MARKET FAILURE in the Western Australian (WA) DAIRY INDUSTRY

Market failure is defined as:
Illogical outcomes resulting from seemingly logical actions.

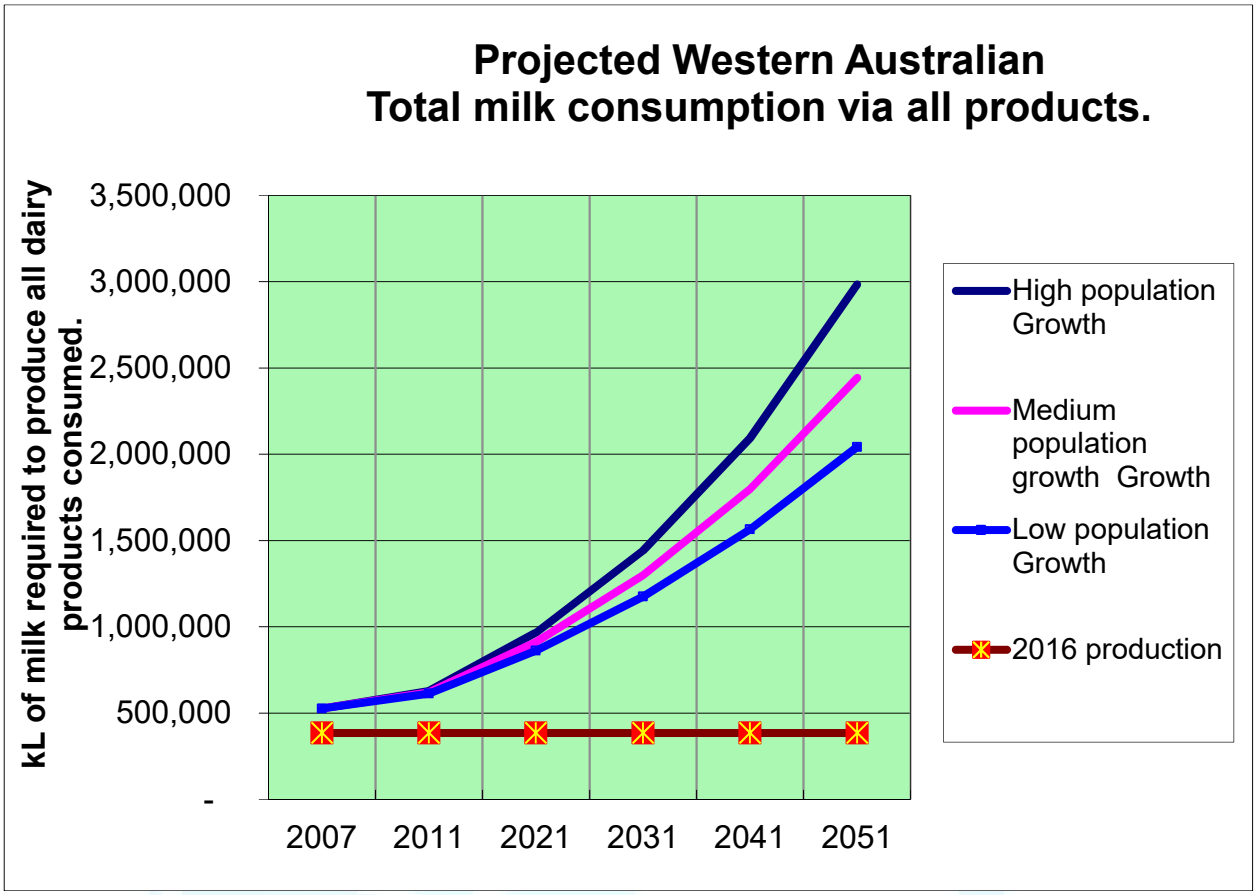

Figure 1 - Projection of milk required by Western Australian consumers as the population grows and as consumption patterns change.

Western Australia's population is growing.

The consumption of milk in all dairy products is growing by 14.4 million litres of milk equivalent per year or 2 litres per person per year.

Western Australia used 1% of its agricultural land to produce milk in 2015, to be self-sufficient only 2% of the state's agricultural land is needed.

BUT

The production of milk is falling.

CONTENTS

TABLE OF FIGURES

MARKET FAILURE IN THE WESTERN AUSTRALIAN (WA) DAIRY INDUSTRY.

ABSTRACT

MARKET FAILURE IS DEFINED AS "ILLOGICAL OUTCOMES RESULTING FROM SEEMINGLY LOGICAL ACTIONS."

This paper focuses on the WA dairy industry. It does not discuss national or international issues associated with the dairy industry.

Demand for milk is growing by 2% per year, the WA population is growing by 1.2% per year, this means an extra 14.4 million litres of milk is consumed each year, but the industry is declining!

In 2015, there was a shortfall of 400 million litres of milk in WA. SEVEN HUNDRED and EIGHTY-SEVEN MILLION (787,000,000) litres of milk was used to produce ALL the dairy products CONSUMED in WA, but only 387 million litres of milk were produced in the state.

An estimated 200,000 hectares is used for DAIRY FARMING in WA. Self-sufficiency requires 400,000 hectares of land. This is 2.6% of the 15 million hectares in WA's South West agricultural region.

WA is self-sufficient in drinking milk, processed by 3 factories. These factories benefited from a regulated environment starting in 1932. Regulation guaranteed profits and favoured liquid milk processing over storable products such as CHEESE, BUTTER, POWDERS and ICE-CREAM. Storable products (except UHT milk) are no longer produced in the state.

WA imports 34,500 tonnes of the 35,000 tonnes of cheese consumed. WA also imports 10,000 tonnes of butter, all its retail Ice Cream and a significant proportion of its yoghurt. There is a huge cost to this as each tonne of refrigerated product coming to WA costs about $550 in transport alone.

At the time of deregulation, cheese, butter, milk powder and Ice-cream were produced and packaged in WA. Since that time, the cheese, butter, milk powder and Ice-cream facilities have closed or are closing – They were not able to maintain profitability, reinvest and grow to supply the local market. Some artisan companies remain, but are not looking at scaling up production.

Currently, "excess milk" is not being made into storable products and consumed in the state. This milk is being exported to Darwin and other markets within Australia to the international market if they are price competitive.

This situation is not logical and so, meets the criteria of Market Failure.

It is recommended that an Industry working group is formed to in develop a dairy strategy for WA. This must include all sectors of the supply chain.

DEFINITION OF MARKET FAILURE

Market failure describes any situation where the individual incentives for rational behaviour do not lead to rational outcomes for the group. (Investopedia, 2016)

WESTERN AUSTRALIAN INDUSTRY IMBALANCE

Consumption – 787 million litres of milk equivalent in all forms. (2.6 million people X 303 litres per person per year (per capita))

Figure 2 - The milk required to produce all the dairy products consumed by the Average Australian in 2015.

State production – 387 million litres (2015) - (148 litres per capita)

Deficit – 400 million litres of milk equivalent - (155 litres per capita.)

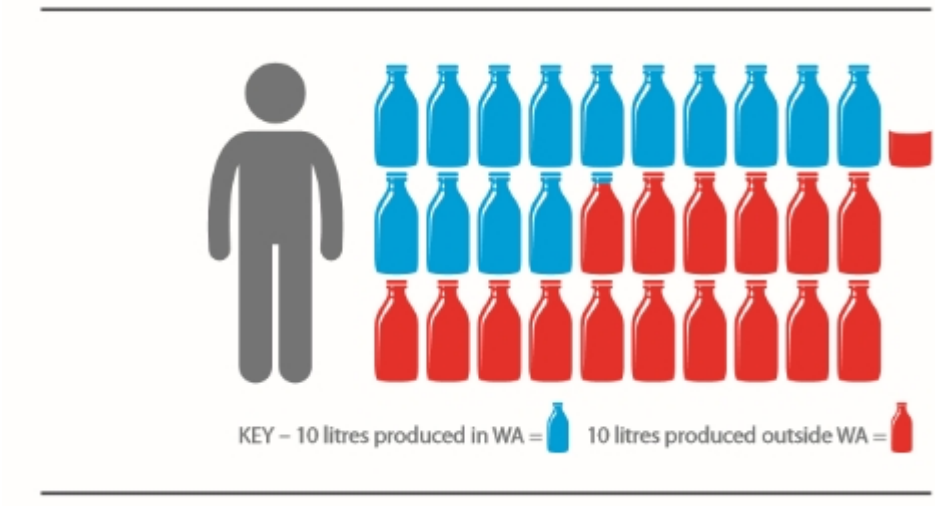

Figure 3 - Products produced from WA milk - Blue, products imported into WA - Red.

More than 50% of all dairy products are brought into WA.

