

Dairy Expansion?



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Table of Contents

Table of contents	1
Acknowledgements	2
Executive summary	3
Recommendations	4
Introduction	5
Future world dynamics in population and food production	6
The importance of dairy	7
The UK dairy industry	8
Australia	9
Russia	12
Hungary	15
New Zealand	17
California	22
The UK	27
Conclusions	29
Appendix	33

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Executive Summary

- The larger herd size does not automatically lead to increased margins, usually the opposite.
- Paid labour units associated with large herds are more difficult to control than ones with equity partners/share milkers or family members as they have a personal stake in the business.
- The market for the milk produced needs to be reflected in the production system. Volatile milk prices (hard dairy products) need to be produced by least cost producers. Retailer aligned even milk supply must receive a premium for increased costs of production and infrastructure associated with such systems.
- Expansion needs to happen in the right place in terms of the environment and resource availability and sustainability.
- Land ownership is essential as the biggest growth comes from land appreciation over the long term.
- The best businesses think about profit first then production.
- A mixture of housing and grazing can work, especially in the UK. But all costs must be kept under control.
- Make sure you are the right person for your role in the business.

Recommendations

1. Scrutinise every part of the business before expanding. You will often find inefficiencies that can be addressed to give increased profits before expanding.
2. When you have got it right replicate it on another unit with the help of a partner or share milker.
3. Match the marketplace with your production system or match your system to the market place if you have not already done so.
4. Measure, record and benchmark against the best performers. Know your cost of production.
5. We grow forage easily with an abundance of rainfall. This can lead to a lower cost of production through less bought- in feeds if utilised correctly. Measure, record and utilise better.
6. Feed input responses will vary on each farm. Are the systems in place to get the most out of your inputs, water, dairy cow housing, parlour design, staff expertise and training?
7. Look at potential extra earners, such as methane and slurry nutrients.
8. Don't let your costs increase to meet the milk price. Keep rigid control of them through budgeting and planning.
9. Keep your eye on the profit margin not how full the tank is and lock into input and output prices whenever possible to create a guaranteed margin.
10. Make sure the management style and breed of cow matches the marketplace and your production system

Introduction

Never wanting to be a farmer especially a dairy farmer, I “fell” into it after leaving agricultural college. Returning home to work on my parents rented farm I soon enjoyed the management and financial side of the business which was mixed between dairy, beef, arable and sheep.

It soon became apparent I might as well utilise this interest and farm on my own and a tenancy was sought. Fortunately for me and my wife Claire we managed to secure the tenancy of Higher Wrantage Farm near Taunton, Somerset in 2002 at the age of 23! It was a 300 acre dairy farm set up for 180 cows. It was also only 3 miles from my parents’ farm which meant we could “borrow” some machinery in the early years.

After building numbers and acres we now farm 750 acres carrying 250 dairy cows, 350 followers and beef and 250 acres of cereals. The business is now at a crossroads as to where next? We would need significant investment to take cow numbers higher and on a tenanted farm it may be a short lived investment.

Dairying is however the bread and butter of our business and to expand the other enterprises would be silly when they contribute so little to the overall profit of the business. That’s why I want to look at expansion around the world to see how other leading agri businesses have approached this problem in varying scenarios.

The dairy market as a whole will impact my business as we move towards a freer market so hopefully I should come back with a greater understanding of the requirements of my product.

I am a simple farmer who understands the workings of my business. I do not want to get into the science of why and how things work, that is for the academics and experts I employ to help advise me. For that reason this report is of the journey I have undertaken and how I have come to my conclusions, some of which have already been implemented on my own farm during my studies.

I want to look at different types of business set up and the management style employed, in terms of financial planning and arrangements.

The system and its market suitability also interest me. I am, however, probably most concerned with whether there is a perfect model of efficient utilisation of all assets from feed to labour, land to water and, if so, is it relevant to us in the UK?

“A single conversation with wise men can be better than years of study”

Future world dynamics in population and food consumption

At the current average birth and death rate, the world population is growing by 2 people every second or 80 000 000 extra mouths to feed every year. At the moment it is thought that there are 6.7 billion people living and it is expected to reach 9 billion by 2050.

These figures are staggering and are happening due to increased life expectancy, lower infant mortality, better diet, health care and wealth.

All of these people are putting massive strain on our natural resources and it would be naive to think that this will not affect food production. Like everyday life, we need some of the main staples of modern existence, oil and water, in order to produce food.

It has now been suggested that we have already reached or are about to reach “peak oil”. This is when the maximum rate of global oil extraction is reached, after which the rate of extraction goes into terminal decline. This will have a massive effect on our food producing systems. Fertiliser and fuel, transport and the competition for land if biofuels are to feature in the long term energy solution will all be factors affecting our ability to compete and feed the worlds’ population.

Attention is now also being focused on our water efficiency. When the amount of water used to produce an item of food is calculated the results are quite shocking:-

Product	Unit	Litres of water used
1 Family car	Per car	150 000
Beef (ready to cook)	Per KG	15 500 (range 10 000 – 100000)
Bread	Per slice	40
Cheese	Per KG	5000
Wheat (harvested)	Per KG	740
Milk (raw)	Per litre	995

All this may not seem important at the moment but when you consider only 2.5% of the worlds’ water is fresh and only 1% is “available”, we are going to see increased competition for this essential life supporting ingredient. Its efficiency is also going to be questioned in the future. We saw this in Australia on the Contemporary Scholars’ Conference. Irrigation water was scarce and expensive. This meant that only the higher value and most responsive crops were being irrigated. Milk was a long way down the list of efficient foods to produce with the use of irrigation.

All these nutrients involved in food production and in this case, milk, may seem far removed from the rainy British countryside. Fuel is always only a phone call away and fertiliser has always been available. But in the future, these factors will have a serious effect on our everyday farming lives. It would be silly to not consider them when looking at our dairy businesses. The clever investor, planner, businessman or farmer can see what is coming and hopefully prepare themselves for it. This will, in turn, lead to profitability and survival.

Understanding Dairy production, consumption, trade and expansion worldwide

In order to understand dairy farming outside my farm gate I needed to do some research in order to steer myself in the right direction. It's not until you start looking at the facts that you can fully appreciate just how important the dairy industry is worldwide.

Currently we have around 150 million dairy farmers in the world today, obviously ranging from 1 cow (or sometimes one cow shared!) to circa 30 000 cows per herd. This in turn means that it is estimated that one billion people world- wide are directly associated with the dairy cow, whether it is ancillary industries or an actual production job itself. The industry affects more people than I ever imagined.

Worldwide dairy producers produced an estimated 663 million tonnes in 2007. Since 2002 this figure has grown each year by between 12 and 18 mill tonnes or 2 – 3% pa. So, although we hear of our national herd and number of dairy farmers in the UK decreasing, world-wide we are expanding as a whole. Interestingly China, India and Pakistan contributed to over 60% of this growth.

Amazingly, it is estimated that around 60% of this milk actually reaches a “processor” meaning that the remainder is sold untreated locally or consumed by the producer at home. This makes India the largest producer in the world by volume but it is the USA who delivers the most milk to the processor. The UK is in 10th and 8th place respectively, something we should be proud of as we are only a small island!

China and India each now have over 1 billion people, yet their per capita milk consumption is less than 1/3 of the EU. China's milk consumption per capita is however rising as the population gradually changes itself to a more westernised diet. As a comparison, the US and the EU each consume 255kg and 300kg per capita per year and is not really growing.

India's cow numbers have grown in line with population but with China's vision of large westernised farms as well as its diet, cow numbers have jumped by 16% in the last 10 years. Yield per cow has jumped by only 2% to 4000 litres per cow. From looking at other “developing” countries data, it is obvious that expansion is driven by the countries demand and this is obtained from an increase in cow numbers and not so much yield. In the UK, we have seen cow numbers fall and yield increase!

