholecrop cereal silages were becoming popular as a cow feed due to their lower water requirements to grow.

Some of the larger farms I visited were struggling to find willing staff to work for them. A few farms had Filipinos and the farmers were very pleased with them but Australia's tight immigration policy had made it very difficult for the Filipinos to get work permits.

New Zealand

I spent 3 weeks touring around New Zealand and the majority of the dairy farms I visited were on South Island. Dairying on South Island has grown rapidly in the last 20 years from virtually nothing to 33% of New Zealand's 16 billion litre a year output. Average herd sizes of 546 cows on South Island are much bigger than the New Zealand average of 366. I was struck by the simplicity of the farming systems that predominantly relied on grass to feed the cows. Many farms used no concentrate supplementation at all and only fed small

amounts of silage in the spring and autumn if grass growth was very low.

With 95% of New Zealand's output exported at world market prices a low cost and efficient milk production system was essential. Some of this efficiency was driven by the farmer owned co-op Fonterra. They handle over 90% of the milk produced in New Zealand and control all their milk collection via 450 tankers all linked by GPS to one control centre. From here all tankers are routed daily for the most efficient way to collect daily farm volume and deliver it according to manufacturing plant capacity. These tankers work two 10 hour shifts per day and collect up to 72 million litres a day at peak..

All the farmers I met were equally focused on profit in the way that they farmed. They all focused on utilizing grazed grass as efficiently as possible as this was considered to be the main driver for profit. Machinery was kept to a bare minimum and great effort was made to set the farm up with a good network of tracks and paddocks to enable the best use of grazed grass. Nobody mentioned litres per cow or margin over concentrates. Figures such as Kg of milk solids per Ha or return on capital were more likely to be quoted.

New Zealand was the only country where I witnessed what could be described as corporate ownership of dairy farms. I came across several companies that would set up syndicates of investors to buy an existing dairy farm or convert a farm to dairying. These farms would usually be run by a share milker with the company who set the deal up in the first place, overseeing the management of the farm for a further fee. With the downturn in milk prices in 2009 and a subsequent drop in land values in excess of 25% from peak values, some of these schemes were in trouble and some of the companies that set them up were being taken to court by investors. The largest corporate Farmers I visited were Dairy Holdings Ltd who owned 56 Dairy farms and a further 10 farms used for Dairy replacements and dry cows. They were one of the first to expand and have three principal investor/directors. Their farms were run by a mixture of managers, contract milkers and share milkers.

Denmark

I spent one week in Denmark mostly on the main Island of Jutland looking at a wide range of farms. The Danes take great pride in the appearance of their farms and farm to high technical and environmental standards. Average yields at 8900 litres/cow/year were not far behind the USA and, in common with the US, most cows and young stock were housed all year round. ,Over 94% of milk is sold by the farmer-owned co-op Arla Foods which also includes most Swedish dairy farmers among its members. Their effective marketing has returned a good milk price to Danish farmers. This has resulted in some high land prices and over capitalization of buildings and machinery on many farms.

The Danes had greater environmental and health restrictions than anywhere else that I visited. It was compulsory to have 9 months of manure storage and dry cow antibiotic use was not allowed unless the cow had been milk-sampled previous to drying off, to prove it had a problem that dry cow therapy could cure.

Robotic milking was popular in Denmark with 27% of all cows being milked by Robots. These were not just confined to small family farms, the average herd size milked by Robots is 168 cows. I visited farms with up to 8 Robots milking 500 cows. They appeared to work well but had significant maintenance needs and also required a lot more electricity

than a conventional parlour. Automated feeding systems consisting of a small mixer wagon carried on a monorail were also quite common.

My Study

As a result of my travels I have identified a number of common factors that I tended to find on the farms that I visited. The one thing I did not see was farmers who had failed or admitted to failure. Nobody wants to take you to show failure and if you do find it people are usually unwilling to talk abut it.

The main areas of success can be broken down into the following areas

- Business Partner
- Staff Management
- Business management

Business partners

Wherever I travelled I kept seeing one common trend. This was Husband and Wife partnerships running successful dairy farms. Many of the farms I visited had undergone fast expansion which had required a lot of management time. Both partners would have different skills which could be employed in the business. The wives would typically be responsible for calf rearing and often be involved with accounts, record keeping and personnel management. When wives were involved in the business I felt there was a better understanding of the lifestyle compromises that sometimes had to be met when running a farm. The most extreme example of this that I saw was on a large US dairy. The owners had emigrated from Holland 14 years previously after selling their 40 cow farm and had purchased a 200 acre farm in Michigan. Through very hard work and determination they now had a milking herd of 2000 cows. Like most US farms of this size this was a 24 hours a day operation. They were very hands on managers and claimed that they would never leave the farm together for more than 1 hour at a time.

On some of the larger farms I visited in the USA there was a partnership of non-related people who had come together to develop dairy farms. A good example of such a business was Milk Source LLP in Wisconsin. The three partners in the business , Jim Ostrum, Kevin Vosters and Todd Willer had come together to manage the Vosters family dairy farm. This was expanded from 150 cows to 6800 and they also run the 2000 cow Omro dairy and the 8000 cow Rosendale dairy. The three partners all had separate areas of responsibility that played to their individual strengths. Jim Ostrum was the 'business' man looking after purchasing and selling and overall administration while John Vosters was the 'cow' man who was responsible for the welfare of the cows and the diets and Todd Willer was the 'operations' man who looked after getting the feed to the cows, removing the manure and designing and building new dairies. Milk Source contracted out as many operations as possible to outside contractors so they could focus on their core business.

Staff Management

This was probably the most difficult aspect of dairy farm expansion for farmers to master. Many farmers commented that managing cows was certainly easier than managing staff. The larger the workforce the more difficult it seemed to be to manage them. One of the best quotes on staff management was given to me by John Mulvany of On Farm consulting in Australia. He claimed the best staff meetings could be held around a card table. The implication was that once there were more than 4 of you on the farm you often needed layers of management.

The majority of farms I visited were using migrant labour to some degree. The only exception to this was Australia where it was difficult for migrants to get work permits. It was very noticeable that the Australian dairy farmers that I met appeared to be having more problems recruiting suitable people to work on their farms. A significant part of what I saw came down to learning how to manage the different nationalities that may be working in a particular country.

Hispanics in the USA

It was the exception to visit a dairy farm that did not have Hispanic staff working on it. The legality of some of these workers was a bit of a grey area but this was only a problem if the immigration officers were checking businesses in the area. Several farms I visited had the majority of their Hispanic labour disappear overnight if they thought an immigration check was imminent. The workers usually drifted back over the following week but it was a serious issue if you had 1000 cows to milk 3 times a day on your own! A good example in staff management was set by Gordon and Cathy Spears in Wisconsin. They had moved from a 150 cow farm in Canada 5 years previously and built Shiloh Dairy that had a herd of 1100 cows. Most of their staff were Hispanic including their herdsman. They made a great effort to make their staff feel appreciated and part of a team. There was a map of Mexico on the wall in the staff room with pointers on it to show where all the staff came from. Gordon and Cathy would aim to sit down with the staff during coffee breaks and would supply cakes or doughnuts for special occasions such as birthdays. They now had a good team working for them who had now got to the stage that if a new employee joined the farm and did not work to the standard of the existing Hispanics they would not tolerate it and force them out! The Hispanics would often recommend one of their family or friends for any new staff vacancies that arose. In common with many farm owners and herdsmen, Cathy has learned to speak Spanish so she can easily communicate with their staff.