This imbalance has a cost. Refrigerated transport to Western Australia costs at least $550 per tonne. The 45,000 tonnes of cheese and butter will cost someone in the system almost $25,000,000 and the Ice-Cream will cost a similar amount. This may be adsorbed into national supply contracts, but it is being paid by consumers across Australia.

Figure 4 - A bar chart showing the percentage of milk per person is imported into WA.

WESTERN AUSTRALIAN POPULATION AND CONSUMPTION GROWTH

Western Australia's population grew by 1.2% (31,000 people) in the year ending March 2016. (ABS, 2016) These people will consume an extra 9.4 million litres of milk equivalent every year.

Per capita consumption of all milk products increased by 2 litres of milk equivalent per year between 2000 and 2015 (Dairy Australia, 2015) This is approximately another 5 million litres of milk equivalent every year.

Combined growth due to population and per capita consumption increase = 14.4 million litres of milk equivalent per year.

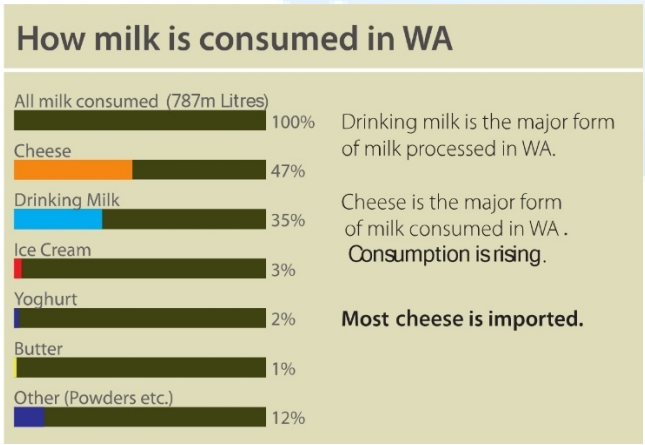

Figure 5 - The percentage of all milk consumed in WA allocated to major product categories.

Table 2 Australian dairy industry – long term trends

At June 30	1980	1990	CAGR 1980s	2000	CAGR 1990s	2015(p)	CAGR 2000s	CAGR 35 yrs
Milk production (m lts)	5,432	6,262	1.4%	10,847	5.6%	9,731	-0.7%	1.7%
Dairy cows ('000)	1,880	1,654	-1.3%	2,171	2.8%	1,740	-1.5%	-0.2%
Farm numbers	21,994	15,396	-3.5%	12,896	-1.8%	6,128	-4.8%	-3.6%
Value of farm production* ($m)	$3,588	$3,354	-0.7%	$4,254	2.4%	$4,723	0.7%	0.8%
Value of ex-factory production* ($m)	$9,190	$8,284	-1.0%	$12,783	4.4%	$13,768	0.5%	1.2%
Per capita consumption (milk equiv)	239	244	0.2%	274	1.2%	303	0.7%	0.7%
Export value* ($m)	$1,083	$607	-5.6%	$3,879	20.4%	$2,884	-2.0%	2.8%
Export share of production	22%	31%		54%		34%		

Sources: ABS, ADC, DA, State Authorities
CAGR = Compound Annual Growth Rate
**Expressed in 2014/15 dollars*

Figure 6 - Per capita consumption in Milk Equivalents as reported by Dairy Australia.

(Dairy Australia, 2015)

WESTERN AUSTRALIAN MILK PRODUCTION CAPACITY

Western Australia has the animal feed and water resources to produce many times the domestic consumption of milk. The agricultural area in the South West Agricultural consists of approximately 15 million hectares.

There are 155 dairy farms in the far South West corner. Significant expansion is possible in locations with adequate supplies of water.

CURRENT DAIRY HERD.

The current milking cow population by calculation is 70,300 cows. This is calculated by taking the current milk production of 387 million litres divided by 5,500 litres per cow (Dairy Australia) =70,300 cows

	NSW	VIC	QLD	SA	WA	TAS	AUST
1979/80	2,870	3,012	1,984	3,163	3,105	2,958	2,848
1989/90	3,602	3,920	3,122	3,934	4,205	3,791	3,781
1999/00	4,827	4,989	4,349	6,790	6,338	4,381	4,996
2000/01	4,687	4,977	3,943	6,369	5,903	4,177	4,859
2001/02	5,030	5/391	4,067	5,933	5,402	4,646	5,215
2002/03	4,996	4,885	4,230	6,556	5,348	4,304	4,913
2003/04	5,093	4,944	4,162	6,021	5,285	4,219	4,925
2004/05	4,925	5,101	3,735	5,862	5,418	4,497	4,983
2005/06	5,039	5,221	4,076	5,791	5,369	4,581	5,108
2006/07	5,151	5,261	4,033	6,417	5,235	4,696	5,182
2007/08	5,031	5,393	4,163	5,799	5,907	4,961	5,275
2008/09	5,420	5,807	5,032	6,053	6,355	5,140	5,691
2009/10	5,329	5,518	5,052	5,907	6,641	4,640	5,448
2010/11 (r)	5,409	5,860	4,980	6,257	6,637	5,379	5,758
2011/12 (r)	5,753	6,023	4,965	6,589	5,967	5,636	5,921
2012/13 (r)	5,527	5,469	4,618	7,025	5,996	5,166	5,487
2013/14 (r)	5,317	5,632	4,546	6,776	5,418	5,407	5,555
2014/150(e)	5,692	5,808	4,276	6,998	5,557	5,615	5,731

Source: Dairy manufacturers, ABS and Dairy Australia

Figure 7 - Milk produced per cow in Western Australia - Dairy Australia

CURRENT LAND UTILISATION

Average cow requires 1.75 ha on the home farm ("Western_Dairy", 2016)and 1 hectare in the wheat belt to provide 2 tonnes of grain (This is a generous allocation)

The total requirement is 123,000 hectares of home farm land and 70,300 hectares of wheat belt land

Total land used = approximately 200,000 hectares of 15 million hectares in the Southern Agricultural area.

LAND UTILISATION - IF WA WAS SELF SUFFICIENT.

If all the milk required by WA was produced in the State, the dairy herd would be 143,000 cows using 250,000 hectares on their home farms and another 143,000 hectares in the wheat belt. Approximately 400,000 hectares out of 15,000,000 hectares.

This assumes that the farming system remains the same. There is a trend towards farm growth with the largest farms in WA milking 3,000 cows. These are medium sized in world terms, there are farms in other parts of the world milking 10,000 or more cows. The largest dairy farm in the world milks 75,000 cows, this is in Saudi Arabia at a property owned by Almarai. (Farmers Journal Ireland, 2013).

MILK VOLUMES, CALCULATIONS AND REFERENCES.

WESTERN AUSTRALIAN MILK PRODUCTION.

Western Australian Production in 2015 – 387 million litres of milk. (Dairy Australia, 2016)

WESTERN AUSTRALIAN MILK CONSUMPTION

Western Australia's population (2,600,000 in 2016) (ABS, 2016) consuming 303 litres of milk equivalent per year. This equals 787,000,000 litres of milk consumed as milk, cheese, butter, yoghurt, ice-cream and powdered products.

The 787 million litres of milk consumed in WA is divided between the following products:

Liquid milk – 273 million litres (Dairy Australia, 2016) mainly produced in WA.

Cheese – 370 million litres of milk producing 35,000 tonnes – based on per capita consumption of 13.6 kg / person/ year (Dairy Australia , 2016) Almost all imported, some artisan producers in the state produce approximately 500 tonnes. The cheese plant owned by Brownes can produce up to 10,000 tonnes of cheese but is hampered by whey disposal issues and lack of milk supply. This plant is in the process of being closed now.

Yoghurt – 24 million litres (including fortifying powders) (Dairy Australia , 2016) Less than ½ made in WA

Butter – 10,000 tonnes of butter requires approximately 220 million litres of milk which is separated into skim milk for further processing and cream for butter production. (Dairy Australia , 2016) All imported.

Ice cream – 13 million litres of milk equivalent based on 18 litres of Ice-cream per capita. (46.8 million litres of Ice-cream) (Business Insider, 2013) Almost all imported, some artisan producers.

With significant imports, there is a significant transport cost. Industry sources indicate that the cost of bringing a pallet of product from the Eastern States of Australia in refrigerated containers is in the order of $550 per pallet which usually holds less than one tonne. Based on 45,000 tonnes of cheese and butter the added cost is a minimum of $25 million per year.

As milking cows is a biological process, converting vegetable matter into liquid milk, there are natural variations in supplies from the cow. The major things that affect milk supply include, the stage of lactation of the cow, the feed going to the cow, the weather conditions and how the cow is treated including her nutritional status. Generally, there is a flush of milking spring as grass is plentiful and the weather conditions are favourable. In countries like NZ where storable products are the major products, the second week of November is generally the peak of the season. At this time, up to 6 times the minimum "peak to trough ratio is achieved. In WA, the peak to trough ratio is much lower with it being approximately 1.5:1 in recent years. This is due to the focus on liquid milk in the state. There are changes in consumption from the customer side as well. The following graphs show actual figures for 2015.