The other big player in world dairying and more importantly world trade is New Zealand. Perfectly situated to satisfy the rising demand of Asia, New Zealand has found itself exporting over 90% of its dairy products. With this much product entering the competitive world market, New Zealand farmers have had to produce milk as cheaply as possible. We will come to this later. It is worth noting that although over 90% of New Zealand's dairy product is exported, worldwide only 7% of all

dairy product ever reaches the world market. It is amazing how much influence this small 7% can have on dairy markets in every country around the world.

What does this tell us about the UK?

The UK produces 13 billion litres per annum with around 51% being utilised for the liquid market. This is the premium end of the market yet our self sufficiency is only quoted as 86%. Is this as a result of the UK dairy industry producing the wrong product, un-competitiveness or are we simply unable to satisfy our own market? What was even more disturbing is the fact that we have seen UK milk production fall by nearly 1% per annum over the last 7 years. This year saw us produce the lowest amount of milk since milk quota was introduced in 1984.

This decline is seriously damaging for our industry as a whole. If dairy processors cannot procure enough milk to fill their factories then they are not going to invest nor have confidence in the future. We will also be losing market share to imports. We then have to compete and under cut them in order to regain that share. If the decline in UK milk production continues, we will lose critical mass in the processing sector that will be difficult to regain.

The farmers' share of the consumer or retail price has also fallen from 60% in 1996 to 35% in 2008. There are a number of reasons for this. Supermarkets and processors have increased their margin and reduced the farmer price or farm gate price. Increasing costs over the last few years have also affected the whole supply chain. This has not been passed onto the consumer but instead passed back down the line of supply, inevitably ending with a lower price to the farmer.

Production systems in the UK are also more diverse than other countries. I will comment about this in more detail later but out of all the countries visited the UK has the most diverse range of systems. From the low input spring calvers to the total confinement, 10 000 litre herds on a total mixed ration. In each country visited, there seemed to be a set system for producing milk. I initially thought this was where we are going wrong. We didn't know which camp we were in. But actually I think that it is a massive strength we have and something we must build on if we are to maximise our dairying potential.

Expansion in the UK

From the brief data listed above I think before we expand we need to look at what we are doing already. I feel this can be summarised as the four "S"

- **System** – Is it the correct production system for your milk?
- **Size** – Optimum size of herd may have already been reached or a long way off!
- **Suitability** – are you as a farmer suitable to running this operation and is the local climate suitable.

- **Sustainable** – with the future concerns over global warming, peak oil and water availability does the current system prove to be future proof?

The study

Australia

• Human Population	20.9 million
• Cow Population	1,810,000
• Average Yield	5.3 t/cow/year
• Milk Consumption	320kg ME per capita/year
• Export %	Approx 37% of production
• Import %	Approx 9% of local consumption
• Self-sufficiency in Milk	144%
• Farmers' Share on Consumer Price	23%

Australia's dairy production systems are what could be described as "farming on the limits". Without the help of artificial watering of crops, dairying can be virtually impossible in most parts. Even with the help of watering it is often too expensive to use. This occurs because of the opportunity cost of using the water allocations in a given area. It is often the case that the farmer is better to sell the water allocation and not produce the milk.

Does this system satisfy the four "s"?

With climate change the hot topic of the moment, will Australia's climate become any more suitable to dairying? I personally cannot see it and, in the Murray Delta where I stayed for a while, it was entering the seventh consecutive year of drought!

The system however was pretty well matched. Most farms had limited infrastructure and cows were not housed. This meant that the fixed costs of the farm were well under control. So the suitability of the most common farms was pretty good as they need to keep costs under control in order to compete with others in the export market.

Australia is also well placed to satisfy the growing populations of East Asia. This has been the backbone of all agricultural products in Australia whether it is beef, cereals, sheep or milk. It is impressive how this is always on the mind of the farmer. Their products are very much tailored towards the market.

Differing systems

As mentioned above the UK has several different production systems. I did see this in Australia on my first day of visits. The first farmer was typical of the system in Victoria, low input costs with minimal capital invested in buildings or infrastructure. This farmer had started from nothing as a share milker and now owned a sizeable farm. This was done by not investing in buildings and instead investing in livestock and land. It has proved worthwhile as land prices increased, the investment has paid off.

The next farm visited had invested heavily to increase output on the same area of land. This meant that he also had to invest in cows but with drought and world market fluctuations, these cows looked quite different in value terms on different months!

This farm was also extremely dependant on buying in food. Concentrates are just as volatile as any other world traded commodity. The problem is that they don't always follow the milk price. This is where I came across a theme, Milk to feed price. As most Australian farms adopted the low input system in order to survive volatile markets, it was not something that was talked about very much. Only the totally housed herds were paying attention as feed prices headed north!

Investment funds

Agriculture has become a "sexy" investment with investors seeing that land prices have steadily increased over recent history, with commercial and residential assets peaking and the stock market wavering (at the time of visiting it was before the financial crisis) investors were creating funds in order for the everyday person to have a slice of the agricultural boom. These funds would either invest in plc companies associated with agriculture (Monsanto, Bayer etc) or they would actually buy land and farm it.

I was fortunate enough to visit an investment company with such a fund. My first thoughts were: is this the way for me to expand? Should we be using the clout and muscle of these investors? They could buy the land and we could run or rent or have a stake in it?

From my observations it is immensely difficult for them to control. The only way the fund grew was from the asset value of the land, the farming activities actually lost money. This is mainly down to all the costs associated with running large units with paid labour and trying to keep control of every aspect of running a farm.

I am not suggesting these would be a bad investment but the growth can often come from speculative hype and not so much from bottom line profit and growth.

Bringing the investment and corporate structure to your own business

One such businessman/farmer has looked at the corporate structure of business and employed it on his own farm with great success.

Mr David Brownhill discussed with the whole group of scholars how he has split the farming operations and asset ownership in a bid to "take the business forward"

An independent chairman is employed for the farming operations which rent the land from the holding company. Any purchases then have to be cleared at board level. This then means everything has to be justified! As this is a family business each family member takes responsibility for each part.

More of his presentation can be viewed at nuffieldinternational.org/csc_conf/2008

Lessons learnt from Australia

- Before expanding look at the resources needed to run the dairy enterprise. In this case its water, in terms of reliability, cost and availability.
- Look at the market and work backwards in order to find the correct production system.
- Family operations will grow more successfully if a corporate structure is employed.

Russia

• Human Population	142.1 million
• Cow Population	9,405,000
• Average Yield	3.03 t/cow/year
• Milk Consumption	219kg ME per capita/year
• Export %	Approx 1% of production
• Import %	Approx 8% of local consumption
• Self-sufficiency in Milk	93%
• Farmers' Share on Consumer Price	39%

I wanted to look at another form of expansion, investment abroad with other parties on a much larger scale.

Russia is outside of the European Union so a whole number of difficulties are encountered in just getting into the country! Running a business is not much different.

My host, Heartland Farms, entered Russia in 2002 with the aid of a UK investor and two more minimal investors in Russia (both British who moved to Russia to run the project). It was deemed an opportunistic move at a time when land prices were low as was agricultural optimism.

The first 12 000 Ha were in full production in 2008. It is a long process with most of the land secured under 49 year leases. Over the whole farm, (27 000 Ha is the predicted total for 2008/9) 1400 landlords have to be dealt with, meaning in-house lawyers and negotiators are employed.

Cropping is mainly wheat, OSR (winter and spring) and sugar beet. Other crops are being grown as a trial, mainly potatoes, navy beans, soya and sunflowers.

Yields for the wheat are around 4 – 7t/ha, OSR can yield 1t/ha and sugar beet 25t/ha.

The dairy connection?

Heartland Farms is an exclusively arable operation, but due to the countries policy to increase its food production, politicians are looking at livestock enterprises more closely.

