

ASPECTS OF SOUTH AMERICAN DAIRYING

Bruce Greig

Agriculture and Life Sciences Division

Lincoln University

Introduction

There is increasing interest in the dairying industries of South America. Many of these countries have comparative advantages in dairy farming that may threaten the international competitiveness of the New Zealand dairy industry. This paper will provide an overview of the South American dairy industry, their dairy farming systems, and prospects for New Zealand investors. The discussion will focus on how New Zealand dairy farmers might take advantage of developments in South America.

Latin America

Brazil and Argentina are the major milk producing countries of the South American continent. Chile and Uruguay are also emerging as major milk producing countries (Shwedel, 2005) and some Central American countries like Costa Rica (Dobson, 2003) have notable successes in their dairy industries.

Table 1: Comparative Facts

	Argentina	Brazil	Chile	NZ
Land area (10000 km ²)	276	851	75	27
Population (million)	39.9	161	14	4
Population density (person/km ²)	13	19	18	15
Agriculture contribution to GDP (%)	25	31	15	16
Self sufficiency in milk supply (%)	110	97	115	>1000

Source: Rabobank, 2005; Hemme, 2004

Table 1 highlights the differences in population density and the contribution of Agriculture to Gross Domestic Product (GDP) of Argentina, Brazil and Chile compared to New Zealand. Argentina and Brazil are heavily reliant on Agriculture.

Political and economic instability have adversely affected the development of the dairy industries of South America (Dobson, 2003). The self sufficiency in milk supply data demonstrate these countries growing contribution to trade in dairy.

Table 2: Economic Indicators of selected countries

	Argentina	Brazil	Chile	NZ
Per capita GDP (US\$)	13,700	8,400	11,300	24,200
GDP growth (%)	8.7	2.4	6.0	2.5
Inflation rate (%)	12.3	5.7	3.2	3.0
Population below poverty line (%)	39	22	18	NA
Average wage rate (US\$/hr)	2	1	2	9

Source: CIA, 2006, Temme, 2004

In addition, the Corruption Perception Index (Transparency International, 2005) gives a measure of how attractive these countries are for direct foreign investment and trade.

Table 3: Corruption Perception Index for selected countries

New Zealand	9.6
Australia	8.8
United States	7.7
Chile	7.3
Brazil	4.0
Argentina	2.8

Source: Transparency International, 2005, 10=highly clean, 0=highly corrupt

South American countries have emerged as international traders, as evidenced by the following trade agreements and arrangements (Dobson, 2003):

- North American Free Trade Agreement (NAFTA)
- Free Trade Areas of the Americas (FTAA)

- MERCOSUR- Regional customs union between Brazil, Argentina, Uruguay and Paraguay has the intention to phase out tariff barriers, and promote free movement of goods, services, labour and capital
- US-Central American Free Trade Agreement (CAFTA)
- Nestle and Fonterra joint venture Dairy Partners of America (DPA) based in Brazil, with the intention to sell into NAFTA
- SERLAC Brazilian dairy exporting organisation (alla NZDB)

Argentina

Argentina is a rapidly growing economy. Consumers' purchasing power has increased with recent political and economic stability. However, there is still a wide income distribution especially between the rural and urban areas.

Economic growth and a free dairy sector have increased domestic consumption of dairy products, and attracted increased investment in the sector. Per capita consumption of dairy products is high (230 kg/person) while local production is increasing faster than consumption.

Brazil and neighbouring countries are the main destination for exports. Farmers are adopting new technology thereby increasing yield and productivity. The economy is still burdened by excessive regulation, and labour market problems. The government employs 3% of the labour force.

Reca (2005) reports that dairy contributes 13% to Argentina's Agribusiness after oilseeds (24%), meats (19%) and grains (13%). The major dairying regions are Santa Fe, Cordoba and Buenos Aires. Almost 80% of milk supply is processed by six dairy groups, of which SanCor cooperative is the largest. Due to the burgeoning export market greater attention is being paid to milk quality. Dairy farmers delivering un-refrigerated (>7 °C), high SCC (>500 000 cells/ml) and high bacteria count (>200 000) raw milk receive 46 % less for their milk (Haumann, 1999).

Foot and Mouth Disease is still endemic in many parts, and this affects the countries' exporting ability. Argentina benefits from the close proximity to the large and expanding Brazilian market.