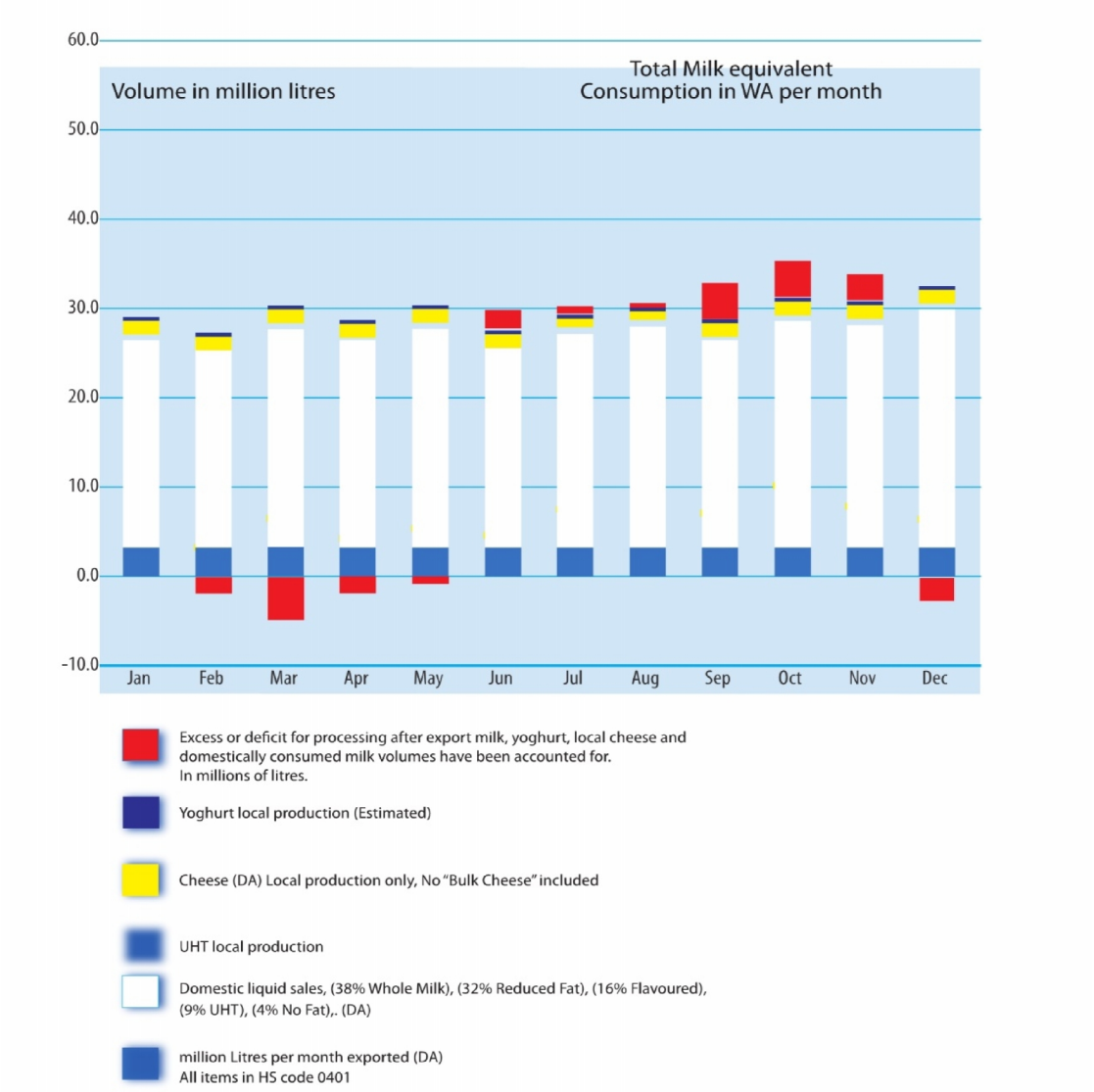

Figure 8 - Monthly milk production (2015) in WA and what it is used for.

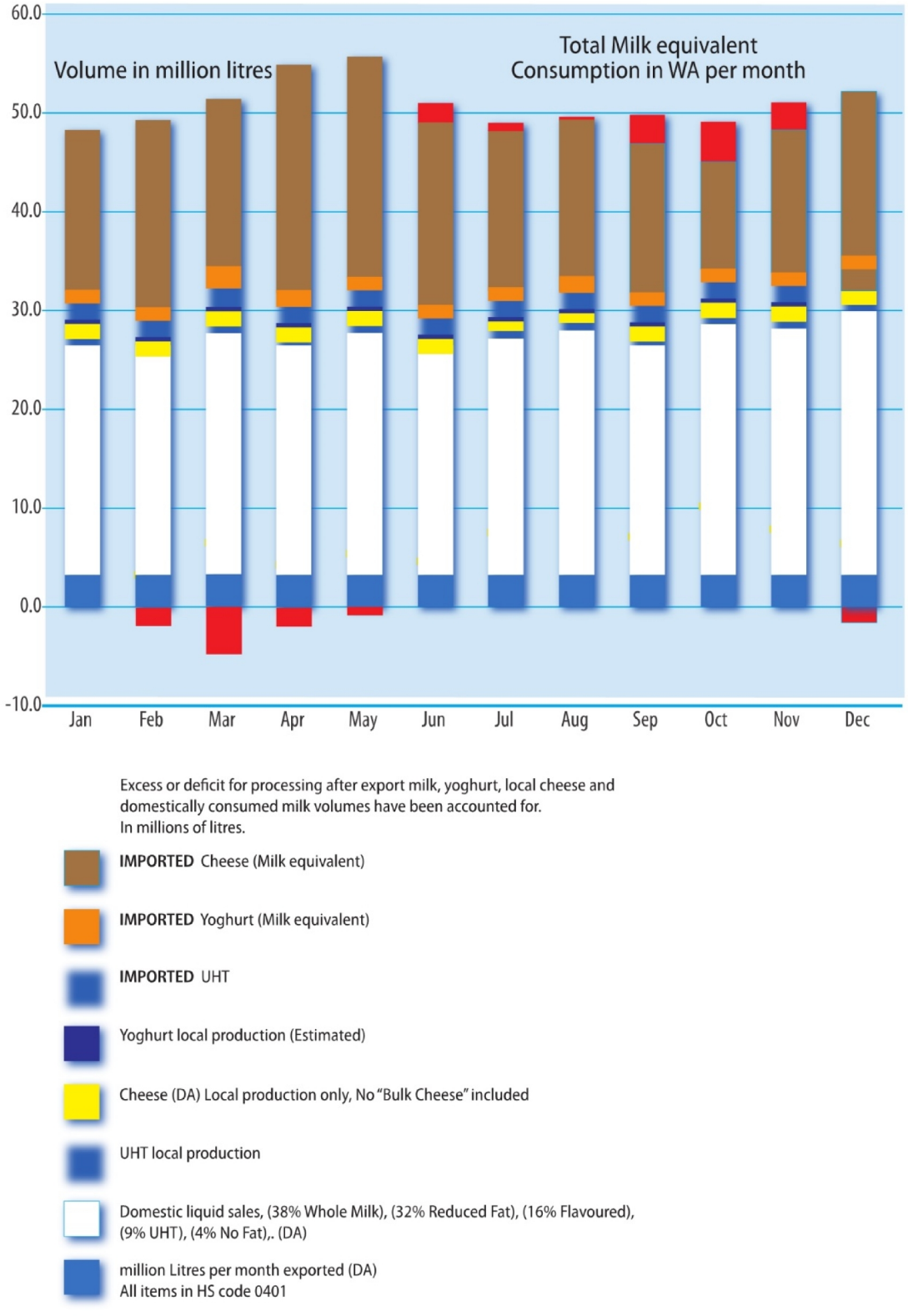

Figure 9- Monthly consumption (2015) of all dairy products and the milk is needed to make them. (Butter is not included)

PROJECTED REQUIREMENTS

As the world's population grows, so does Western Australia's population. Food consumption patterns also change. A study of statistics provided by Dairy Australia shows that there is a slight increase in liquid milk consumption, estimated to be 0.4% per year and an increase in cheese consumption, estimated to be 1.3% per year. This combined with Western Australia's population growth of 1.2% per year means that the demand for dairy products as milk and associated products will continue to grow.

The graphs below were originally created in 2007 and have been updated with production and consumption data from 2015.

As milk production in the state is dropping and the market failure is supporting this drop, the deficit in milk production in the state will only grow unless some sort of remedial action is taken.