Heartland's problem is that the local governor is unwilling to let them have any more land leases unless they start producing livestock or more importantly milk. This is where I realised something that I was to later experience in New Zealand – Collaboration and partnerships.

You need to know your own strengths and weaknesses, in this case the people involved with Heartland knew very little about dairy farming. With investors falling over themselves for a piece of the agriculture boom, it was relatively easy to find partners with some backing.

What was not so apparent at the time but came to light, was how quickly this investment money can dry up when the financial crisis started to unfold. When this happens the money can disappear as fast as it arrives.

A different business approach.

When a business is looking for investors as a means to expand and grow, it has to sell itself. I saw this in Russia yet in the UK a lot of farms are failing to do this.

We need to sell our businesses in order to attract staff and maybe investment or partners. In Russia margins, yields and profitability is often discussed and a rosier picture was painted, even I felt like I wanted some more! It is relatively easy to sell yourself and not that expensive.

- Create a farm/business logo and have items of clothing made for the staff, they can be given as Christmas presents and when visiting other farms or hosting visits it is a good way of presenting someone with a gift and advertising what you do.
- Web site and a diary/photo gallery of what is happening means anyone can then look you up.
- Farm sign and tidy appearance. Create a smart look for your business. This affects the whole industry image. Would you eat out of a restaurant with weeds growing around the building, rubbish outside and dirty windows?



- California dairy farmers know how to make a controversial factory style of farming look very smart.

Although it won't be apparent to begin with, all of the above will help attract good staff and business associates.

Culture

Russia and Eastern Europe have in history relied on state run farms of massive scale. This has led to a totally different culture in relation to work. If I were to expand my business interests into these countries, I would have to employ more labour per unit of output (livestock) because these workers are only familiar with single task jobs. That is why some of them are so suited to just putting units on cows, which is happening on many larger UK farms. Massive scales are required to utilise these workers.

This is why many businesses struggle in Europe. We take our management practises out to the country and expect them to adopt them but as we all know cultures run deep.

Russia has the largest scale agriculture anywhere in the world. I was fortunate enough to have dinner with a director of Cherkizovo, Russian arable, poultry and processing business that has been floated on the stock market. It totals 600 000 hectares and will soon reach 1 million. Its aim is to process 60 million chickens per year to go into its own branded products. It also has interests in cows, beef and pigs and is totally integrated from start to finish!

Russia summary

Difficult bureaucracy and culture make it a difficult and long winded experience and you ideally need to be resident in the country.

They have more red tape than anywhere else experienced. This means specialist people need to be employed for each area of red tape and farms have to be large in order to justify them. This then makes the whole business difficult to control.

It comes back to the people employed. Get the best and Heartland were a good example of this.

A year after I left Russia, the farm was involved in an asset buy out with Volga Farming. Hopefully this will satisfy the livestock requirement as Volga are involved in a wider range of enterprises.

I was however in love with the country and the opportunities that exist. It also became apparent the huge amount of land that is not in full production. This is going to cap cereal prices as soon as the price rises to profitable levels, vast areas of land can be brought back into production with relative ease.

Hungary

• Human Population	10.1 million
• Cow Population	270,000
• Average Yield	6.51 t/cow/year
• Milk Consumption	195kg ME per capita/year
• Export %	Approx 11% of production
• Import %	Approx 17% of local consumption
• Self-sufficiency in Milk	93%
• Farmers' Share on Consumer Price	42%

Magyar Farming Company

This is a true success story of British farmers wanting to expand and exploit opportunities they felt lay in Eastern Bloc countries. In 1998, Andrew Hunter acting as share holder and managing director took over a Hungarian farm. Now totalling 1000 cows on 3000 ha, cropping includes cereals and potatoes. In a bid to expand the business and take up opportunities, the company has recently expanded into the Ukraine and Serbia.

The key to the success of this business is the management employed at the top. Another important lesson learnt here is the importance of the agreement set up by all the equity parties involved. There needs to be clear exit and entry strategies for all involved. When Magyar was formed, the tie-in was for years with only the exit strategy for investors now being looked at. This was done on purpose as it enabled Andrew and his team to make long term decisions knowing that an equity partner was not about to jump. Whether it is a family partnership of husband and wife or siblings or an outside partner, the parameters have to be clear to all involved so that when an interested party wants to enter or leave, the business is not rocked by such an event.

The dairy

Magyar's decision to go for the liquid market was obvious, local and premium. As this business was interested in reinvesting every bit of spare revenue, it needed a good market for its milk. What was worrying was the volatility of the milk market. The European milk pricing structures seem to follow the abruptness of the dairy commodity markets with ease!

The culture issue was also seen again with CCTV installed in the milking parlour and everything from paper towels to fuel having to be locked. On the way home from the farm, we managed to catch a farmer who was suspected of stealing semen for his own herd!! All this coupled with the language barrier meant that good management staff could be found but they were limited to ones who were capable of communicating in English.

The dairy system commonly used in Eastern Europe is the housed system. This is because there are very few fences around the fields and the climate is extremely hot in the summer and very cold in the winter. This makes expansion relatively easy. With the massive grants being offered to agriculture in Hungary, putting the infrastructure in place at the moment for the future is a no brainer. This farm is thinking of the future now, with the aid of grant aid. Very opportunistic!

It is however a relatively high cost system with all food having to be cut and carted. This is why we see so many farmers on the continent protesting at low milk prices. Their system of production cannot cope with the troughs in the milk price as they are not that flexible when it comes to reducing costs.

From the outside looking in, I could see an open grazing system working with large fields to work with and a New Zealand type system could be set up. The different language and cultures do create an immediate stumbling block. It would need serious education before it could work. Perhaps the next generation of Hungarians may be the ones to do this? On suggesting and discussing the different systems with the managers on the unit, they felt the cold winters would create more of a problem with a grazing model!

Summary of Hungary

- With the right person in charge of the expansion, the investors have gained a hugely successful business. Timing was near perfect!
- Management staff are also key. I feel it would be beneficial to them if they had a training scheme in place.
- The volatility of the milk market and a non flexible system would not be good if the business was carrying huge debt.
- Most EU grants are aimed at this part of Europe making expansion a little easier
- Huge amount of red tape makes the UK look relatively free!
- Human population is predicted to fall in this part of the world so the dairy market needs to remain competitive.

New Zealand

• Human Population	4.2 million
• Cow Population	3,917,000
• Average Yield	4.41 t/cow/year
• Milk Consumption	> 350kg ME per capita/year
• Export %	Approx >90% of production
• Import %	Approx 3% of local consumption
• Farmers' Share on Consumer Price	39%

I am ashamed to say I travelled to New Zealand with my mind made up. Low cost dairying that was not going to be suitable to the UK as we have neither the weather nor the soil conditions. I also thought that they had been “driven” to this system.

The New Zealand dairy system from processing down to production has come a long way in the last 10 years and I would say they are so far ahead of the rest of the world when it comes to matching the product with the market.

I entered New Zealand just as commodity prices were tripping over the edge from historical highs. The price Fonterra paid its farmers peaked at nearly 8 NZD per kg of milk solid. This equates to a milk price of around 33 ppl (2.2 – 2.75 NZD/£. Currency values have varied dramatically during my study). It has since fallen to 4.4NZD per kg of milk solid in Oct 2009 (approx 14ppl). What was astounding was that the costs of production I saw varied between 2.8 – 4.5 NZD per kg of milk solid. That left a good margin in most scenarios and even at its trough the market still managed to cover production costs!

But surely more litres from an intensive system would mean more profitable litres or was I just thinking about production not profit. The first farm I stayed on had addressed this in a brilliant way.

The farm was perfectly laid out for the utilisation of grass. Technology was only used to increase production when the economics allowed. To do this in a way that would not burden a system with extra infrastructure and costs was very clever. A simple yield recording system was incorporated into the parlour that allowed concentrate to be fed. There were three feed augers meaning each ingredient could be changed as economics dictated. It also meant that every cow could theoretically be fed a different protein mix by simply varying the amounts of each ingredient.