Farming system

Near Buenos Aires average rainfall is 825 mm, 40-55 frosts/year, average temperature in summer is 22°C and winter is 9°C. This favourable climate allows grazing all year round with a predominately pasture based system. Supplements are in the form of grains, mixed concentrates and maize silage. Herds are supplemented with grass silage in summer, maize silage in autumn and winter. Grain contributes 20 -30 % of the diet. The milk price: supplement cost ratio is more favourable in Argentina (2:1) compared to New Zealand (1:1).

Production is 23 -25 litres/cow/day in Spring, 17-19 litres/cow/day in summer due to pasture quality. Average production is in the order of 250-500 kg MS/ha (Peluffo, 1997).

Peluffo (1997) is an Argentine dairy farmer who achieved 467 kg MS/ha from a stocking rate of 1.4 cows/ha and grass production of 4100 kg DM/ha. Farm working expenses were 66% of gross farm income (\$3.38/kg MS with \$4.66/kg MS payout). Concentrates and maize silage contribute 63% to costs, and labour 18%. This performance (profit/ha) was 30% higher than the average for his discussion group.

A seven year crop rotation is commonly adopted because of lack of persistence of permanent pastures. This rotation consists of four years pasture followed by one year of maize and two years annual ryegrass for silage (Haumann, 1999).

Stocking rates range from 0.6 – 1.5 cows/ha (Garcia, 1997, Glassey, 2005). Pasture production ranges from 6000 – 8000 kg DM/ha in the first year, decreasing to 4000- 5000 kg DM/ha by the fourth season. Glassey (2005) believes pasture production may be limited by soil fertility, pasture substitution, limited use of nitrogen and management.

Calving occurs all year round or in two seasons: Spring and Autumn. First calving occurs at 26-32 months, calving interval is 365-400 days.

Artificial insemination is widespread with 95% of cows being of US Holstein origin. There are no official herd improvement or animal evaluation systems.

Herringbone milking parlours are most common. Presently there are no restrictions on nutrient use and no environmental legislation. Farms are family owned, mostly with absent land lords, farms are commonly managed by contract milkers receiving 8-15% of milk proceeds (Quattrochi, 2005). Wages paid to farm workers are low.

A study by Peluffo (2005) showed that adoption of New Zealand innovations, namely pasture management, seasonal calving and labour productivity by Argentine dairy farmers were associated with higher levels of return on investment. This was due to greater utilization of land.

Peluffo (1997) identified human capability as a limiting factor in Argentina dairy farms, specifically: lack of skills and education, poor social status of contract milkers, poor working conditions on farms, and most graduates desiring professional or advisory careers rather than farm management work.

According to Glassey (2005) Argentina faces a number of limitations to sustaining productivity and milk supply growth. These include:

- poorly trained staff who are poorly paid and have little time off
- a preference to fund almost all development from farmers' own cash rather than from credit

- the need for significant on farm investment in infrastructure e.g. milking sheds to accommodate increasing herd sizes
- need to develop rural infrastructure, particularly roads and power supply
- a shortage of cows and replacements
- an emphasis on per cow production targets rather than profit
- absentee landlords who have little involvement in farm management

Brazil

Brazil is ranked first in the world for production in coffee, oranges, sugar, and second in beef and soybeans. Brazil is ranked first in world exports for coffee, oranges, sugar, ethanol, beef and leather (Hirsch & Costa, 2005).

This increase in competitiveness has resulted from an open economy, and investment in research and technology. The rapid growth in these agricultural sectors presents opportunities for new entrants in providing expertise, logistics, trade and supply chain management. The most prominent barrier to progress is logistics; particularly transport infrastructure.

Brazil accounts for the second largest number of dairy cows in the world. Like elsewhere in the world herd size is increasing as a result of fewer milk producers. Milk supply is increasing due to increased consumer demand which has been a consequence of increasing milk quality and food safety. Dairy exports are rising due to increased competitiveness created by the devaluation of the *Real*. Within Brazil a large informal milk production and distribution system exists.

Due to the expanding industry Brazil is an attractive market for genetics, refrigerated bulk tanks, technology and expertise. The government has aggressive policies to make dairy more competitive, in particular by raising milk quality standards (Costa *et al* , 2004). The policy is to encourage dairy production by: streamlining procedures to approve firms for exporting, negotiating trade agreements, identifying foreign import barriers, and creating market promotion programs to increase dairy exports.