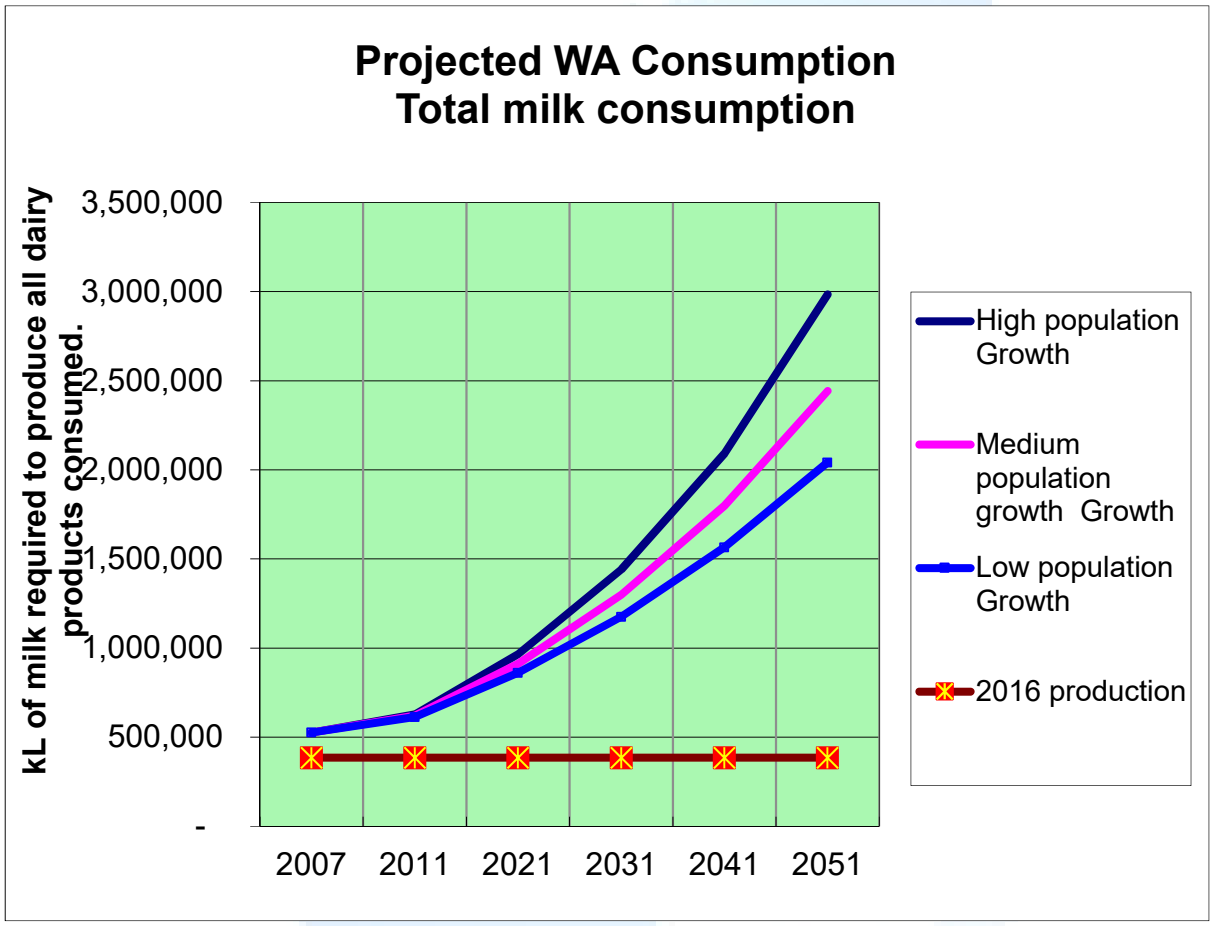

Figure 10 - Projection of milk required to produce all dairy products in WA. Accounting for population growth and consumption changes.