Ukrainians in Denmark

The vast majority of migrant labour found on Danish dairy farms was from the Ukraine. Most written communication for Ukrainian staff was in English as this was the common language that could be understood by both the Danes and Ukrainians. There were 2 grades of immigrant workers in Denmark. The first were those on student visas who could work for a maximum of 18 months and be paid at a lower rate than the Danish minimum wage. These were typically used for the lower skilled jobs such as milking assistants. The second grade were the more skilled workers who were paid at the same rate as Danish workers and had permanent residence in Denmark. As in the USA the farmers I spoke to thought that it was important to sit down with the staff at break times so they could have a two way conversation on what was happening on the farm.

Migrant labour in New Zealand

Migrant labour in New Zealand came from a wide variety of sources. The most common of these were the Philippines and the Middle East. A 1700 cow farm I visited ran a 3 week staff rota that gave the staff a Friday, Saturday and Sunday off and then a Tuesday and Wednesday off in the rota. The owner said it was important to have the Friday-Sunday period in the rota as this covered all the Holy days for the various religions he employed. Because he farmed near to the city of Canterbury he felt that it was an advantage to him as there was a Mosque and a Hindu temple there that his workers could visit which would not be an option for those working in more remote areas of the country.

One large dairy business that I visited with 5600 cows in 6 herds had developed separate areas of accommodation for their migrant workers. All the staff employed on this farm were provided with either houses or lodges for the single people. About a third of the staff were from the Middle East or the Philippines. The manager had found he was getting too many problems with New Zealand-born staff and the migrant staff falling out with each other when they were living in the same blocks of accommodation. The two groups of workers seemed to have far more problems living together than working together. The move to give the migrant workers a block of accommodation on another area of the farm had improved the situation considerably.

Staff Protocols

Written staff protocols were found on almost every farm I visited. As cow numbers and staff numbers on farms had grown the farmers found it impossible to be able to watch and direct all the employees all of the time. Standard operating procedures (SOPs) were very common, especially for less skilled migrant labour. The most common SOPs seen included milking routines, care of new born calves and start up and wash down procedures for milking parlours.

Example of start up protocol for a rotary milking parlour on a Danish farm

Please see next page

Arbejdsgang malkestart 1. malkemand

Malkestart

1. aktivitetsliste- tjek + sortering
2. hanedrejning:
   - tank
   - tunnel
   - 2*kølerum
   - karruselcenter
   - 2*udskiller
3. påsætning filter
4. afmontering vaskeslanger
5. pultknap ON
6. udgangslåger AUTO + ÅBEN
7. sammendrivning køer + tjek kælvningsboks
8. sengebåsefejning
9. spandesamling
10. tænde 2*vacum styring
11. hæve malkesæt (grøn knap) Vente ca. 2 min. før påsætning
12. malkehastighed 32-37
13. tænde kodriver efter 1 til 1½ omgang
14. stor OBS. alarm INDEN udgang

This is a typical style of protocol found in Denmark in that it incorporates pictures as well as text. This was felt to reinforce the message and make it easier to follow, especially for more complex operations such as setting up this rotary parlour. Pictures were also useful as most of the written protocols I saw were written in English as this was deemed to be the most common language that the Danes and their Ukrainians could understand.

On one Danish farm I visited, all staff were issued with note pads and were required to give a note to the head herdsman at the end of each day. They had to write down about any piece of equipment that may not be working, any supplies that needed ordering or any animal health problems they had seen such as a lame cow. It was then up to the head herdsman as to by whom or how the issue could be resolved.

Another useful method I observed for managing labour was a routine jobs board that assigned various jobs to different members of staff. On the example below the farmer (Bjarne) had 3 Ukrainian workers who worked a shift system as the farm milked the herd of 300 cows 3 times a day. Bjarne had jobs assigned to him but did not necessarily do them himself but could allocate them to whichever worker was most suitable on that particular day.

Example of a routine jobs board in Denmark

(please see next page)

In the USA the majority of the farms I visited milked the cows 3 times a day and would run the milking parlours almost constantly on a shift system. As these parlours were running at close to their capacity it was very important for them to be run efficiently or they would be unable to milk all the cows 3 times a day. Many of the large milking parlours had software to measure milker performance and help analyse where it could be improved. One parlour I visited had a large digital stopwatch in it. This started as soon as the first cow walked in and stopped when the last unit on that side of cows was applied. If the operators could not do this sequence in 5 minutes then they were unlikely to be able to get all the cows through in the allocated time, so they kept a close eye on the stopwatch.

In the confinement herds of the USA and Denmark a lot of emphasis was put on the milker getting the correct 'Prep-Lag time' . This is the length of time from preparing (cleaning) the cows teats until milk flow will start and the milking unit can be applied. The recommended wait from cleaning the teats to applying the unit was 60 to 90 seconds. A lot of training and protocols (see appendix 1) were devoted to this particular aspect of milking. To get this part of milking correct was much easier with a large rotary milking parlour. Todd Willer from Milk Source LLP claimed that his new Rosendale dairy with 80 point rotary parlours was easier to manage than his similar sized Tidy View dairy that had large rapid exit parallel parlours. This was because in the large rotary there were 3 operators to do the teat preparation and cluster attachment.

- Operator 1 Dip and strip
- Operator 2 Clean and dry
- Operator 3 Attach milking unit

To get the correct lag time between each operation all the manager had to do was position the rubber mats the operators stood on at each station, the correct distance apart depending on the rotation speed. Unless the operators moved the mat they could not get the timing wrong and it was extremely consistent at each milking regardless of which operators were working.

The New Zealand Share Milker System

The share milker system is very common in New Zealand and is also found in Australia to a lesser degree. Put simply, share farming is a contractual arrangement to share the income and expenses of a dairy farm on an agreed basis, derived from the perceived risk involved, degree of management autonomy and investment in the business. Generally the farm owner provides the infrastructure required for dairy farming and the share farmer provides the physical labour, management skills and some of the livestock and equipment needed to operate the farm.

There is a high degree of interdependence between the farm owner and the share milker which encourages both parties to have regard for one another. Share milking is seen as a good way to attract and retain good people in the dairy industry. It allows share milkers a gradual skills pathway and allows them to build equity which they may use to eventually buy their own farm. When the system was originally developed one of its main aims was to allow farm owners who wanted to stop milking, a way of retaining ownership of the farm and an income from it.

The two main types of share milking agreement are the 50-50 share agreement and the variable (also known as lower order) share agreement. In a 50-50 share agreement the share milker owns the cows and mobile equipment such as tractors, machinery and tools. They are responsible for labour involved in looking after the milking herd, stock related expenses, general farm work and maintenance. The share milker receives 50% of milk income and the proceeds of all stock sales. The farm owner receives 50% of all milk sales and is responsible for the farm infrastructure so that production can be maximized. The owner is required to pay for any capital expenses, base fertilizer and half of any production related feed costs. The share milker will employ any labour required but it is the responsibility of the farm owner to provide housing for the share milker and their employees.