This meant that performance from the herd was running at 2600kgs of milk solids per ha or 33 000 litres per ha!!! How many farms in the UK are creating production figures like this? Many other farms in the area are producing around 1500 kg/ha milk solids.

This extra production was gained by feeding 2700kg/head per lactation of concentrate (mainly wheat, rape meal, sodium bicarbonate, minerals and molasses). Because these cows react very well to the first tranche of concentrate added to the diet the results were fantastic. What was even more amazing is that this is a similar amount of concentrate to what I feed at home. But this farm made hardly any silage (surplus grass is cut and used in the winter or dry periods). All the remainder of the yield came entirely from cheap grazed grass.

I would call this system an opportunistic production related investment. When the market dictates a high milk price returned to the farmer, the feed is turned on which increases yield and the production of profitable marginal litres. When the milk price is low it is only used selectively or not at all. The beauty is that nothing has been invested in silage pits, housing or feed pads or machinery.



- *The Mackenzies' new dairy shed showing the three augers and gravy or molasses pipe that drops different combinations depending on the cows yield and milk price!!*

New Zealand dairy farming brought home to me the importance of forage utilisation. Their businesses thrive on the back of it and they make it so simple.

1. Enter covers at 2800 kg/ha DM
2. Residual grazing heights should be 1500 kg/ha DM
3. Measure every week
4. Feed supplements/cull cows or feed extra forage if growth rates are not enough to sustain the herd intake requirement.

On farms that can utilise irrigation the output is quite staggering. 30% of all irrigated land in New Zealand is now down to dairy production as it's the easiest way to pay for the infrastructure. This has mostly happened on the Canterbury Plains as water is more available and the topography more suitable to centre pivot or lateral irrigation systems and Greenfield sites.

Share milking

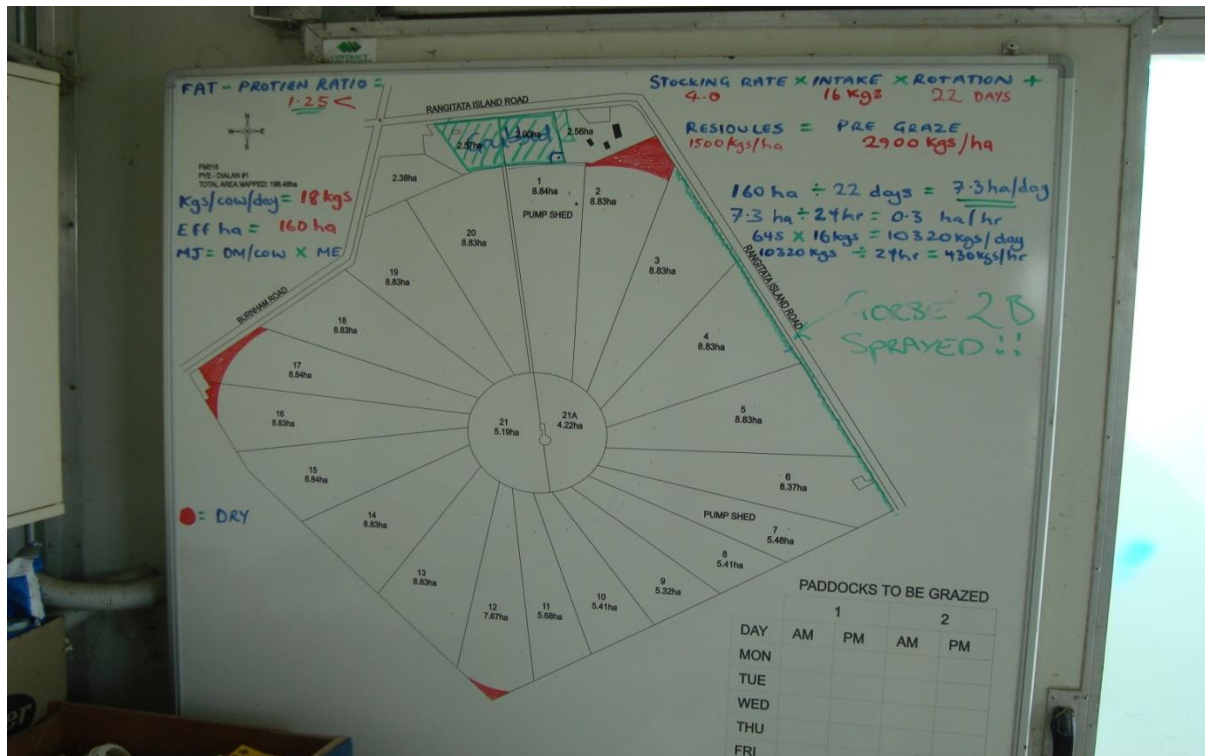
I was aware that this happened but not the influence it has on agriculture in general. I first came across it in Australia but it is New Zealand that has embraced it as a way of climbing the farming ladder and a way to aggressively grow your dairying business and equity.

I spent the weekend with Leighton Pye at Ashburton who is converting his 5th dairy farm. Most farms were currently being managed by excellent staff but he was converting the managers to share milking agreements as a way of delegating the management and risk as his business had grown. These farms used little technology nor concentrate and his production was lower but so was the cost of production. Where the farms gained was that on most of the farms he had "wiped them clean" and laid out the milking shed and tracks in order to gain maximum efficiency. A common theme ran through all of the units. A milking shed in the centre of the centre pivot irrigator so all the paddocks were located from the collecting yard!

I can see that share milking can help the UK dairy farmer expand and pass on the business but we have problems with our system. Many farms have been in the family for years with multiple generations involved making it difficult to make it work. Also many farms are mixed, making enterprise clarification more difficult. This is where our culture is hindering progression. We are simply too emotionally attached to our businesses. New Zealand farms on average change hands every 8 years. I was surprised by this as you are able to trace the history of every farm back to when it was settled. Something that I thought they would be proud of and would not want to let go!

Efficiency

We all know that a Greenfield site should be built with maximum efficiency in mind and will inevitably have an advantage over an older site that has evolved over the last two generations. What we don't do in this country is make the fields and paddocks more efficient. Although not so commonly seen on the north island, the southern islanders that have converted farms to dairying often wipe the farm clean and start with a clean sheet. This would not be possible in the UK and I feel the New Zealanders are becoming "conscious" of the environmental element of what has been happening. It does however create a very efficient dairying platform.



- *Pye Farms. A farm map showing all of the data needed by the staff for everyday management. A similar idea is now on my dairy office wall.*

The picture above is of one of the Pye Farms. It shows how well laid out one of the dairy units is. We have since installed one of these on the farm at home. This was done as I could see it was an excellent way of communicating with the staff. We now measure the grass weekly and the report is added to the corner of the map. The fields are then marked in the order they need to be grazed and recorded. After using it for one season I can say that it has helped enormously in the utilisation of grass. Our management has been better and everybody knows what is going on. I can thoroughly recommend it.

A society fully behind co operation

Not once did I hear how their milk buyer was not paying enough. The New Zealand dairy industry seems to be behind their milk buyer 100%. This optimism and willingness to proceed has filtered right through the industry. I really enjoyed being around a positive group of people, we as UK farmers can learn a lot!

Efficient size of units

Most new units built on Greenfield sites number around 800 head. This I was told is ideal for a staff number of 5. It is also about the right number in terms of distance to paddocks. The system in place aims to milk cows extremely quickly and return to the paddock as soon as possible. A new section of grass is entered onto after each milking.

Empires built

One of the best success stories of dairy farming and expansion comes from visiting Jim van der Poel. He is a director of Spectrum Dairies and a board member of Fonterra.

Spectrum was started in 2003 by three investors after a “road trip around the south Island”. The farm business now totals 12 farms with 15 000 cows producing 5.2 million kg of milk solids. It has also invested in Missouri in the USA where it has 4000 cows on 3 farms.