Note: 1 kL =1000 Litres. E.g. 500,000 kL= 500 million litres of milk

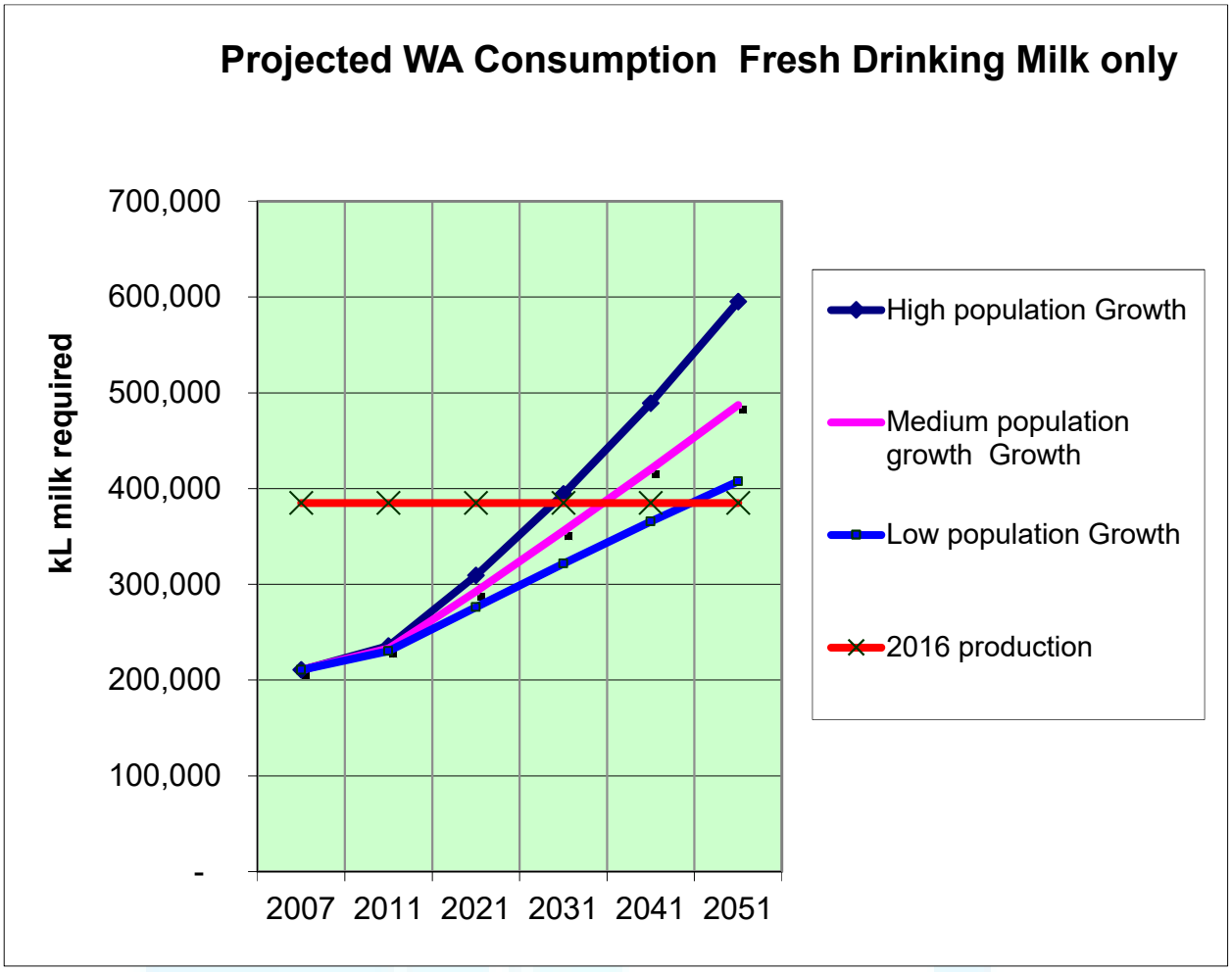

Figure 11 - Projection of milk required for drinking milk only in WA

Note: 1 kL =1000 Litres. E.g. 500,000 kL= 500 million litres of milk

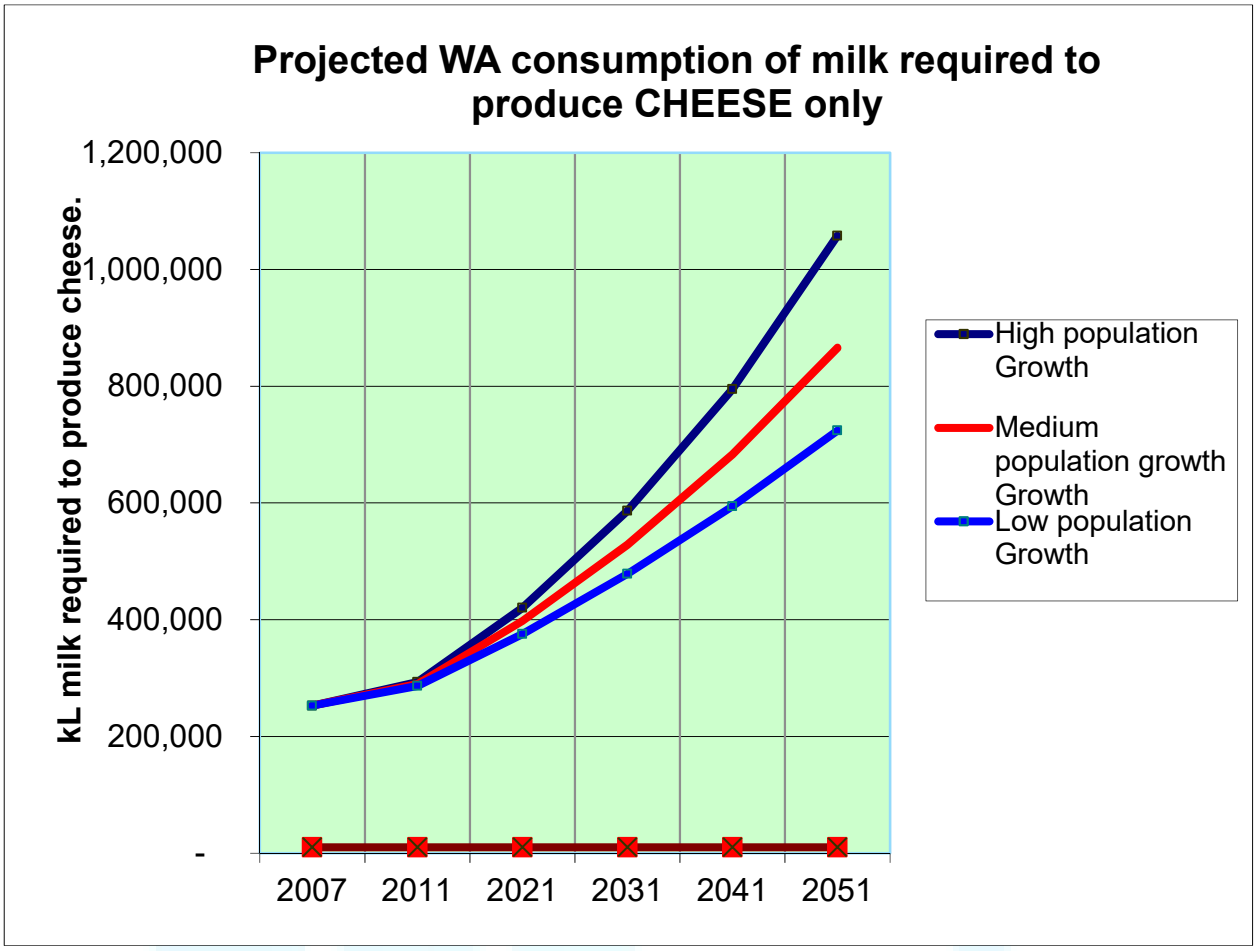

Figure 12 - Projection of milk required to produce the cheese consumed in WA.

Note: 1 kL =1000 Litres. E.g. 500,000 kL= 500 million litres of milk

CAN WESTERN AUSTRALIA PRODUCE MORE MILK?

The agricultural resources (land, water and feed) exist to support a much larger dairy industry. The Western Australian Department of Agriculture has investigated a range of production areas where expansion of the industry can take place (DAFWA, 2013) It is estimated that total land resources for self-sufficient would be 400,000 hectares out of 15 million hectares in the southern Agricultural area. There is enough land and water available for WA to be self-sufficient for the foreseeable future.

WHAT HAS LEAD TO THE MARKET FAILURE?

The Western Australian dairy industry has not responded well to deregulation. While there has been constant population growth and a continuing growth in per capita consumption of dairy products, there has been a contraction of product range and market spread.

This has been partially due to the inability of individual processors products to compete with established large scale producers based on the east coast. In the regulated environment, cheese, butter and powders were cross subsidized to ensure continuous production of drinking all year. Since deregulation this has been complicated by the major processing factories being owned by out of state entities, each with different market strategies.

The Western Australian dairy industry operated in a regulated environment from 1932 to 2000. The Metropolitan milk act of 1932 started this period. (Western Australian Government, 1932)

This act, controlled drinking milk prices and production quotas throughout the period at the discretion of the board. It did not encourage growth for products other than drinking milk. Ultimately, processing plants for the storable products of cheese, butter and milk powders did not have the economies of scale to remain cost competitive, nationally or internationally.

An example of this price control is seen in the following diagram which shows how costs were allocated to a litre of drinking milk in 1988. When farmers, processors and distributers received prices such as these, there is no incentive to grow production for non-regulated products, especially when excess production impacted negatively on farm profitability due to the mandated milk payment system. (The Western Australian Dairy Industry Authority, 1989)

Since deregulation there has been a shift of margins away from the farmers and processors to the large distributors who have significant market power.

(The Western Australian Dairy Industry Authority, 1989)

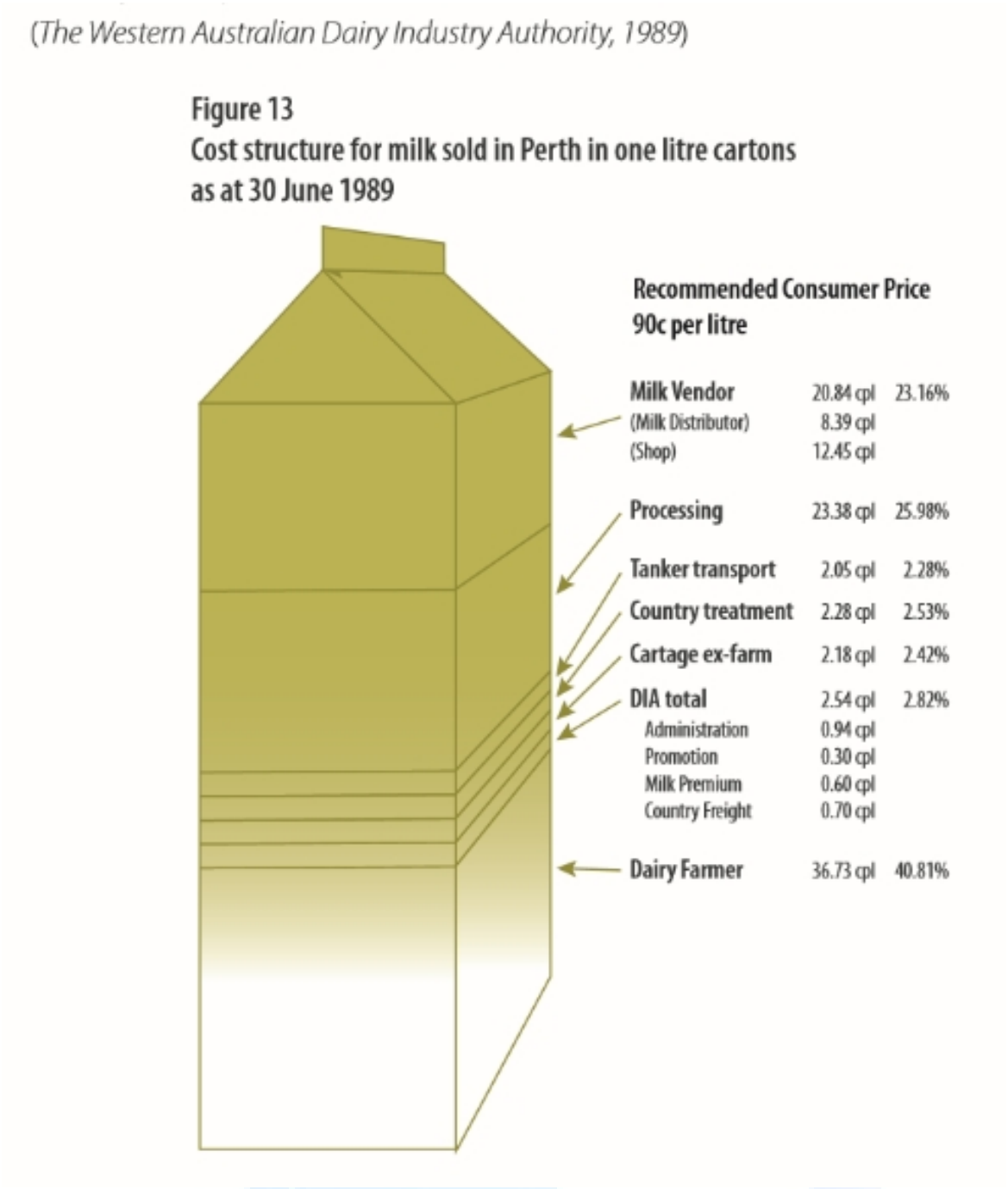

Figure 13 - From the WA Dairy Industry Authority Annual report detailing the regulated costs of a litre of milk.