In a lower order share agreement the share milker will milk the farm owner's cows and will have a limited value of equipment, usually only hand tools and motorbikes. They are still responsible for employing any extra labour required and paying the costs of running the milking parlour (electricity and chemicals) and a percentage of any supplementary feed costs on a pro-rata basis to their share of the milk receipts.

See chart overleaf. Source : Silvanus Consulting

Item	Farm Owner	50-50 Share Milker	20% Share Milker
Provides			
Land and Buildings	100.00%		
Dairy company shares	100.00%		
Staff		100.00%	100.00%
Cattle	0-100%	100.00%	0.00%
Tractors and machinery	0-100%	100.00%	0.00%
Motorbikes		100.00%	100.00%
Milk	50-80%	50.00%	20.00%
Cattle sales	0-100%	100.00%	0.00%
Calves (sales & rearing)	0-80%	100.00%	20.00%
Dairy shed expenses		100.00%	100.00%
Wages		100.00%	100.00%
Electricity		100.00%	100.00%
Purchased feed	50-80%	50.00%	20.00%
Fertilizer spreading	0-100%	100.00%	0.00%
Nitrogen Fertilizer	50-80%	50.00%	20.00%

The farmers I met in New Zealand who had expanded their farms usually progressed to multiple units before cow numbers approached 1000. There were farms milking more than 1000 cows on a single unit but the consensus seemed to be that these units were much more difficult to run . They needed very good managers and there was a tendency to 'burn them out' quite quickly. A good example of this was Les Keeper who had two dairy farms run by share milkers in Southland. One farm had 1100 cows and the other had 1200 cows. A block of land came up for sale that linked his two existing farms which he purchased. He then built a new rotary parlour on this land and split the herds into three 800 cow units which performed better than the original two unit arrangement and was more profitable.

Expanding farmers I met tended to favour lower order share milkers as it gave the farm owner a better return than a 50-50 agreement. Lower order share milkers would usually receive between 18% and 22% of the milk cheque depending on what equipment of their own they used and what the expected milk price that season would be. Traditionally a lower order share milker would have been on 30% of the milk cheque but higher land values and the cost of Fonterra shares (the farmer's obligations) had risen faster than other costs which had resulted in the lower order share milker getting a lower percentage of a usually better milk price. The big advantage for expanding farmers to use share milkers was that it freed them up from the day to day issues of managing the units and also gave them a motivated person to run the farm who had a big financial incentive to manage the farm well.

Dairy Holdings Ltd had 18 of their 58 dairy farms run on a 50-50 share milker arrangement, 23 by lower order share milkers and 17 by farm managers. Although the company felt that their return on investment was not as good on the 50-50 share milked farms it was important to have them to show a career path through the company for the

most ambitious managers. Without the 50-50 share milker farms they thought they would not be able to attract in at the bottom the best people would be looking for a way to progress to farm ownership through the share milker system.

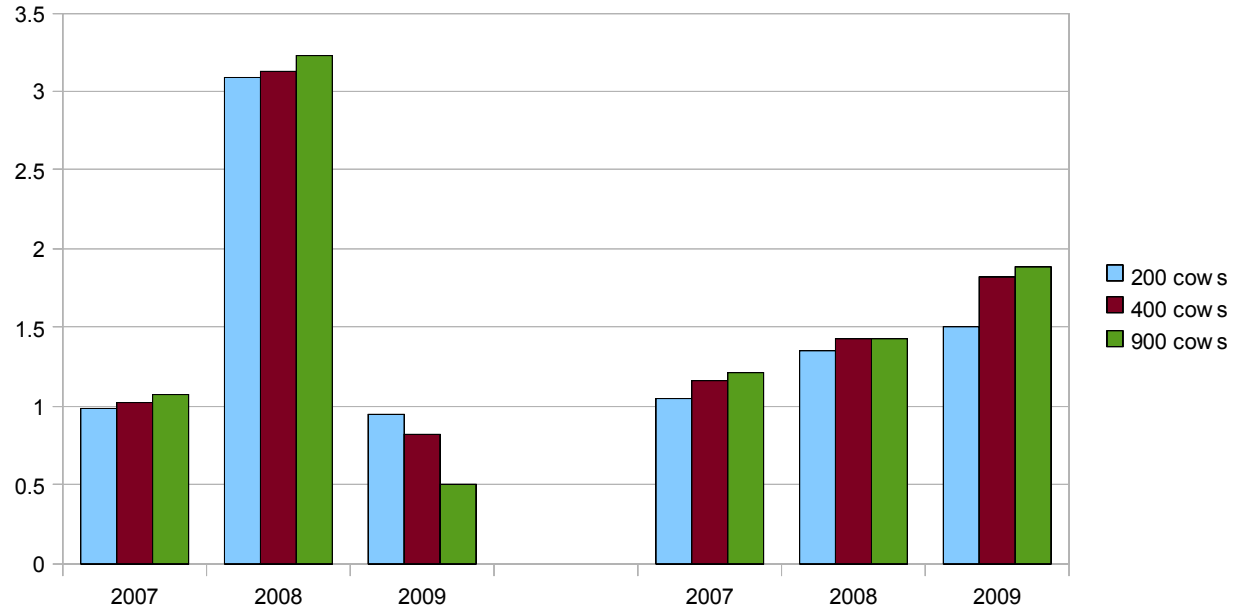
Business Management

As dairy farms grew it became obvious that the role of the farmer changed from being a skilled dairy worker to that of a business manager. Farms that had expanded invariably had more debt than the average dairy farm and required accurate business monitoring and planning to succeed.

Benchmarking

Wherever I travelled the farmers I met were very aware of their costs and the majority were benchmarking themselves against their peers. The better farmers in New Zealand and Australia were often members of very focused discussion groups who would share production cost information with each other. Both countries concentrated on profitability figures and not yield per cow.

Farmers would compare themselves by quoting farm working expenses per Kg of Milk solids produced (F.W.E./Kg MS). This was all the costs of production except finance costs. The FWE figure would even be quoted in farming magazine articles about featured farmers. Benchmarking programs such as Red Sky and Dairy Base (appendix 2 and 3) were the most popular ones used by the farmers I met.



Farm profitability Interest and rent costs

The chart above shows Dairy base farm profitability figures for New Zealand

The figures above show clearly that their was little advantage in profit per litre (or Kg milk solids per Ha in this case) from the different herd sizes apart from the 2009 figure. In this year profits were very low due to the crash in world milk prices. The larger herds had noticeably higher interest and rent costs (32.8% of total revenue in 2009) which severely impacted on profitability. This demonstrates the risk involved if there is a sudden drop in profitability when expanding using a large proportion of borrowed money.

Risk Management

In New Zealand and Denmark there was a certain degree of milk price hedging due to the fact that over 90% of the milk in each country was sold by one farmer owned cooperative. Fonterra and Arla both sold some of their milk products on forward contracts to try and minimize volatility. Both companies, especially Arla, were also into branded products which were less exposed to commodity market price fluctuations. Despite this there had been large variations in farmer milk prices between the highs of 2008 and the lows of 2009.