It is actually relatively simple how the business has grown. This has been achieved through gearing and share milkers. Each unit utilises share milkers so that its set up costs are reduced. The assets have luckily grown so that they can be used as leverage and borrowed against for the next unit.

As each share milker has a vested financial interest in the farm, it is also relatively easy to manage.

The ingredients of success in New Zealand

- Co operation and collaboration both at processor and farm level (share milkers) has seen dairy expansion work on a mass scale.
- No mixture of enterprises that cloud judgement and financial understanding.
- Fluid land market enables farmers to progress
- The whole country is behind its farmers
- A dairying system that is completely matched to its market, cheap spring milk for commodities
- Fonterra has invested wisely around the world to exploit margins further up the dairy chain so that its shareholders (the dairy farmers of New Zealand) can benefit.
- Plenty of irrigation water from a sustainable source (glacial melt water).

Take home point

Virtually all of the above businesses mentioned have some things in common. They all have websites to advertise their business to potential share milkers and employees. They all utilise share milkers as a way of expanding. They all try to own land as a way of increasing equity and as a good asset base to borrow against and they are all passionate about farming in a way I have never seen before. They are also all involved in other businesses or industry activities outside of the farm gate.

USA

• Human Population	302.7 million
• Cow Population	9,158,000
• Average Yield	8.66 t/cow/year
• Milk Consumption	257kg ME per capita/year
• Export %	Approx 4% of production
• Import %	Approx 2% of local consumption
• Self-sufficiency in Milk	102%
• Farmers' Share on Consumer Price	50%

California State (CA)

- 2200 dairy farms
- 1.5 million cows
- 21% of all USA milk production
- Lower cost of production than the rest of the USA
- Expansion has added 1 million cows in the last 10 years!

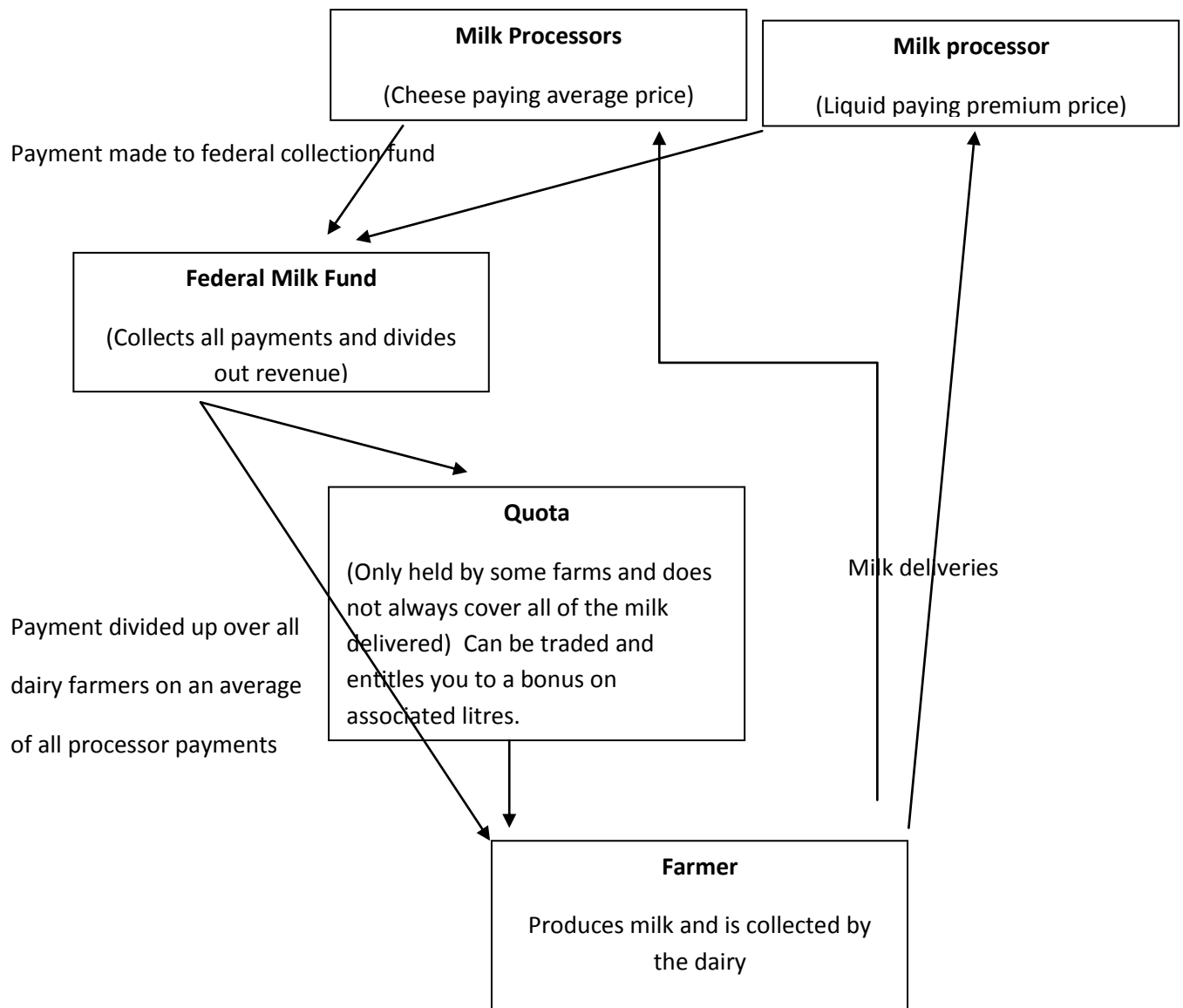
Flying from New Zealand to California meant that I went from 36 degree heat to 10 degree in less than 14 hours. It wasn't just the temperatures that were at each end of the scale, the dairying systems were as well.

Factory farming with huge outputs needed to cover large capital and input costs would be the easiest way of summing up the dairy system. Cows housed all year on a total mixed ration producing a lot of milk.

This was the way I thought I could expand my business at home. It is relatively easy for me to erect a dairy shed and take on land anywhere in order to grow the food. This meant all infrastructure and management on one site that should lead to efficiencies and dilution of costs.

The Californian milk market is very strange. Its milk field and market is relatively isolated, by the Rocky Mountains on the east and the pacific on the west. The state of CA is however the size of the UK so has got a pretty big home market to satisfy.

California milk pricing structure



The system above explains how the CA dairy farmers arrive at the same price with quota litres gaining a small premium. It could be described as a similar system to the UK when we had the MMB (Milk Marketing Board). This has created a level playing field but I could not see that they were any better off financially or as an industry as a result of it.

Hillmar Cheese is an example of working around the system. A group of farmers set up this creamery that has now become one of the biggest cheese makers in the world. The farmers supplying the cheese factory still get the same milk price as the other CA dairy farmers but they also get a profit dividend from the cheese company.

In a bid to expand the company they have recently set up a factory in Texas.

Mr C. A. Russell kindly met with me during his busy schedule. He runs Claus Dairies and was a founding member of the Hilmar Company. He has used leverage of his vast land assets in CA and bought 8000 acres of cropping land in Texas. In a theme seen in New Zealand, many expanding dairy

business often buy non dairy land. It is cheaper and you can add instant value to it by converting it to dairy, thus creating a paper profit straight away and you also have a blank sheet to work with.

The worrying part of this aggressive expansion is that the Dalhart region of Texas where the bulk of the dairy conversions are happening needs huge amounts of irrigation. This water has to come from an underground aquifer that was established during the last ice age and is not being replenished. When questioned about this, the opinion of the farmers is that it should last 90 years.

My conclusions were from an environmental point of view. Someone is going to place some restrictions on this after time and how sustainable is it to build a cheese factory and dairy farms where you only have 90 years supply of water?