The prices the farmers received for quota drinking milk in 1989 ($0.3673 per litre) are comparable (in numeric terms) to prices received in 2016 without factoring in inflation. Using the reserve bank of Australia's inflation calculator, the 2016 milk price would be $0.80 per litre. (Reserve Bank of Australia, 2016)

Using the same calculator gives a processing value of approximately 47cents per litre. These two costs alone would take a litre of milk to $1.27, much more than the current $1.00 per litre milk sold in supermarkets.

High drinking milk prices at the farm gate, significantly lower prices for "manufacturing milk" (used for cheese and powders) and guaranteed processing margins for milk packers resulted in skewing the market away from anything other than drinking milk for the metropolitan market.

It is interesting to note that the milk payment system has shaped the industry differently in each of Australia's States. There were two general systems in place.

The quota system which was adopted in WA which guaranteed a price for a SET VOLUME of milk, these quotas were tradable.

The proportional payment system which divided the market milk premium evenly amongst ALL dairy farmers.

The quota system was adopted in NSW, WA, and Southern Queensland. The proportional system was adopted in Victoria, Tasmania, South Australia and Far North Queensland. Victoria and Tasmania are now the main milk processing states, providing not only all their states drinking milk, but also their storable products, being cheese, butter and powders.

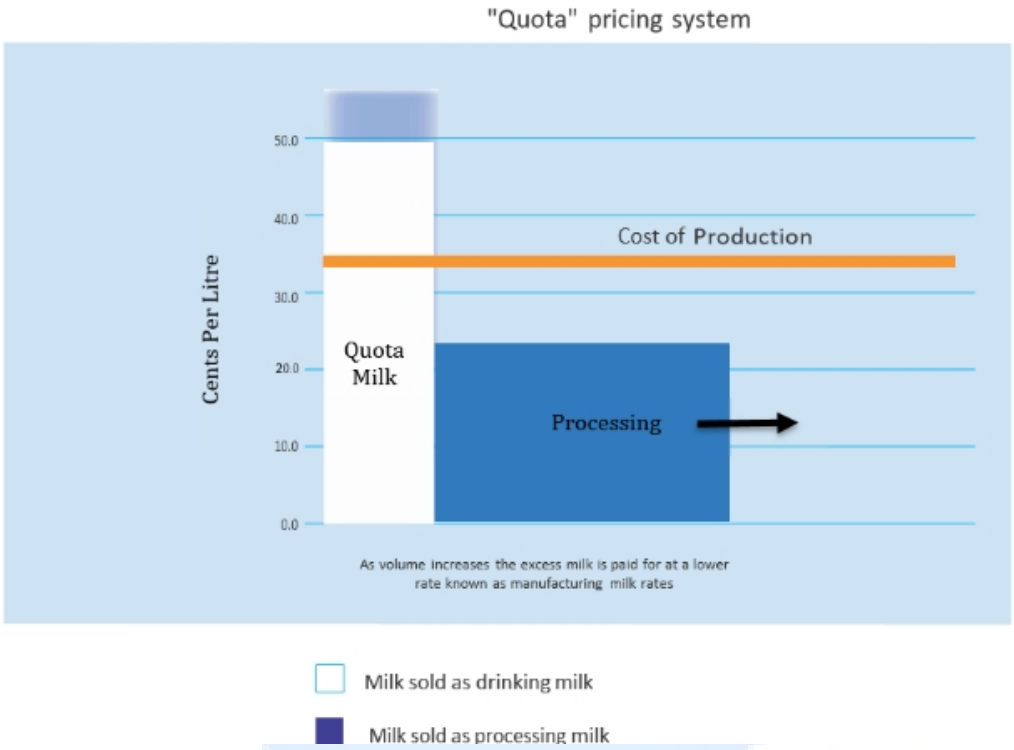

Figure 14 - How milk was paid for under the quota system used in WA, NSW and Qld. This system discouraged growth more than drinking milk requirements. The last litre is paid at a discounted rate.

This system was used in Western Australia, NSW and Southern Queensland. It did not encourage growth in milk production and did not account for changes in consumption patterns for products other than drinking milk. Thus, factories making storable products such as cheese, butter and milk powders did not grow or maintain world competitiveness.

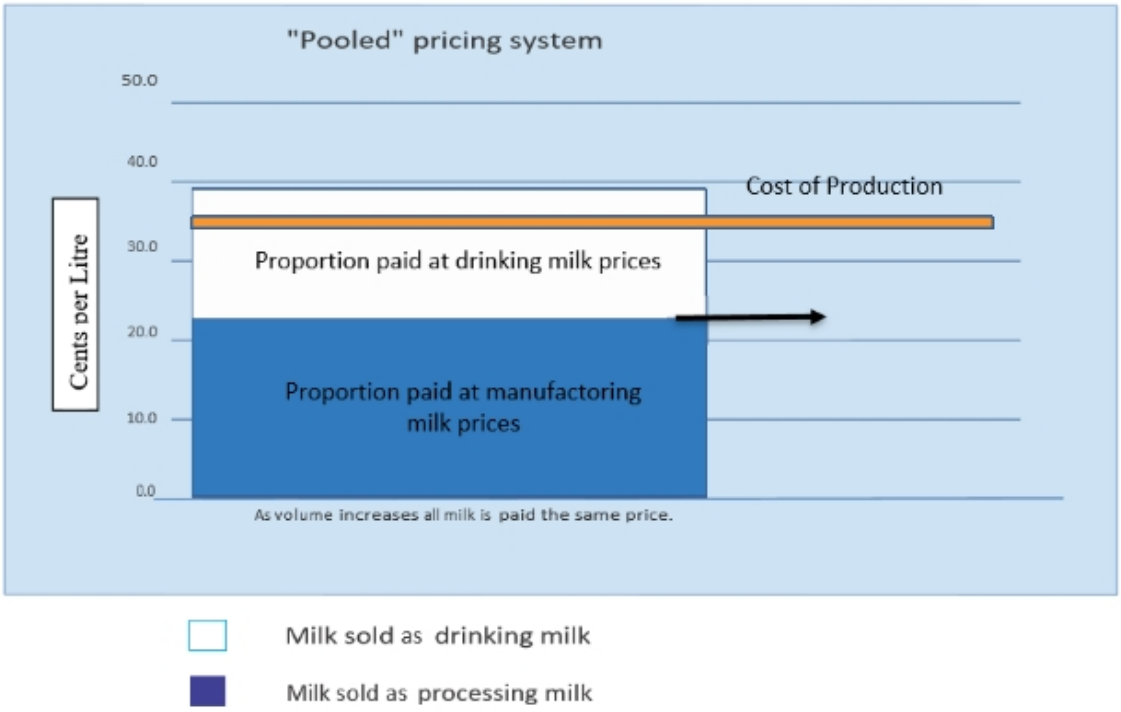

Figure 15 - How milk was paid for under the pooling system in Victoria, Tasmania and SA. This system promoted growth and world scale factories. The first and the last litre of milk is paid the same price.

This system was used in Victoria, Tasmania, South Australia and Far North Queensland. Milk production grew consistently in these states and factories developed scale and cost competitiveness.

The Quota pricing structure, where drinking milk had a preferential price (due to the higher costs of producing milk every month of the year), and a lower price for processing milk (to make storable products, which was based on world market export prices), resulted in a clear economic signal for farmers NOT to produce more milk. Over time the processing assets for cheese, butter and powders became progressively LESS competitive. The result is their extinction, as seen in 2016.

Margins for all members of the drinking milk supply chain were guaranteed. During the years of regulation, the task of the drinking milk processor was to be as efficient as possible to maximize their guaranteed profit! Capital was regularly spent to accumulate fixed assets to enhance the efficiency of processing factories and maintaining them at maximum profitability. Since deregulation, little capital has been spent on any processing assets in WA.

Cheese and milk powder factories were used to dispose of excess milk or fulfil legislative requirements, once there was a legal requirement to include milk powder in bread. The margins were slim and so investment was not allocated to these processes. The plants were worn out and in need of repair / replacement. Some fixed assets still exist in WA, but the majority have been fully depreciated but not replaced.

MARKET POWER.

A simple way to measure market power is to use an index system commonly used in the USA. It is called the Herfindahl-Hirschman Index – HHI (USA Department of Justice, 2016) This simple index develops a score made up of the square of the market share of the top 5 companies. The maximum score is for a monopoly, being 100% - their score would be 100 X 100 = 10,000

The USA Department of justice says that a score over 2500 represents a highly concentrated market.

In WA, there is no farmer with more than 2% of the total production, so the farmers score will be no more than - (2x2) +(2x2) +(2x2) +(2x2) + (2x2) = 20. Companies or firms with scores such as this are known as atomistic firms – meaning they have no market power.