In the USA farmers could buy dairy futures contracts on the Chicago Mercantile Exchange (CME) to fix a forward price for their milk. There was a small fee to pay for arranging these contracts and farmers were liable to pay a margin call if the value of the contract dropped below its contract price before it matured. For these reasons they were not popular with the farmers I met. A more common way for them to be used was for the farmer's milk buyer to use futures to offer a fixed price deal for a set period (usually 6, 12 or 24months). The farmer was not subject to margin calls and was dealing with a company he trusted. An example I witnessed of the effects of volatility was a farmer milking 900 cows in Wisconsin who showed me his accounts. For the first 7 months of 2009 he had lost $70,000 which was considered a very good performance considering the milk price at the time. In the same 7 month period in 2008 he had made $1,200,000 profit.

For a typical US confinement style dairy buying in all their feeds it was possible to fix the input price of at least 70% of inputs to the farm by using futures contracts. If this was combined with forward selling of milk on a futures price contract then it was possible for the farmer to get close to locking in to a fixed margin on their production. These type of arrangements had been fundamental to some of the farmers I met getting funding from their lenders for expansion projects. Milk Source LLP previously mentioned in this report had locked into a high forward price for 24 months near the peak of the market in 2008. Their policy was to lock in to a milk price if they could *also* lock in their input prices to give them a $4cwt margin (approx 5.5ppl). This had allowed them to avoid the carnage caused by the low milk prices of 2009. When I visited them in October 2009 they were just over half way through the $70 million development of their 8000 cow Rosendale dairy. The success of this project has largely been down to protecting their margins when the opportunity was available. Their business is going from strength to strength and they are now planning to build another 4000 cow dairy in 2011.

Simplicity

I was struck by how simple a lot of the large dairy farms I visited were. This ran from the grazing-based dairies of New Zealand and Australia right through to 8000 cow dairies in Wisconsin. There was a definite trend to concentrate on the core business of producing milk and contract out other ancillary jobs such as heifer rearing, crop field work, manure spreading, cow breeding and heat detection. This allowed the farmers to concentrate their management on the milking cows and also resulted in a lot less capital being tied up on these farms.

Building new dairy units certainly helped to make them simple to operate. This was most clearly seen on the South Island of New Zealand where a lot of land had been converted from sheep, beef and arable to dairy farming. Typically dairy farms would be on the better

shaped and sized blocks of ground and less favourable land would be used as a 'run off block' for rearing dairy replacements and keeping dry cows on. Before a new unit was built the land would be GPS-mapped to work out the optimum place to put in the cow tracks, fence lines, water pipes and centre pivot irrigators.

I visited a 550 acre farm on the Canterbury plains in New Zealand that had just been converted to dairying. A 60-point rotary milking parlour had been erected in the centre of the farm and 4 centre pivot irrigators covered 90% of the farmland. There were 28 equal sized paddocks where the gateway was a maximum of 800 metres from the milking parlour. The only machinery on the farm was a medium sized loader tractor, a fertilizer spreader and a grader blade for the cow tracks. Any surplus grass would be made into silage by contractors. This farm was stocked with 900 milk cows and was run by a lower order share milker who had 4 employees. The farm owner had 3 other similar sized units in the area that he had converted to dairying and all run by lower order share milkers so that he had no day to day staffing issues to deal with.

Contrary to what many people believe a lot of the large US confinement dairies were quite simple operations. Many of the newer large dairies had very little land and had all their forage grown on contract by neighbouring farmers. This feed would be put over a weigh bridge as it came onto the farm and paid for on a pre agreed pricing formula depending on drymatter and quality. All calves would be reared by contractors and returned about 4 to 6 weeks before calving. The cow manure would usually be taken away by the farmers growing the forages for the farm to be used as a source of fertilizer for their fields. Cattle breeding would often be contracted out to companies such as Alta genetics or Genus ABS. These companies could undertake heat detection using tail chalking techniques where the person from the breeding company would check the cows daily and inseminate those on heat.

The other technique popular on large farms was the Ovsync program. The farm's herdsman would give 3 hormone injections to each cow to synchronise ovulation and then the technicians from the breeding company would come in and do a fixed time insemination, usually using semen from test bulls. This system would result in farms only inseminating on one day of the week. Because most of these farms had self locking head yolks on the feed fence the A.I. technicians did not require any farm labour to assist them. With so much of the work contracted out to specialists the farmer could concentrate on harvesting the milk from the cows, putting the feed in front of the cows and managing the calving cow.

In Denmark I viewed a lot of farms using robots to milk cows. While the robots themselves and some of the automated feeding systems were very complex pieces of equipment , once set up the systems were quite straight forward to operate. The picture below shows the farm of Hans Skovgaard. It has 900 acres and 350 cows milked by 5 Lely robots and fed with an automated feed cart that runs on a monorail above the feed barrier. Hans runs this farm with just 2 employees and sells almost 4 million litres of milk a year from his high yielding herd. The feeding system just requires two large hoppers to be filled with maize and grass silage once a day with the tractor loader from the silage pits situated next to the building. The cubicle passageways are all slatted and have automatic scrapers running over them to keep them clean.

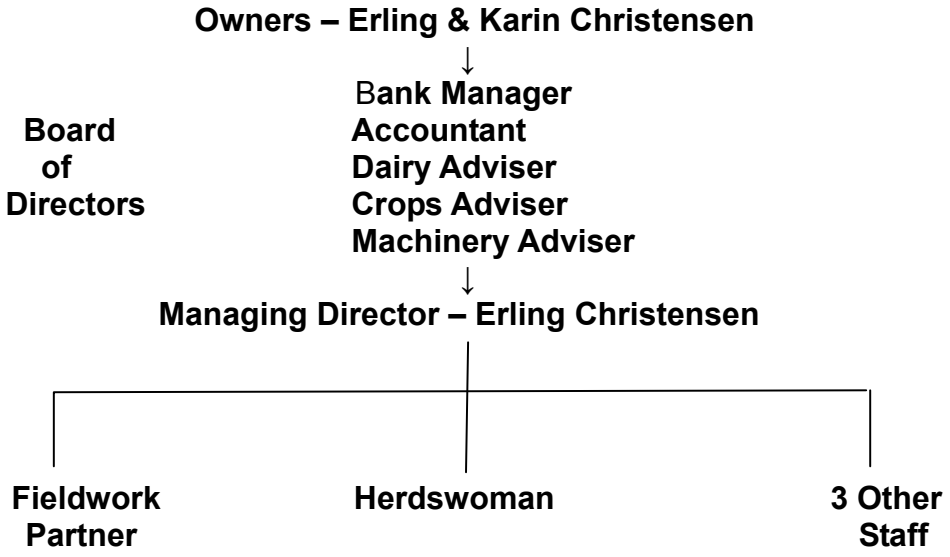
Hans realised some of the issues he would face if he employed more workers and had

chosen this system so that he did not have to employ more than two members of staff, a number that he felt comfortable managing. Although the capital investment was high he did have milk sales of 4 million litres per year. He was also not tied to defined milking times so this gave him some flexibility over which times of day he carried out routine stock tasks.