Milk Hedging

Mr Russell was unique on his milk marketing. Not content with owning a share in the biggest cheese maker in the world he also uses the futures market to hedge his milk price. This is something that can be done through the Chicago Mercantile Exchange but is not really adopted by dairy farmers. Mr Russell believes in seeing a margin and locking into it. He had fixed most of his inputs and fixed milk at US\$18 per hundredweight. The current price was nearer US\$10!

Unsustainable on every front?

A theme was developing on my travels, namely “the importance of water and its sustainability”. Although it is not an issue for UK farmers, it does make us have a competitive edge. The irrigation water in the Central Valley was failing due to below average or zero snow fall in the mountains that lie to the East of the valley. Whilst I was visiting the area some farmers were being told that they had no water for the 2009 growing season. This effectively totally destroys your business. With only a 3 – 5 inch annual rainfall you can’t really grow much using rainwater in what was originally a desert!

The rapid expansion of the dairy industry was also unsustainable in my view. The CA dairy industry had lost sight of its market and they thought that the commodity boom would continue forever! A conference attended at the World Agriculture Expo was themed on the introduction of actual production quota similar to what we have experienced in the UK. They were in serious trouble.

The milk price peaked at around \$20 USD per hundred weight of milk (30ppl) it had however crashed to \$9.10USD per hundred weight (13.5ppl) whilst I was visiting. With an annual cost of production running at 20 – 23 ppl these farms were seriously haemorrhaging cash.

From what I was told and what I could see most farms were using equity to stay afloat as they had very little scope to decrease their costs of production. With a lot of bought in feed ingredients, their milk price depended immensely on the “milk to feed price” ratio. This is the formula for working out how many kg of food can be bought with a litre of milk. The dairy farming system in this part of the US relied 100% on this in order to make a profit.

They had no contracts in place in order to guarantee a milk price with only limited federal intervention in operation. The dairy industry has expanded so rapidly the dairies could not cope with all the milk and the liquid processors were buying milk cheaply and making good profits (allegedly)

out of the situation. It really was unpleasant to see and I did really feel for some of the businesses that I visited. Established large businesses were strong enough, providing they were not carrying too much debt to ride the storm out. As one speaker said at the World Ag Expo “I hope you all paid off your debts whilst the milk price was high, after all I told you all last year it would never last”

Sexed Semen

This has been widely adopted as a tool to aid aggressive expansion. Currently 45 heifers are born for every 100 cows in milk. This means that with the current tendered cull scheme was an aid to reducing production, huge amounts of now low value heifers are entering the system. It also means that the widely reported culling rates of 40% exist because they can. If it doesn't fit they kill it!

This is something the aggressive farmer in the UK could adopt more. Fertility needs to be correct to start with but it would mean the extra cows or second unit is easier to set up requiring less capital outlay. I have always looked at rearing heifers as buying cows on finance. A little and often payout in the rearing costs needed to be paid back after milking begins.

Size and efficiencies

The most efficient sizes of herd seem to be 3000 cows utilising one parlour milking 3 times per day. When expansion happens, they simply replicate it next door. The only extra utilisation of infrastructure would be a small amount on the slurry and the farm drive!

A spanner in the works

Just as I was beginning to think that housing my cows all year and pushing for yield was not for me I stumbled across something that makes you think about the large 1000 cow units and the opportunities that come off the back of such investment.

BioEnergy solutions have emerged when a slurry store is basically covered over and the methane gas captured. This gas was then “scrubbed” in order to remove other elements present. These were mainly carbon dioxide and sulphur. This gas was then chilled and pumped straight into the grid pipeline. The process was so simple it was hard to believe. The company had been set up by a dairy farmer/entrepreneur and I can see it really taking off. The neighbouring farm had already signed up and plans were being drawn up for the piping of the gas across to the scrubber which would then service 2 farms!

This gas was purchased by PG&E (Pacific Gas and Electric) and was marketed as “Natural Gas” along with a picture of a cow.

The even cleverer bit was the fact that the new farm that was to join the scheme did not have to pay any capital towards the set up as the company (BioEnergy) financed everything and then paid the farmer for the gas that was collected.

What I liked about this system is the fact that no other crops need to be grown. It simply uses what's already there going to waste. If we are to feed 9 billion people, we can't really afford to go around using up land in order to grow crops to produce gas and energy. There is bound to be conflict in the future.

This system does however suit the larger farm and after discussing the system with the company it could be adopted where the methane and other gases are burned in a converted engine to produce electricity. It already happens at South West Water's treatment works at Exeter and other locations. This electricity can then be sold or utilised on the farm. In this case, there could be a case for it in the UK as we would also benefit from keeping the rain water out of the slurry pit.

In any expansion, future legislation needs to be considered when planning is taking part. The legislation in CA is that utility companies like PG&E need to be using 20% renewable by 2010! With huge dairies across CA, the potential is huge. A 2500 head unit has the potential to produce enough power for 1000 homes and create thousands of dollars of revenue that at the moment is escaping to the atmosphere.



Vintage Dairy, Fresno California. BioEnergy's first methane capture unit. The covered slurry pit has the optimum 42 days capacity. The scrubber can be seen in the background.

California summary and "take home" messages

- High population state which is imposing massive environmental restrictions on dairies. Air pollution is next on the agenda.
- Losing site of the market and competing with low cost producers has cost the farmer millions.
- Sexed semen means culling can be stricter and aids rapid expansion.
- The system is extremely rigid and relies heavily on the milk to feed price ratio.
- Farmers are unable to lock into higher value milk purchaser contracts. Something I would not want to return to.

UK

• Human Population	60.8 million
• Cow Population	1,954,000
• Average Yield	7.10 t/cow/year
• Milk Consumption	264kg ME per capita/year
• Export %	Approx 20% of production
• Import %	Approx 31% of local consumption
• Self-sufficiency in Milk	86%
• Farmers' Share on Consumer Price	36%

I have visited numerous farms in the UK that have adopted various production systems and I was able to learn from them all. Our milk market is unique. A farm can lock into a market that suits their farm and production system.

A liquid supplier needs milk all year round so ideally needs to pay a premium for the extra costs incurred with this type of system. A cheese or hard product processor can be a little more flexible with their milk profile. I have encountered many arguments for and against differential pricing but as I have seen, a high milk price doesn't always lead to higher profits. In many countries, farmers often lift the production costs to near the milk price.

Every country is different but I feel it is extremely difficult to pick up a system from another country and expect it to be 100% correct for our market.

Expansion of my UK based dairy farm.

I feel you really have to look at three main areas whether you are starting a business or expanding an already established one.

Me, myself or I?

What are your personal strengths and weaknesses? All businesses I saw that were making a success of growing and expanding knew that the farmer behind it all was not good at everything. They employ people that are better than them for key and specific jobs.

Sometimes it may take a close friend to help. Ask them what they feel you are like and tell them to be honest. You might think that you are a good people manager but actually everyone else thinks that you are lousy!

What part of the business do you enjoy? The usual rule of thumb is that if you don't enjoy it you won't be good at it!

If you are not a good delegator or communicator then how will the business work with more people involved? Larger operations often require more staff. This is where the share milker utilisation can help.