The processors in a better position compared to the farmers having larger market shares. For the exercise, I will use a market share of 33% each, although they are different.

(33x33) +(33x33) +(33x33) = 3267 (within WA, but this is complicated by national purchasing agreements.) The processors have market power over the farmers, but are overshadowed by the distribution sector.

The processors are then affected by nationally based supermarkets who have the following shares

Australia	Percent of market share.	HHI Score
Woolworths	40.2	1616
Coles	33.3	1109
Metcash / IGA	9.5	90
other	8.9	79
Aldi	8.1	66
Total HHI	100	2960

Figure 16 - The Herfindahl-Hirschman Index for Australian Supermarket sector.

(Business Insider, 2015)

These concentrations of market share have a significant bearing on the Western Australian market which represents only 3% of the nation's milk production and 10% of the nation's population.

CHANGES IN CONSUMPTION PATTERNS

Cheese consumption has been steadily rising since 1939, (ABS , 1999).

The population in 1939 was 459,000, (Lahmeyer, 2006) consuming 918 tonnes (2 kg per person per year) of cheese made from 9.1 million litres of milk. At that time, 49 million litres of liquid milk were consumed. With ratios, such as this, there was little need to focus on cheese.

The population in 2016 is 2,600,000 people, consuming 35,000 tonnes (13.6 kg per person per year) of cheese made from 350+ million litres of milk, this is more than the 273 million litres of liquid milk consumed.

This change in consumption was never addressed by the metropolitan milk board or the Dairy Industry Authority. The hurdles due to lack of investment were not overcome in the deregulated environment.

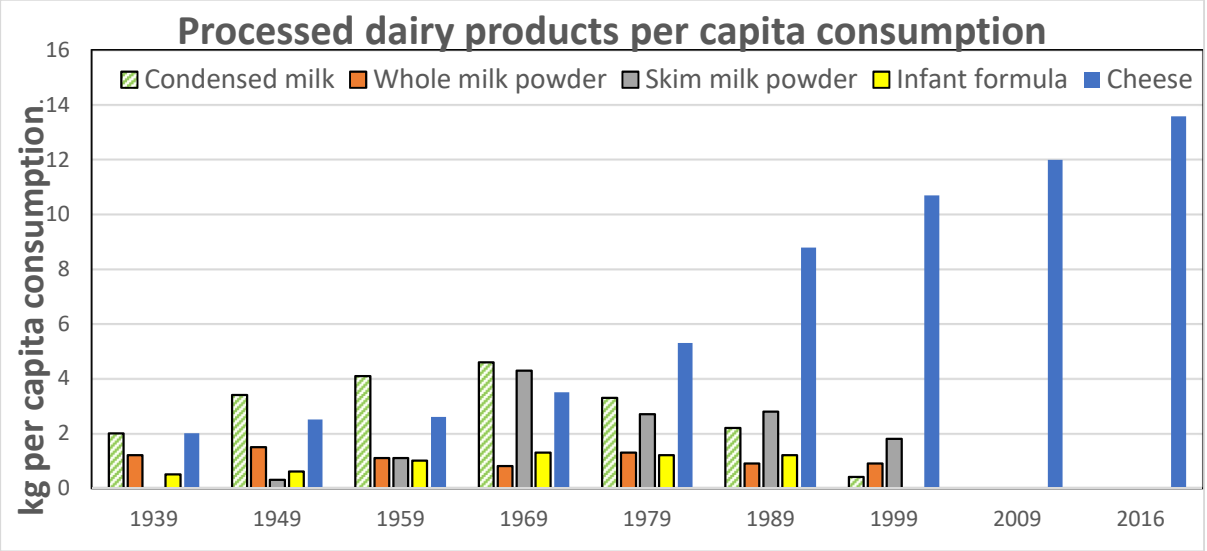

Figure 17 - Changes in Per Capita consumption of processed dairy products including cheese (in blue) since 1939

(ABS, 2000) and (Dairy Australia, 2015)

The stand out change in dairy consumption is the continuous rise in cheese production.

Per capita drinking milk consumption spiked in the 1940's, remaining high to the 1970's and returned to the 1939 levels in the 1980's. Consumption is rising slowly at about 0.4%per year

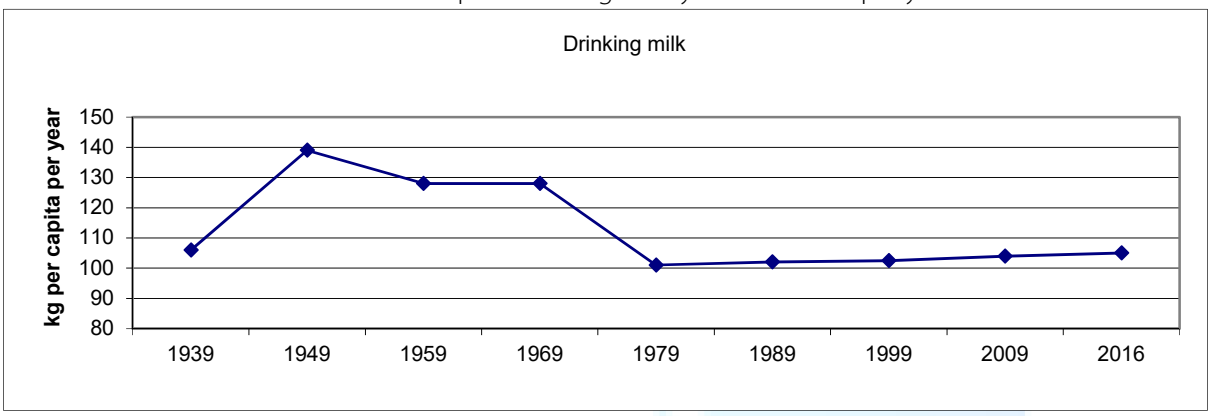

Figure 18 - Changes in per capita consumption of drinking milk since 1939.

(ABS, 2000)

Butter consumption dropped significantly in the 1970's because of margarine promotion, it has not recovered from this slump.

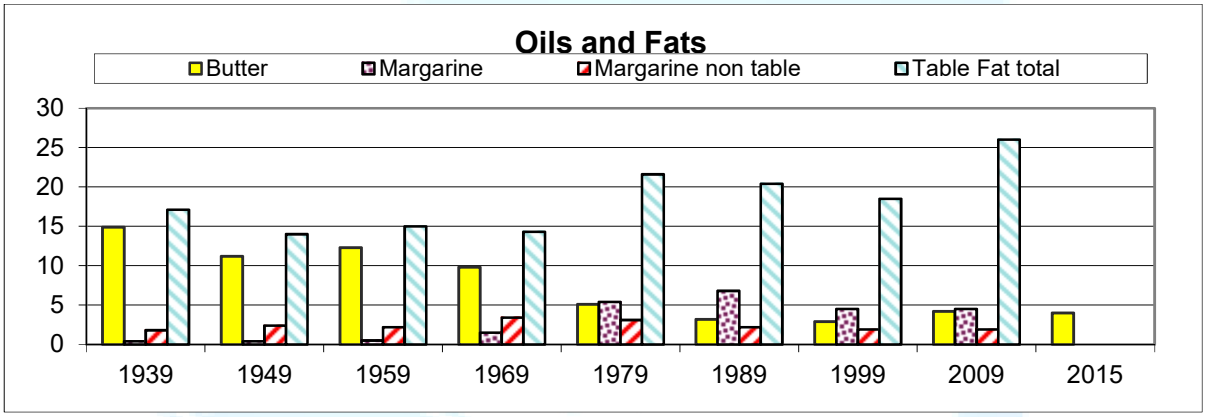

Figure 19 - Per capita consumption of fats and oils including butter.

(ABS, 2000)

Butter is a product which needs a co- product, being skim milk powder and butter milk powder. These powders require major infrastructure for processing. Butter is not produced in WA now.

At June 30	1980	1990	CAGR 1980s	2000	CAGR 1990s	2015(p)	CAGR 2000s	CAGR 35 yrs
Milk production (m lts)	5,432	6,262	1.4%	10,847	5.6%	9,731	-0.7%	1.7%
Dairy cows ('000)	1,880	1,654	-1.3%	2,171	2.8%	1,740	-1.5%	-0.2%
Farm Numbers	21,994	15,396	-3.5%	12,896	-1.8%	6,128	-4.8%	-3.6%
Value of farm production* ($m)	$3,588	$3,354	-0.7%	$4,254	2.4%	$4,723	0.7%	0.8%
Per capita consumption (milk equiv.)	239	244	0.2%	274	1.2%	303	0.7%	0.7%
Export value* ($m)	$1,083	$607	-5.6%	$3,879	20.4%	$2,884	-2.0%	2.8%
Export share of production	22%	31%		54%		34%		

Sources: ABS, ADC, DA, State Authorities
CAGR = Compound Annual Growth Rate
**Expressed in 2014/15 dollars*

(Dairy Australia, 2015)

Figure 20 - Per Capita milk consumption - All products in milk equivalent terms. (mMilk required to make all the products consumed)

(Dairy Australia, 2015)

Per capita consumption of all dairy products is rising steadily at a rate of 2 litres per person per year. This is mainly in the form of cheese. WA's investment profile in dairy is not reflecting this increase in demand.