The industry is able to produce milk at low cost; however, limitations are imposed by lack of infrastructure, transport systems and high interest rates. Brazil is benefiting from the presence of strong international traders like Nestle and Fonterra.

The level of buying activity by co-operatives is weakening due to inability to adapt to structural changes and remain competitive. As a consequence there has been a proliferation of mergers into large national and multinational buyers dominated by Nestle, Parmalat and Danone.

Farm system

Tropical climate allows for year round grazing with no need for confinement housing. Therefore herd size can expand rapidly given no restriction on land availability. However, the influence of North American genetics and management systems, means that many farmers do confine animals and cut and carry forage.

The Brazilian dairy industry has a large number of milk producers covering a wide range of production practices and management strategies (Costa *et al*, 2004). Farm systems vary from low input grazing to high input confinement systems. Traditional and informal producers farm with indigenous breeds of cattle like Guzera, Nelore, Gir and Zebu. These dual purpose, hardy animals suit the tropical environment where they are traditionally farmed in a ranching system. Many of these farmers milk by hand. The milking procedure involves calves suckling before, after and during milking to promote milk letdown, prolong lactation, restrain cows during milking, and achieve higher calf growth rates. This has an impact on cow and labour productivity.

The high input confinement system uses Holstein cows and North American farm management principles. The emphasis is on high per cow production. Many of the high input farms are vertically integrated. The family farm business therefore involves milk production, manufacturing and processing, and marketing.

All farm systems have some amount of pasture feeding and concentrates. Seasonal climatic variations lead to variation in production from wet to dry seasons. Incentives for milk quality have seen widespread implementation of refrigeration. This increased investment will require increased production through improved productivity.

Table 4: Dairy indicators for selected countries

	Argentina	Brazil	Chile	NZ
Milk production (1000 t)	8,200	23,260	2,200	14,000
Cows (1000)	2,400	16,045	1,000	4,000
Farms	19,000	1,800,000	13,500	14,000
Milk production/cow (kg)	3,833	1,456	3,400	3,882

Source: Haumann, 1997; Babcock, 2002; Garcia, 2005; Costa, 2004; Hemme, 2004

The International Farm Comparison Network (IFCN) is an organisation that benchmarks 81 different dairy farm systems in 31 countries around the world (Hemme, 2004). Table 5 contains comparisons of selected measures for Argentina, Brazil, Chile and New Zealand. Each country is represented by a typical dairy farm. This is an actual farm that reflects a system used in that country, therefore it is not the average.

Table 5: Comparison of dairy systems of selected countries

	Argentina	Brazil	Chile	NZ
Location	Cardoba	Minas Gerais	Region 10	Waikato
No. Cows	350	163	300	254
Farm size	442	264	270	106
Stocking rate	0.8	0.6	1.1	2.4
Labour units	11.3	5.8	27.1	2.3
Kg. MS/cow	450	171	685	394
Kg. MS/ha	360	102	753	945
Total assets (US\$/100 kg)	80	75	48	126
Total Capital cost (US\$/100 kg)	0.3	1.3	0.5	2.4
Equity	100	100	100	70
Milk price (US\$/100 kg)	16	14	17	17
Cost of Production (US\$/100 kg)	7	12	15	11
Average wages on farm (US\$/hr)	4	2	4	8
Cost of labour (US\$/100 kg)	2.5	3	5	4
Labour productivity (kg/hr)	95	25	43	245
Average age at first calving	30	36	25	24
Herd Replacement rate (%)	32	14	29	20

Source: Hemme, 2004

Notes: Cost of production includes all farm working expenses, wages, and debt servicing minus revenue from non milk income. Excludes wages of management, depreciation. Exchange rate 1 NZ\$=0.58 US\$. 1kg milk = 8.5% MS

Prospects or otherwise for Kiwi investors in South America

The 2005 IFCN report has highlighted some emerging dairying nations that pose a threat to New Zealand's position as the lowest cost milk producer in the world. These nations include Brazil, Argentina and Chile on the South American continent. The New Zealand

dairy industry is paying attention to developments in these countries, and has also increased its focus on improving productivity in the New Zealand dairy industry (Greig, 2006).