Hans Skovgaard Denmark

Management Structures

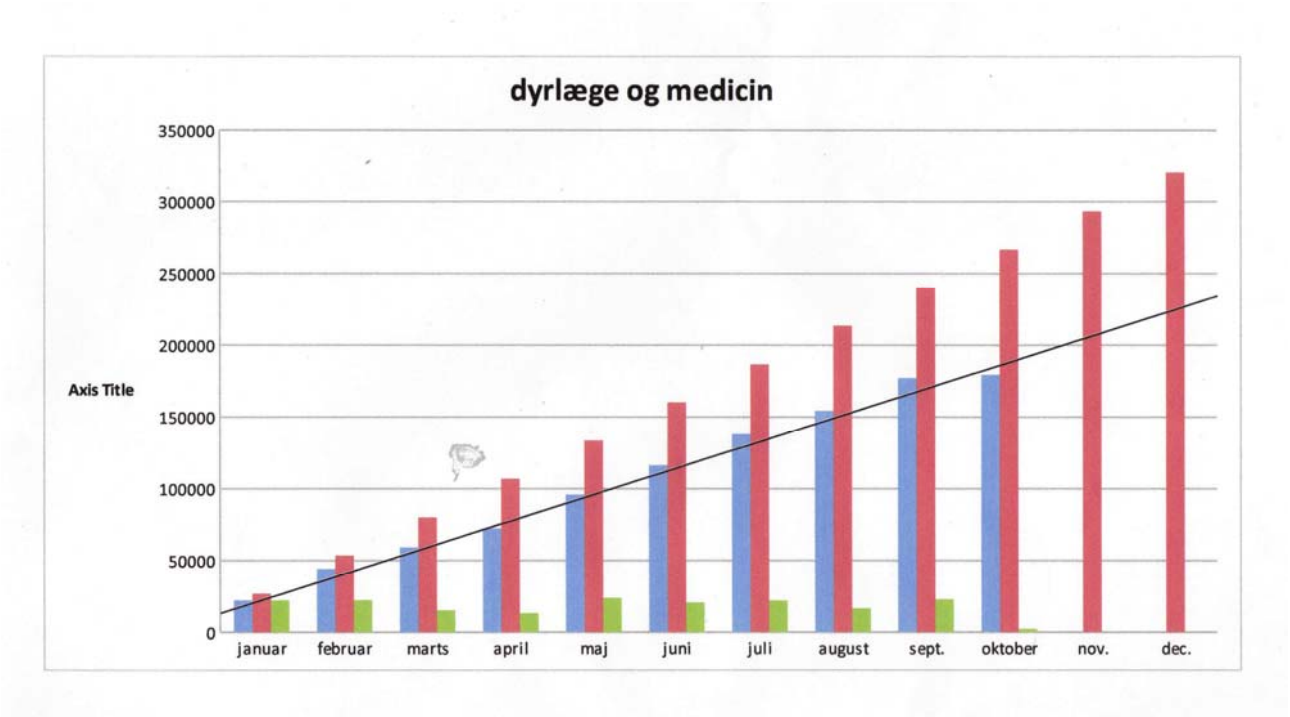
Most of the farms I visited were husband and wife partnerships or occasionally several unrelated business partners. An interesting variation I came across in Denmark was Erling Christensen and his wife Karin who farmed 1000 acres and 400 cows milked by 6 robots. Although they owned the farm they had appointed an independent board of directors for the farm business.



Erling and Karin had recently doubled the size of their herd and put up new buildings to house them along with 6 robots and a visitor centre. They held board meetings two or three times a year to discuss strategy and review progress. After the farm's expansion plan had begun milk prices dropped dramatically. Erling had wanted to scale back the expansion by 100 cows because he was now losing money on every litre he produced. When the board looked at this they concluded that the original plan was still valid and should continue. With the uplift in milk prices and an expected production of 4 million litres this year the board's decision had proven correct. Because the farm's bank manager was on the board along with all the farm consultants it gave the bank manager the confidence to back the farm through the difficult financial period.

Management Tools

All the farms I visited were using some kind of computerized accounting system that enabled them to monitor actual costs against budgeted costs. I particularly liked the system used by Erling Christensen in Denmark. His software could print off graphs (see example below) showing actual expenditure against budgeted in a pictorial form with an estimation of end of year expenditure based on current trends.



Green column Monthly medicine cost
Blue column Cumulative medicine cost
Red column Budgeted cumulative medicine cost
Black line Trend for end of year total spend.

Erling would print off about 30 of these graphs every month relating to key areas on the farm. This system enabled him to quickly pick up on costs that were out of line and easily estimate their effect by the year end. In the example above for medicine expenditure it can be seen that the farm is spending less than budgeted. Instead of a budgeted year end spend of 320,000 DK the farm is likely to only spend 240,000DK. Some of the other items monitored included feed expenditure, diesel expenses, sand for cubicle bedding costs and individual machine costs. The farm's telehandler was beginning to be unreliable and

needed too many costly repairs. From the budget monitoring printouts Erling had been able to calculate that it would be cheaper for him to sell the telehandler and buy a new one.

In Australia I met farm consultant, Gordon Cleary, of the Dairy Business Centre. Gordon and his team have developed a computer modelling program known as 'What-If'. This program combines past physical and financial farm data to predict future financial and physical farm output. The strength of the program lies in its ability to predict what will happen to farm profitability if you change certain factors such as extra concentrate feeding, better pasture management or higher cow numbers. This program is now being used in New Zealand and has been trialled in the UK by DairyCo. The program usually advocates high levels of cow supplementation which is against the trend in New Zealand of no, or limited supplementation, however I did visit a New Zealand farmer who was using this system very successfully (see appendix 4).

Cross Breeding

In all the countries that I visited I saw farms with cross bred dairy cattle. The reason for farmers cross breeding black and white Holsteins and Friesians to another breed was to improve the survivability of their cows. By crossing with other breeds farmers hoped to get a more durable cow with better fertility and less health problems. These factors were felt to be particularly important in large herds which had numerous people milking the cows who were not able to get to know individual cows as may happen in smaller herds.

In the USA the Jersey was very popular as a cross on the Holstein. A few farmers were also using the Swedish or Norwegian Red as a 3rd cross. Trial work showed that there were small benefits in health and fertility in cross bred cattle from Holsteins that outweighed the small yield penalty often found with cross breeds.

In New Zealand cross breeding was wide spread. This always took the form of a New Zealand Friesian crossed with a Jersey, which resulted in a very hardy animal that was suitable for year round grazing. As a rule of thumb a farmer would put a Jersey bull on a cow that looked 'Friesian' and a Friesian bull on a cow that looked more 'Jersey'. New Zealand's largest breeding company, Livestock Improvement Company, have now developed a composite breeding bull of Friesian and Jersey genetics called the Kiwi Cross. This allowed farmers who wanted to keep a 50-50 cross type of animal to be able to use just one bull rather than swapping between Friesian and Jersey in an attempt to keep the desired blend of genetics.

Conclusions

1. Be very wary of expanding your cow numbers faster than your management capability. Before expanding make sure you fully understand your business's strengths and weaknesses.

2. High milk prices can lead to over indulgent spending. This was particularly evident on some farms I visited in the USA and Denmark. In the USA a 400 cow farm had bought a brand new self propelled forage harvester just for their own use. In Denmark I visited 3 farms that all had 45m3 feeder wagons and none of them milked more than 500 cows. In the USA a 30m3 feeder was considered big enough to feed 2000 cows.

3. The simplest systems were the ones that were most repeatable. This could be a grass based intensive grazing system or, to a lesser degree, a total confinement style dairy where as many of the ancillary activities as possible were contracted out to third parties.

4. Farmers running large dairy herds are not very often found milking the cows or driving tractors as this is not the best use of their time.

5. Wives played a very important part on many of the farms I visited and were integral to the success of these business's.