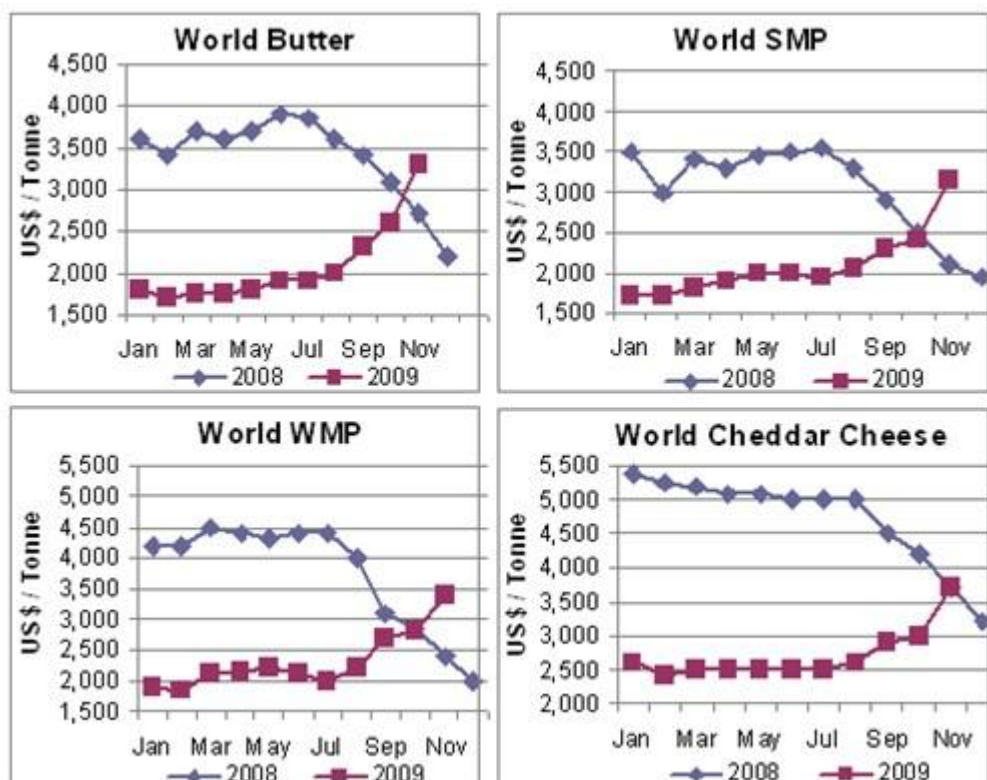
The market place

This is where the UK is different and I returned home from my travels with more awareness of where my milk ends up when it leaves the farm gate and what that person requires of me. The customer is always right, even in farming.

Then match it with the system

If the market you are selling to can have wild price fluctuations then it is complete madness to build in cost that cannot be removed. If it is concreted or bolted down then it can't simply be removed from the cost. Be flexible.

The best businesses I have seen have a rigid 2, 4 or 10 year plan and stick to it. This means that impulse purchases of equipment are avoided that can, if not planned properly, push up the cost of production. These costs have also got to be carefully monitored. Again, the best businesses could tell me how much the labour was, the feed costs or fertiliser cost and most of them knew it without the need for looking it up on the records.



Prices during my study time have varied immensely showing the importance of flexibility and cost control needed at farm level.

Conclusions

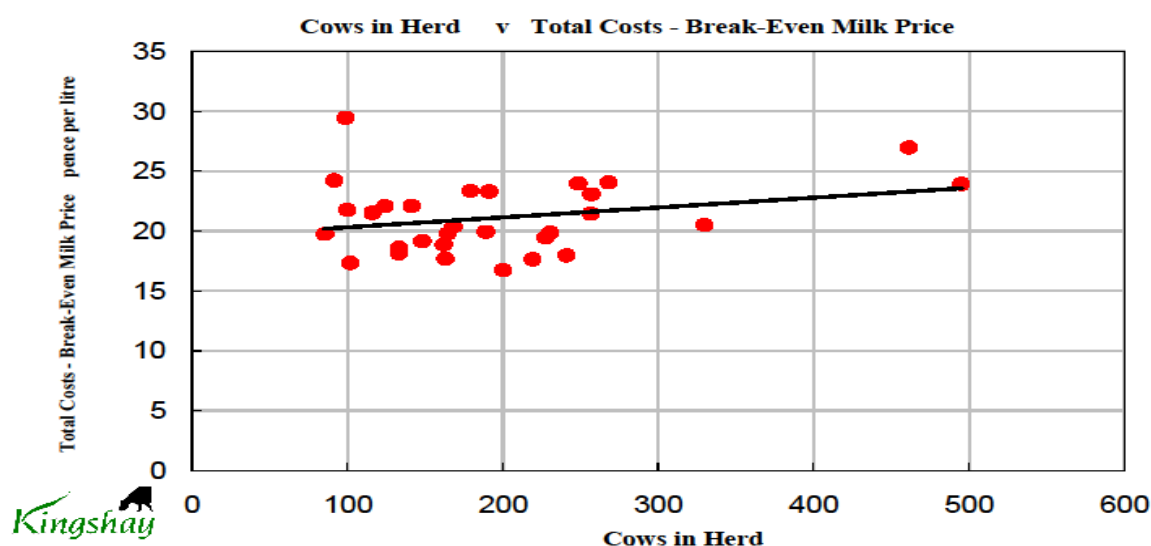
When I started my travels in February 2008, oil was peaking at \$147 (USD) per barrel and feed wheat was topping £200 per tonne. A perfect storm had made us all think about our ability to feed the world and at these prices nearly any type of production system looked OK. By the end of my travels I had seen oil crash to \$37 (USD) per barrel and feed wheat hit £80 per tonne. I think it may have been the most volatile market situation that any scholar has seen during their travels. This was an immense help in focusing my mind and not letting the booming markets get me carried away.

The milk price for a non-aligned contract hit 29ppl (excluding seasonality for a 1million litre producer in the top bands for SCC and Bactoscan) and troughed at 22ppl for the majority although in Ireland and Northern Ireland prices crashed even further to 17ppl as it was so closely linked to the commodity markets.

The reason I bring these figures to the attention of this report is that feed costs feature as a major part of our costs, 20 – 40% typically. When you include fertiliser which follows oil and gas prices it is an even higher proportion of the costs. These costs will feature heavily as we move forward and try to feed 9 billion people.

Herd size

We have seen various herd sizes develop in the UK in a bid to spread costs but the UK model is different from that of the US which does show costs decreasing over larger herds.



From this data I have become ever more sceptical of increasing herd size in order to increase margin. From the graph above it is clearly visible that the larger herd is producing more litres at less margin.

Why?

From the visits I have done in the UK many of these herds have added cows to already stretched facilities and actually made the whole herd management difficult. It is also very often done with the same staff so everything becomes pushed to the limit.

This is where the new purposely built unit on a Greenfield site comes into its own. This does happen but investment has been limited recently due to below cost returns in the UK.

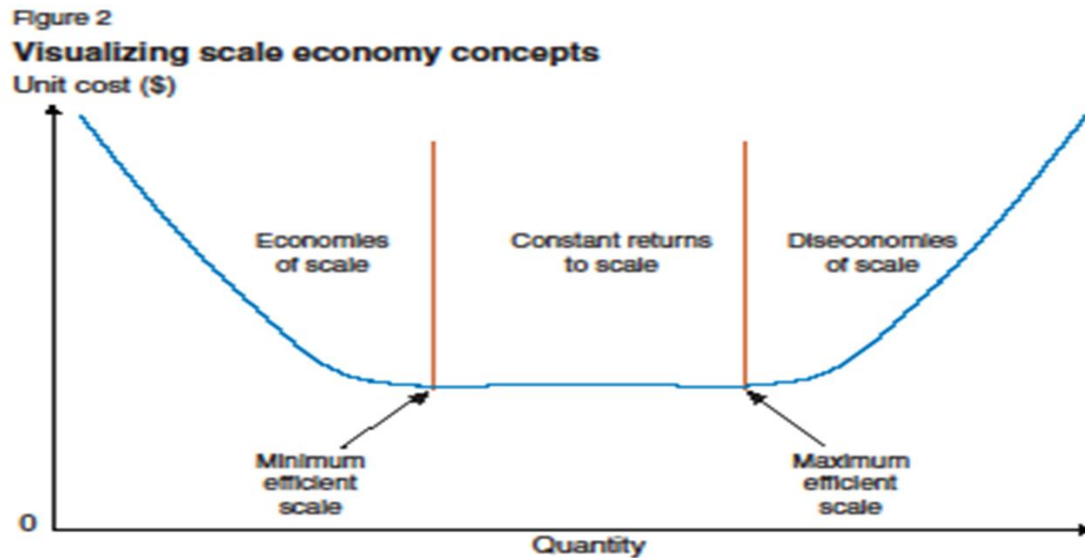
Larger units also rely more heavily on paid labour and this will not usually be as efficient or thorough as the farmer doing it himself.