As a result, in August 2005, I undertook a study trip to Argentina and Brazil. The purpose of my visit was to gain an appreciation of the dairy industries, dairy farm systems and culture of these countries. A summary of my impressions follows.

Key messages

- South America has enormous untapped agricultural potential as a result of comparative advantages in rich soils, favourable climate, relatively cheap land and labour
- This potential is constrained by an uncertain macroeconomic and political environment.
- A high level of willingness to cooperate at primary industry level was expressed; this provides opportunities for New Zealand.
- The highly protected and subsidised industries of other countries feel very threatened by developments in South America
- These northern hemisphere countries are still unwilling to accept changes and adapt to the new agricultural production and trading environment
- New Zealand has comparative advantages of innovative and motivated farmers, operates in a very certain economic and political environment, and has achieved trade access to high value markets.
- In terms of farm systems, Brazil and Argentina has more in common with Australia and South Africa due to a tropical climate and cheaper cereal grains.
- Their farming systems have been strongly influenced by North America.
- These countries are hungry for information and new technology and they know exactly what's happening in New Zealand.
- The governments of Brazil and Argentina are actively encouraging investment by foreign multinational companies, and direct investment in infrastructure.
- Brazilian family owned farms and businesses have an inter-generational planning horizon; they are not looking for short term returns on investments.
- Comparative advantages exist in primary production, but also in trade access. The MERCOSUR, NAFTA, FTAA, and CAFTA agreements provide some certainty for the export of increased production.

Opportunities

Many migrant dairy farmers and sharemilkers from the North Island considered the South Island the last frontier. It took courage and determination to leave the familiar, family

and support networks for the greener pastures of the South. Emigrating to South America is in a different league. Any Kiwi investors would have to seriously consider:

- the language and cultural differences
- business culture and risk
- isolation
- remoteness

South America would be attractive to a New Zealand farmer investor because of:

- cheaper land and potentially lower cost of production, therefore at a similar milk price to New Zealand this would result in a greater return on asset
- less environmental regulation
- the potential to ultimately supply Fonterra without shareholding

However, the disadvantages would be:

- less productive labour requiring much more management input (which most NZ farmers are trying to avoid)
- much greater bureaucratic compliance costs, including tax liability
- having to deal through intermediaries
- the risk of not being able to extract profits and equity from the business

Apart from direct investment in farm land there are other opportunities. These countries have a growing need for expertise, technology and human capability. I know many examples of New Zealanders offering these services already. However, it is interesting to note, that apart from a Fonterra speaker, all the outside speakers for the forthcoming Pan-American Milk Conference are from Australia or the United States. This suggests that maybe South America does not place Kiwi expertise at the top of its shopping list.

At both Massey and Lincoln universities there is a growing student population from Latin America studying agriculture. It is no surprise that much of New Zealand intellectual property is being exported this way. Ultimately it is difficult to stem the uptake of New Zealand innovation and technology, but the value could still be captured by New Zealand, for example, if Fonterra were to source low cost raw milk from these countries.

New Zealand graduates who seek employment overseas, will return with greater insights, skills and ability as a result of their experience in a different country. New Zealand dairying will always benefit from people who have global work experience, bring fresh thinking, and have established valuable worldwide networks.

Emerging dairy competitors will be a ready market for farm inputs. Opportunities exist for animal and plant genetics, machinery, seed, and fencing technology. Gallagher, Livestock Improvement and Wrightsons have exploited these already.

Finally, what can we learn from developments in South America? Governments have recognised the importance of agriculture, and consequently have increased their investment in this sector. They are promoting investment, and clearing the barriers to progress. The benefits of government support and promotion to the industry are clear.

These industries have recognised the need for educated and skilled manpower. They have invested heavily in sending employees overseas to get post graduate qualifications. These returning graduates together with their application to the problems of the local industry are a major cause of increased productivity.

The Latin American culture is about family, relationships and enjoying life. The focus seems to be on long term viability and not short term profiteering. Work life appears to be the means to an end, rather than the end itself. Perhaps we can learn from this culture of enjoying life more, rather than continuously accumulating wealth?

As these countries seek improvements in farm productivity, milk quality, supply chain management and marketing, many innovative ideas will be developed. We should follow these developments with interest.