6. Large farms had unit costs of production the same or only marginally lower than well run smaller farms.

7. Be aware of price volatility and try and manage to mitigate this where ever possible. On my travels I became aware of many businesses that had been forced to sell up due to plunging milk prices and high debt levels.

8. People management was extremely important on large dairy farms. The people employed on the farm were probably the largest factor in the success of the business.

Recommendations

1. Benchmark your performance before you expand to see how good you are against your peers. Unless you are one of the better farmers expansion is unlikely to help.

2. Before you expand make sure your current system is working correctly. You need to get on top of any fertility, mastitis, lameness or other such issues first. Expansion will almost certainly exacerbate any existing problems.

3. Use computerized accounts and comprehensive recording systems that allow you to easily benchmark your farm against others.

4. In times of good profitability do not be tempted to overspend on unnecessary equipment and tractors that you could not justify at any other time.

5. Try and simplify your system. Contract out ancillary activities so that you can concentrate on your core business.

6. Hedge input costs and output prices if possible, especially if you have high levels of debt. Some profit is better than no profit and no farm.

7. Consider cross breeding your cows. Although it may not be suitable for everyone the indications are that it gives a more robust cow with similar yields to pure bred Holsteins or Friesians.

8. Utilize grazed grass more. The UK is better placed than most countries to make good use of grazed grass in low cost profitable milk production systems. Although many are unable to keep cows outside 365 days a year - as in New Zealand - there is significant scope to adopt many of the Kiwi techniques to cut production costs. Grass based systems are also less susceptible to volatile commodity feed prices that can have significant effects on the profitability of confinement systems.

9. Work with a partner in your business. Having someone to share the workload with and to bring different skills to the business is an advantage.

Postscript

Undertaking this Nuffield Scholarship has reinvigorated my desire to continue expanding and improving my farming. I now belong to a worldwide network of colleagues who are innovative, relentlessly positive and willing to share their thoughts with others.

As a result of my Scholarship several changes have been made to our farming. My wife now works part time on the farm with responsibilities for Human Resources and I.T., areas where she is much better than I am! We have developed protocols for routine jobs on the farm and now have weekly and monthly routine jobs sheets that details who should do which jobs. This has allowed the staff to work more independently and reduced the amount of time I need to manage them. Branded overalls and coats have now been provided for all staff to create a team identity.

We have now changed to a computerized accounting system that allows us to easily benchmark our production on a cost per litre basis. I have entered our data into the DairyCo Benchmark Plus system and I am helping to set up a discussion group with DairyCo and my Vet.

A school leaver has been taken on as an apprentice. This extra member of staff has taken the pressure of our workload and has enabled me to have more time to undertake management tasks and analysis.

As a result of what I saw in New Zealand and Australia I have now electric top-wired all the stone walls on our farm. This has greatly improved our ability to paddock graze the farm and better utilise our grass. The fields are more stock proof and it has cut down on wall maintenance. Basically it has made it much easier to farm the land.

I have started a cross breeding trial on the farm using Swedish and Norwegian Red bulls on half of my maiden heifers. This has been done in a randomized way to get accurate results which will be monitored by DairyCo in an attempt to better understand possible benefits of cross breeding. My aim is to now breed cows that can survive on grazed grass based diets rather than expensive TMR diets when at peak yields. With escalating commodity prices and a static milk price I am aiming to develop a system that makes more use of home grown grazed grass and less purchased feeds.

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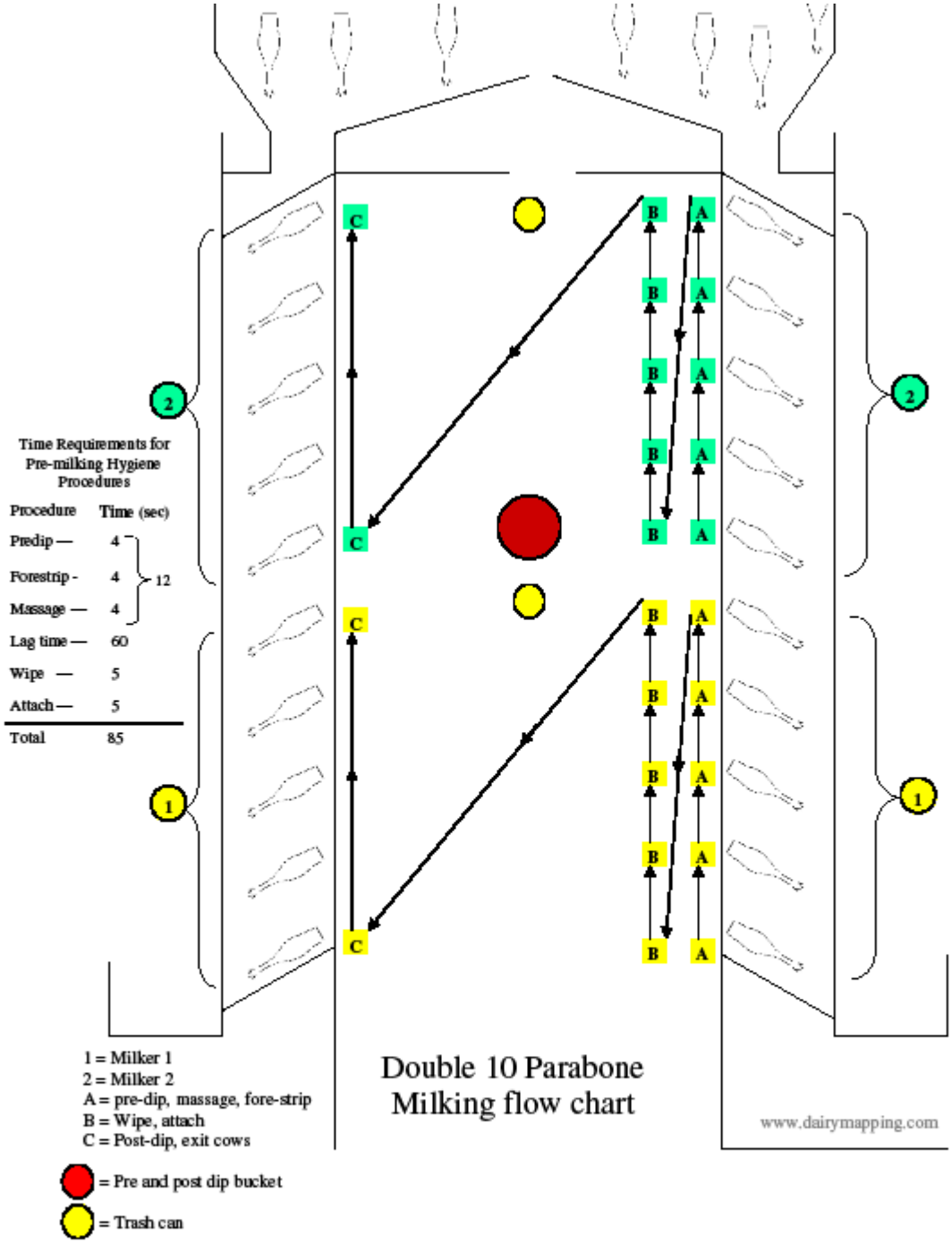
Appendix 1