This is where the multiple site system with an equity partner or share milker involved comes into its own as they will have a personal involvement financially in the management of the cow and unit.

Realising that larger herds had increased costs per litre in the UK, my attention therefore switched to increasing the profitability of what we do already. This can be attacked in a variety of ways:-

- Staff. As mentioned above when the unit is larger more staff need to be employed and the larger the herd the more chance of utilising specially trained staff. If you surround the business in the best people and train them well, look after them and pay well, success will be easier for everybody.
- Know where your optimum efficiency is going to be

I have realised since travelling how many actual farmers attend open days organised by the Vet and MDC and leave the staff at home doing the work. We now send all our staff on Johnes disease workshops, diet workshops and grazing management days. Everybody can then be aware of what you are trying to achieve!!



Source: USDA, ERS.

Where is your business on this scale? You can use this scale for yield as well as number of cows, even stocking rate, fertiliser usage and staffing numbers.

- Forage utilisation and Feed conversion efficiency (FCE)

The average UK farm is not utilising the food that we can grow so cheaply and more importantly without the use of irrigation. I thought it was just for the low input spring grazers but it is not. Even the management of conserved forages can be better to aid further utilisation. Since returning home we have started to measure grass and its consumption resulting to us harvesting the largest amount of forage off of our land (both grazed and cut). Next year we plan to build on this further. I feel at this point I need to mention the breed of cow used. I have seen all breeds and crossbreds in nearly every system and with the correct management they all perform well. It is my feeling that, although the Holstien has a place in UK genetics, we should be breeding a smaller, coarser and more robust animal. The crossbred option is obviously the correct one for the spring grazers as has been proven around the world. If we then bring sexed semen into the system, it can allow higher culling rates of cows that are wrong for the system. The reason why culling rates are low in many cases is because cows not suitable to the system are kept on as replacements either home bred or purchased are not always available or are too expensive.

Feed conversion efficiency

This was seen in different guises in each country. New Zealand used it to a limited extent as you need to know the exact DM of the grass and the intakes achieved. CA used it on a limited scale and preferred to use the milk/feed price ratio to gauge profitability. But I failed to find an industry “target” that has been advertised as a good goal. It seems apparent that it is a good measure of continued farm performance.

The UK market

Nowhere in the world did I find a market like our own. We are relatively free both in options of milk purchasers and red tape involved. I had many farmers amazed at the fact that a major supermarket (TESCO) have agreed to pay a guaranteed price to cover the costs of production and most of the other supermarkets have agreed to pay a premium over the standard price.

The fact that this has happened in the UK had made me feel that this is the place to produce milk. Even with NVZ regulations which are present in the poultry industry and in nearly every other country visited in one form or another. Our land is competitively priced compared to other developed agricultural areas (excluding eastern Europe and Russia as they are not developed in terms of infrastructure as we are) and we often get more work out per unit of labour than many other countries.

From what has been experienced, we can improve our efficiencies on many fronts and can improve profitability from our current average herd size of 100 – 200 cows although I do feel the higher end of this bracket is more sustainable. The most clever and successful people seem to replicate it on another site so as not to enter inefficiencies like the graph before illustrated. Get it right then do it again. This can then utilise share milkers or partnerships if you have multiple sites.

Land ownership

I have seen various business models around the world but nearly all of them either try to own the land or own the lease. This then creates a stable asset base to borrow against and create security. Land values always increase over time and this can add to growth of the business.

Changes to my own farm business as a result of my studies.

- Installation of a segregation gate so that cows could be split at milking with the lower yielders now being challenged to graze more. The gate was seen in New Zealand.
- Variable rate vacuum pump motor fitted in aid to reduce energy usage. Seen on some farms in New Zealand. Payback for this investment is 15 months!
- Adoption of out wintering cattle on stubble turnips. Numbers have risen for the third year with 60 in calf heifers and beef grazing all winter.
- Marginal litres are now questioned more before we start chasing them.
- As a result of me going away, the staff have developed and sadly ones that did not fit the management style or system identified themselves and have left. The net result is we are left with the best team we have ever had. Nuffield affects more than just the Scholar!
- Red clover leys have been introduced as a way of reducing our Nitrogen usage. With rising demand for fossil fuels fertiliser is only going to get more expensive.
- Dirty water is now stored until the spring and spread on grassland eliminating the need for the first application of nitrogen. But you do need to analyse it.
- We are looking at land ownership and a second unit with greater confidence than before my travels.

Appendix 1

The people who made it happen

Australia 20th February – March 14th 2008

All involved in the Contemporary Scholars Conference

Warakirri Asset Management, Melbourne, Managing Director Ian Rohde

Rabobank Melbourne, Mark Bennett

Dairy Australia, Melbourne, Steve Coates

Garry and Anne Budge, 710 Echuka, Nanneella Rd. Victoria.

Sally Mitchell and Barry Osborne, Torrumbarry. Victoria.

Janet Moxey, The Angle Dairy, Rollands Plains, NSW.

Special thanks must go to Jamie and Anne Snell of Merrigum Victoria, for offering me accommodation and helping with contacts.

Russia and Hungary 20th – 28th June 2008

Heartland Farms and in particular Colin Hinchley, Richard Willows and George Green.

Magyar Farming Company, Gyor Hungary. In particular Andrew Hunter and Ted de Boer.

New Zealand 11th – 25th January 2009

Special thanks must go to Craige and Roz Mackenzie Reynolds Road, Methven, for allowing me to use them as a base for my travels.

Leighton Pye, Pye Farming Partnership Ashburton

Sarah Wing

Andy McFarlane

Jeremy Andrews

Wrigley Transport and Dairies.

Jim Van Der Poel Director of Fonterra

California 26th January 2009 – 14th February 2009

Leslie Butler from UC Davis California was instrumental in organising 5 days of support and trips.

Nick Adams from Alltech allowed two of his staff to give up 3 days in order to show me different systems.

Other farms visited were:-

Jack de Young, Riverranch Dairy

Tony de Groot, De Groot Dairies, Hanford

Ray Gene Vedduis

CA Russell , Dairy Farmer in California and Texas and founding member of Hillmar Cheese.

Scott Wicstrom, Wicstrom Jerseys on various sites in California and partner in Hillmar Cheese.

Ralph Perry, Sales Manager for Alltech California.

Pedro Ramos, Regional Manager Alltech Western region.

UC Davis California

Ed de Peters

Dan Sumner

Peter Robinson

Jennifer Heguy

Jerry Higginbotham

World Ag expo Conferences and talks

UK

300 Cow Club, visits joined of interest to my studies were:-

Edinburgh 22nd – 24th April 2008 Dairy expansion and taxation

Harrogate 21st – 22nd April 2009 Metcalf Farms, UK and Russia and Torsten Hemme IFCN Report findings.

North Wales 20th -21st October 2009 Farming system comparisons, David Wynne Finch and David Harden.

Cheshire 25th-16th April, Tesco Centre of Excellence, Richard Fair's 800 cow dairy unit and The Cogent Sexed Semen operation.

Appendix 2

Websites and other supporting evidence

International Farm Comparison Network (IFCN). A tool that every dairy farmer should have on the shelf! Released every year and now in its 10th. It can be gained from contacting DairyCo or Torsten Hemme, Chairman. Info@ifcndairy.org or www.ifcndairy.org

www.dairyco.org.uk

www.heartlandfarms.ru/en

www.pyegroup.co.nz

www.volgafarming.com

www.metcalfefarms.co.uk

www.usda.gov

All other contact details available on request.