Conclusion

Latin America is a major producer and trader of agricultural products, and is emerging as a low cost producer of milk. Argentina and Brazil will have an impact on the international trade of milk products.

Despite the threat this might pose to New Zealand competitiveness, a number of opportunities exist for the New Zealand dairy industry, its farmers and stakeholders. Dairy companies in New Zealand may view South America as a potential source of milk supply or as a market for exporting dairy product.

Brazil and Argentina have the potential to increase dairy production and productivity. However there are several institutional and development barriers that will hamper their progress and slow their ability to challenge the dominant position of New Zealand in global dairy markets.

South American dairy industries will also seek New Zealand expertise, technology and farm inputs. Although farmer investors might find lower land prices attractive, there are several risks involved in direct investment in South America. Certainly, adapting to a foreign culture, language and business environment will require a pioneering spirit.

As a consequence of developments in South America; the New Zealand dairy industry must maintain the focus on; improving productivity in the primary and manufacturing sectors, increasing human capability, increasing trade access to lucrative high value markets, adding value to commodity milk products, and exploiting opportunities where they arise.

References

- CIA. 2005. Central Intelligence Agency - World Fact Book. Sourced from:
<http://www.cia.gov/cia/publications/factbook/index.html> (Accessed May 2006)
- Costa, D, Reinemann, D.J, Cook, N, and Ruegg, P. 2004. The Changing Face of Milk Production, Milk Quality and Milking Technology in Brazil. Babcock Institute Discussion Paper No. 2004-2. The Babcock Institute for International Dairy Research and Development. University of Wisconsin.
- Dobson, W.D. 2003. Dairy Updates – Dairy Industries of Latin America. The Babcock Institute, University of Wisconsin.
- Dobson, W.D. 2003. Developments in the Dairy Industries of Mexico, Central America, Argentina, and Brazil – Implications for the U.S Dairy Sector. Babcock Institute Discussion Paper No. 2003-4. The Babcock Institute for International Dairy Research and Development. University of Wisconsin.
- Garcia, S.C. 1997. Milk Production in Argentina. Dairying Annual, Department of Animal Science, Massey University – 1997 pp. 86 - 91.
- Glasse, 2005. Report on Trip to Argentina. Dexcel Ltd.
- Greig, B.J. 2006. Global perspective. Dairy Exporter. January 2006.
- Haumann, S & Wattiaux, M. 1999. Overview of World Livestock Agriculture and Selected Dairy Industries – Australia, New Zealand, Argentina, The Netherlands, and Wisconsin. Babcock Institute Discussion Paper No. 1999-3. The Babcock Institute for International Dairy Research and Development. University of Wisconsin.
- Hemme, T; Christoffers, K, and Deeken, E. 2004. IFCN Dairy Report. – For a better understanding of dairy farming worldwide. International Farm Comparison Network, Braunschweig, Germany.
- Hirsch, R & Costa, F. 2005. Brazil's Agribusiness – Expanding and becoming increasingly competitive. In North American Food and Agribusiness Outlook. Rabobank International.
- Jesse, E. 2003. World Trade in Dairy Products and the US Role: An illustrated Primer. Babcock Institute Discussion Paper No. 2003-2. The Babcock Institute for International Dairy Research and Development. University of Wisconsin.
- Peluffo, L. 1997. Low Cost milk production in Argentina. Dairying Annual, Department of Animal Science, Massey University – 1997 pp. 82 – 85.
- Peluffo, M. & Shadbolt, N.M. 2005. Adopting New Zealand Dairy Farm Principles and Practices in Argentina. Proceedings of the International Farm Management Association (IFMA) Conference, Campinas, Brazil.

Quattrochi, H. 2005. Personal Communication. CREA Dairy Farm Consultancy Group, Tandil, Argentina.

Reca, Alejandro. 2005. Argentina's Agribusiness – Further Restructuring and Increasing Exports. In North American Food and Agribusiness Outlook. Rabobank International.

Shwedel, K. 2005. Chilean Agribusiness – Globally Integrated and Export Focused. In North American Food and Agribusiness Outlook. Rabobank International.

Transparency International. 2005. Sourced from:

http://www.transparency.org/policy_research/surveys_indices/cpi/2005 (Accessed May 2006)