Time Requirements for Pre-milking Hygiene Procedures
Procedure Time (sec)
Predip — 4
Forestrip - 4
Massage — 4
12
Lag time — 60
Wipe — 5
Attach — 5
Total 85
1 = Milker 1
2 = Milker 2
A = pre-dip, massage, fore-strip
B = Wipe, attach
C = Post-dip, exit cows
= Pre and post dip bucket
= Trash can
Double 10 Parabone
Milking flow chart
www.dairymapping.com

Appendix 2

Summary Farm Performance - Dairy

Victoria, Australia Benchmarks

Western Districts vs Gippsland vs Northern Vic

	2003/04 Sou-West Average Ad|$	2003/04 Sou-West Top 10% Ad|$	2003/04 Gippsland Average Ad|$	2003/04 Gippsland Top 10% Ad|$	2003/04 North Vic Average Ad|$	2003/04 North Vic Top 10% Ad|$
PHYSICAL PARAMETERS						
Peak Milking Cow Numbers	**301**	**411**	**225**	**283**	**247**	**308**
Effective Milking Hectares	154.6	184.1	101.4	113.9	92.5	98.6
Milking Cows per Effective Milking Hectare	**1.95**	**2.23**	**2.22**	**2.48**	**2.67**	**3.12**
Milksolids per Cow	**423**	**461**	**400**	**450**	**406**	**468**
Milksolids per Effective Milking Hectare	**824**	**1,030**	**887**	**1,117**	**1,084**	**1,462**
Milkfat per Cow	235	256	223	249	226	259
Volume per Cow	5,690	6,259	5,284	6,034	5,420	6,317
Actual Milksolids Price ($/kgMS)	**$ 3.67**	**$ 3.72**	**$ 3.68**	**$ 3.72**	**$ 3.67**	**$ 3.72**
Actual Milkfat Price ($/kgMF)	**$ 6.60**	**$ 6.70**	**$ 6.60**	**$ 6.71**	**$ 6.60**	**$ 6.72**
Actual Litre Price (cents/litre)	**27.26**	**27.40**	**27.85**	**27.71**	**27.52**	**27.55**
Pasture Dry Matter Harvested (tDM/ha)	**6.9**	**8.2**	**7.9**	**9.1**	**8.6**	**9.9**
REVENUE						
Milk Sales	$ 467,101	$ 704,948	$ 331,097	$ 473,382	$ 368,545	$ 535,971
Total Operating Revenue (TOR)	**$ 503,460**	**$ 754,727**	**$ 362,696**	**$ 511,492**	**$ 401,103**	**$ 579,435**
GROSS REVENUE (GR)	**$ 511,762**	**$ 769,184**	**$ 364,943**	**$ 524,708**	**$ 416,755**	**$ 598,231**
Gross Revenue per Hectare	$ 3,310	$ 4,178	$ 3,599	$ 4,607	$ 4,505	$ 6,067
Gross Revenue per Cow	$ 1,700	$ 1,871	$ 1,622	$ 1,854	$ 1,687	$ 1,942
EXPENSES						
Total Operating Expenses (TOE)	**$ 344,657**	**$ 459,692**	**$ 227,872**	**$ 283,628**	**$ 269,312**	**$ 345,929**
GROSS OPERATING EXPENSES (GOE)	**$ 419,557**	**$ 542,652**	**$ 293,300**	**$ 358,011**	**$ 352,422**	**$ 442,453**
Gross Operating Expenses per Hectare	$ 2,714	$ 2,948	$ 2,893	$ 3,143	$ 3,810	$ 4,487
Gross Operating Expenses per Cow	$ 1,394	$ 1,320	$ 1,304	$ 1,265	$ 1,427	$ 1,437
Debt Servicing & Non-Operating Expenses						
Total Debt Servicing & Non-Operating Exp	**$ 138,147**	**$ 181,493**	**$ 155,486**	**$ 194,158**	**$ 197,637**	**$ 183,400**
Operating Surplus (TOR - TOE)	$ 158,803	$ 295,035	$ 134,824	$ 227,863	$ 131,792	$ 233,506
Change in Working Capital	**$ 77,413**	**$ 181,013**	**$ 22,108**	**$ 87,874**	**($ 18,825)**	**$ 77,789**
KEY PERFORMANCE INDICATORS						
OPERATING PROFIT (GR - GOE)	**$ 92,206**	**$ 226,532**	**$ 71,643**	**$ 166,697**	**$ 64,334**	**$ 155,778**
Operating Profit per Hectare	$ 596	$ 1,230	$ 707	$ 1,464	$ 695	$ 1,580
Operating Profit per Cow	$ 306	$ 551	$ 318	$ 589	$ 260	$ 506
Total Assets at End of Year at 4-Yr Av Values	**$ 2,026,567**	**$ 2,684,382**	**$ 1,770,376**	**$ 2,122,508**	**$ 1,735,204**	**$ 1,936,454**
Total Liabilities at End of Year	$ 694,778	$ 1,027,366	$ 583,819	$ 816,531	$ 684,354	$ 876,056
EQUITY at 4-Yr Av Values at End of Year	$ 1,333,789	$ 1,657,016	$ 1,186,557	$ 1,305,977	$ 1,050,849	$ 1,060,398
EQUITY % at 4-Yr Av Values	**65.8 %**	**61.7 %**	**67.0 %**	**61.5 %**	**60.6 %**	**54.8 %**
Change in Equity at 4-Yr Av Values	$ 73,081	$ 56,577	$ 80,269	$ 79,376	$ 45,958	$ 58,151
RETURN ON ASSETS (ROA) at 4-Yr Av Values	**5.2 %**	**9.1 %**	**4.6 %**	**8.4 %**	**4.3 %**	**8.7 %**
ROA including Capital Gain at 4-Yr Av Values	8.2 %	10.4 %	9.0 %	11.6 %	5.3 %	10.0 %
RETURN ON EQUITY (ROE) at 4-Yr Av Values	**4.1 %**	**9.9 %**	**3.7 %**	**9.9 %**	**1.5 %**	**8.8 %**
ROE including Capital Gain at 4-Yr Av Values	8.5 %	12.0 %	10.2 %	14.9 %	3.2 %	11.2 %
OPERATING PROFIT MARGIN	**18.0 %**	**29.5 %**	**19.6 %**	**31.8 %**	**15.4 %**	**26.0 %**
Comparative Cost of Production per kg Milksolids	$ 2.94	$ 2.52	$ 2.88	$ 2.41	$ 3.03	$ 2.64
Comparative Cost of Production per kg Milkfat	$ 5.30	$ 4.55	$ 5.17	$ 4.35	$ 5.45	$ 4.77
Financing Costs as % Gross Revenue	10.9 %	10.9 %	11.0 %	9.8 %	14.6 %	12.6 %
Management + Staff Costs per Cow	$ 323	$ 309	$ 336	$ 304	$ 347	$ 324
Cows per Full Time Staff Equivalent	**105**	**116**	**102**	**119**	**96**	**109**
Pasture as % of Total Consumed	**67.8 %**	**66.3 %**	**69.8 %**	**67.9 %**	**63.4 %**	**57.9 %**
Average Cost of All Consumed Feed (/tDM)	**$ 181**	**$ 167**	**$ 187**	**$ 174**	**$ 198**	**$ 188**
Pasture Cost (Per tDM)	**$ 152**	**$ 134**	**$ 156**	**$ 139**	**$ 176**	**$ 159**
Forage Cost (/tDM Consumed Incl.wastage)	**$ 195**	**$ 190**	**$ 207**	**$ 197**	**$ 203**	**$ 199**
Concentrate Cost (/tDM Consumed Incl.wastage)	**$ 259**	**$ 245**	**$ 276**	**$ 262**	**$ 253**	**$ 240**

DairyBase
Platform for growth.

Benchmark Summary
2008 / 2009 Owner-Operators
as at 30 April 2010

Region / Island	Northland	Waikato	Bay of Plenty	Taranaki	Lower North Island	West Coast - Tasman	Marlborough-Canterbury	Otago - Southland	North Island	South Island	NZ
Number in Benchmark Group	51	133	29	54	34	31	54	30	301	115	416
Farm Physical KPI's											
Cows/ha	2.5	3.1	2.9	2.9	3.0	2.5	3.6	2.8	2.9	3.1	3.0
kg Milksolids/ha	773	1052	1021	998	1020	873	1433	1124	991	1211	1058
kg Milksolids/cow	305	340	347	348	344	349	402	398	337	392	354
Cows/FTE	125	140	143	118	135	141	161	148	134	153	139
kg MS/FTE	38,177	47,591	49,714	41,101	46,556	49,109	64,686	58,824	45,149	59,973	49,243
Profitability											
Gross Farm Revenue/ha	4,611	5,831	5,619	5,506	5,679	5,578	7,893	6,233	5,544	6,837	5,926
Operating Expenses/ha	4,390	5,038	4,768	4,497	4,895	4,529	7,279	5,351	4,810	6,047	5,169
Operating Profit (EFS)/ha	221	794	851	1,009	784	1,048	614	883	734	791	757
Gross Farm Revenue/kg MS	5.97	5.54	5.50	5.52	5.57	6.39	5.51	5.55	5.59	5.65	5.60
Operating Expenses/kg MS	5.68	4.79	4.67	4.51	4.80	5.19	5.08	4.76	4.85	4.99	4.88
Operating Profit (EFS)/kg MS	0.29	0.75	0.83	1.01	0.77	1.20	0.43	0.79	0.74	0.65	0.72
FWE/kg MS	4.40	4.00	3.78	3.41	3.92	4.12	4.37	3.91	3.93	4.18	4.00
Operating Profit Margin %	4.8%	13.6%	15.1%	18.3%	13.8%	18.8%	7.8%	14.2%	13.2%	11.6%	12.8%
Asset turnover %	12.8%	11.0%	9.2%	10.2%	10.1%	16.3%	14.8%	12.8%	10.7%	14.3%	11.6%
Return on Dairy assets %	0.7%	1.3%	1.4%	1.8%	1.3%	3.4%	1.3%	2.0%	1.3%	1.8%	1.5%
Total Business											
Interest & Rent/Total Revenue	31.2%	35.9%	26.4%	29.2%	31.9%	22.7%	25.7%	32.2%	32.8%	27.4%	31.2%
Interest & Rent/kg MS	1.91	2.04	1.54	1.69	1.81	1.46	1.50	1.88	1.89	1.62	1.81
Total return on assets %	-11.1%	-8.7%	-7.0%	-0.5%	-6.0%	0.9%	-5.2%	-6.0%	-7.1%	-4.6%	-6.4%
Return on equity %	-4.5%	-3.3%	-1.0%	-0.9%	-2.4%	-0.2%	-3.1%	-3.0%	-2.6%	-2.7%	-2.7%
Total return on equity %	-23.2%	-18.9%	-12.9%	-4.4%	-13.8%	-4.7%	-14.3%	-17.1%	-15.6%	-14.0%	-15.2%
Total Wealth											
Growth in Equity %	-21.5%	-18.7%	-13.2%	-4.8%	-12.8%	-3.8%	-12.3%	-17.6%	-15.3%	-13.1%	-14.8%
Debt to assets %	49.0%	45.4%	34.4%	39.7%	43.1%	48.4%	48.3%	52.2%	43.4%	49.7%	45.1%
Opening Liabilities/kg MS	17.65	19.27	19.31	19.31	20.93	18.05	15.98	19.72	19.34	17.52	18.79
Closing Liabilities/kg MS	22.57	22.82	20.65	22.59	23.47	20.36	18.62	23.20	22.66	20.39	21.97

DairyNZ

Appendix 4

Profit Calculator Report for Scarva Farm

Printed at 06:48 pm on Thursday, 11 February 2010

Base 2009-2010			Resources	Projected 2010-2011		
	300		Total Area >	300		
	290		Effective Area >	290		
	13500000		Land Value >	13500000		
	1120000		Livestock Value >	1225000		
	100000		Machinery Value >	100000		
	14720000		*Total Capital*	14825000		
			Production			
	5609		Yield (litres/cow)	7327		
	550		Bodyweight (Kg) >	550		
	800		Herd Size	875		
	0.5		BCS change >	0.5		
			Energy Needs			
	5.40		Energy (Mj/litre) >	5.30		
	30289		Energy (Mj/cow)	38833		
	27225		Maint (Mj/cow)	27225		
	1672		BCS (Mj/cow)	1672		
4084	15	%	Weather Effect >	4084	15	%
	63270		*Total Energy*	71814		
Current Year			**Herd Size**	Final Plan		
	46.11		Milk Price (c/litre) >	46.11		
	1050		Core Cost (/cow)	1050		
	2.76		Stocking Rate >	3.13		
	800		Herd Size	875		

DM t	NDF %	ME MJ/kg	Cost /t	Annual Farm Feed Inputs	DM t	NDF %	ME MJ/kg	Cost /t
912	13	11.9	547	Concentrates >	1619	13	11.1	542
324	55	10.0	167	Purch Fodder >	875	53	9.1	259
0	0	0.0	0	Milking Area >	0	0	0.0	0
218	33	11.5	210	Other Feeds >	0	0	0.0	0
3192	40	11.0		Pasture >	3500	40	11.0	
DM t	NDF kg	ME MJ	Cost		DM t	NDF kg	ME MJ	Cost
1.14	143	13566	624	Feed Inputs/Cow Concentrates >	1.85	241	20535	1003
0.41	180	3280	68	Purch Fodder >	1.00	424	7280	259
0.00	0	0	0	Milking Area >	0.00	0	0	0
0.27	71	2484	57	Other Feeds >	0.00	0	0	0
3.99	1596	43890		Pasture >	4.00	1600	44000	
	1990	63220	749	Total >>		2265	71815	1262
FCE	2309			Max NDF Intake		2309		FCE
0.97			80	Feeder Eff. (%) >	80			1.07
	Other	0.00	11.01	PastureLft (t/ha)	12.52	0.00	Other	
			5609	MilkYield (l/Cow)	7327			
	438Kg (350002 Kg) @ 90% PFR			Solids (Kg/Cow)	572Kg (500068 Kg) @ 90% PFR			
	/Cow	/Ha	Farm	**Milk Profit**	/Cow	/Ha	Farm	
	2586			Milk Income	3376			
	749			Less Supp. Cost	1262			
	1050			Less Core Costs	1050			
	787	2172	629880	Milk Profit EBITD	1068	3337	934360	
				Capital Productivity				
		4612		*Capital / t Grass*	4236			
		197		*Profit / t Grass*	267			
		4.0		*Return on Capital*	6.0			

Note:

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