INVESTMENT IN PROCESSING EQUIPMENT, FACTORIES AND DAIRY FARMS.

Under regulation, profits were guaranteed in the market milk sector and local consumption of cheese was low so there was no incentive for processors to invest in storable product manufacture. It was necessary to fulfil some regulatory requirements, but no more. Hence, second hand equipment was purchased. The driers at Capel were originally installed in Korumburra in Victoria in 1953 and then relocated to WA. The cheese plant at Capel was relocated from Tasmania in the 1970's when Lactos upgraded their system and one of the dryers at Boyanup, which was never commissioned, was imported second hand from New Zealand. The minimum was spent on fixed assets for these product classes.

At the time of deregulation in 2000 this equipment was very old and in no way cost competitive.

Challenge co-operative was formed in 2001 with support from the Government and some investment from farmers, these investments were not enough to upgrade / modernize the equipment at their Boyanup and Capel plants. This co-operative finally failed in 2010 partially because of the global financial crisis, lack of investment in state of the art processing equipment and other market factors.

In 2016, only one, old, medium scale cheese making plant exists in WA. It has no whey processing capability, resulting in high costs, product losses and high disposal costs. Modern cheese factories recover the fat, protein and lactose from the cheese whey and turn this "waste" in to at least a break-even situation. Currently whey disposal in WA is a loss centre, with the most common disposal method of distribution over paddocks as a fertilizer is no longer supported by the Environment Department.

The milk supplied to the Western Australian market is provided by individual family companies or similar types of organisation. These businesses have almost no market power compared to the distribution sector which is the ultimate seller of the products. Since deregulation in 2000, the number of dairy farms in Western Australia has dropped from approximately 400 to less than 150. The milk volume produced has also dropped, but not as much. In 2000, the state's milk production volume was approximately 405 million litres. In 2015, the production volume was 387 million litres of milk. This means that in the 15 years of deregulation, average farm production has risen from approximately 1 million litres per farm to 2.5 million litres per farm. It is significant to note that very few new farms have been developed in this time. The capital costs of developing a dairy farm, including, capital works – sheds, equipment, lane ways, fencing – staffing, procedures and accreditations are significant. In existing farms, they have paid for over a long period. This is much more difficult in the current climate where margins are low and prices and demand are fluctuating. Both the farms and factories have been developed in a way which may be described as "accretive" (Investopedia, 2016) defined as - "The process of accretion, which is growth or increase by gradual addition, in finance and general nomenclature." In the case of dairy farms and dairy factories (and in fact most food processing factories), this accretive growth happens in several parallel areas at once. These are land acquisition, building development, staff training, systems development and market development. In the case of the dairy farm, there is also the accretive development of the dairy herd. Dairy cows take at least 35 months to produce milk from the date of conception. Then in the first year the dairy cows milk production is much less than a mature dairy cow. The long term biological nature of this industry is significantly different to that of other agricultural industries. The benefit of this industry is that it is a much better (more efficient) converter of vegetation to human food than meat industries, particularly those associated with ruminants.

CONCLUSION

Western Australia's dairy industry does not produce enough milk for the state to be self-sufficient, although there are adequate agricultural resources.

Milk production is reducing despite demand increasing by 14 million litres of milk equivalent (Spread across all dairy products) per year.

It would be logical for Western Australia to be self-sufficient in dairy products, however all butter, 98% cheese and most ice cream is imported.

This can be classed as a market failure.

This lack of self-sufficiency existed *before* deregulation, however there was hidden cross subsidization from the market milk sector to support "balancing operations" which used out of date equipment to make cheddar cheese, butter and milk powders. With the loss of the guaranteed margins by the market milk sector, there was no way for these plants to remain viable. The result is a much-reduced range of dairy products and nowhere for milk which is classed as "Excess to needs" to go to. This situation is rational and economically sensible to the remaining liquid milk processors; however, it is not logical for WA not to be self-sufficient in all dairy products.

The existing processors are using their liquid milk processing plants to try and extract commercial returns, the market power of their main customers, in the distribution sector, result in significantly lower margins. Therefore, they are not investing in upgraded equipment and opportunities that may not meet the financial hurdle rates required by the financers. They certainly are not able to invest in extra processing facilities with no guaranteed milk supply. These companies are not experienced in dairy farming, so will not invest in capital for farms, let alone cows, which banks in Western Australia do not class as assets.

The current industry structure based on processing assets developed accretively (gradually) over many decades, is not producing an industry that provides the full range of required products. There are still 3 market milk packers (each capable of processing all the state's milk) and no large scale storable product manufacturers.

There is no commercial will to invest in the farms or the processing plants required to produce the storable products such as ice-cream, cheese and butter that are consumed in WA. The products that are being imported into the state are being produced in plants which have been built up accretively, over many decades with incremental accumulating capital injections, together with quality and efficiency gains and so have a market advantage.

There is a significant deficit of milk in WA for manufactured milk products whilst at the same time the commercial liquid milk packers have too much milk for that segment of the market. This can be classed as an illogical action i.e. market failure.

RECOMMENDATION

An industry working group is recommended.

This group would consist of representatives of the WHOLE supply chain. The distribution sector – Retail, food service and Institutional suppliers are important as are the processing sector (including equipment suppliers and existing large scale international manufacturers) and dairy farming community.

Retailers, food service and institutional suppliers will know what is required and where the economic price points will be, especially in relation to national supply where significant costs are added to supplying refrigerated or frozen products to WA.

Processors will be able to define what scale of production is required to be competitive, locally and on the world market.

The farming community will understand what is possible locally as Western Australia has a range of conditions that are not common around the world.

The desired outcome is a bankable investment plan which will provide value to all members of the supply chain. for example, distributors will not have to import 45,000 tonnes of product (butter and cheese) costing approximately $550 per tonne to bring to WA and 45 million litres of Ice-cream at a similar cost per pallet. Processors can invest in equipment with the knowledge that there is a local market for their products as well as any export markets that they may be able to develop and dairy farmers will be secure in the fact that they can sell their product.

ABOUT THE AUTHOR.

ANDREW WEINERT
PRINCIPAL CONSULTANT OF NICHE AGRIBUSINESS CONSULTING.
SUPPORTING ENTREPRENEURISM IN AGRICULTURE.

Over the course of my career, I have concluded that supporting entrepreneurism with practical knowledge and experience is one of the best ways to develop the agricultural economy.

RANGE OF KNOWLEDGE

- Industry economics – Based on practical experience in dairy and food processing, growing up on a farm and understanding primary production.
- International markets and linkages for a number of food groups. My main contacts are in China, Singapore, Japan, and India via the support systems of the Western Australian (WA) Trade offices.
- Processing and quality – Gained by starting on the factory floor, progressing through quality management to overall operations and financial analysis.
- Supply chain mapping and modelling. Gained developing prefeasibility studies.
- Process design and development. Gained while commissioning large scale processing equipment.

EXPERIENCE

I have spent 25 years in private industry and 15 years in the State Government of WA. This has given me the a technical and economic understanding of several agricultural industries. I am a member of Industry groups, including the Dairy Industry Association of Australia (DIAA) and the Australian Institute of Food Science and Technology (AIFST), Busselton Chamber of Commerce and the Bunbury Wellington Economic Alliance.

I have managed manufacturing operations, designed and commissioned food manufacturing processes using world first technologies and developed markets. Examples include:

- Commissioning a large scale cheese making plant in conjunction with Murray Goulburn, CSIRO and my employer at the time, APV.
- Managing a 3,000 tonne per annum cheese manufacturing plant at Malanda in Far North Queensland which included developing a market in Japan for cream cheese.
- Managing a small soft cheese and yoghurt plant in South West WA.

While working for the State Government of WA, I modelled business operations, developed full supply chain models (30,000 tonnes per year milk powder plant) identifying costs and world scale competitive issues and hosted many delegations. I supported industry by providing linkages, market research, and practical experience.

DAIRY
AND FOOD
INDUSTRY
PROFESSIONAL

ANDREW WEINERT
176 Kookaburra Way Busselton 6280 • 0404819535 •
andrew@nicheagribusiness.com https://nicheagribusiness.com

REFERENCES

ABS . (1999). *Apparant consumption of foods* . Retrieved from http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/3CDE7A3E9BEF68F3CA256982007E8CD6/$File/43060_1997-98%20and%201998-99.pdf

ABS. (2000). *Apparant consumption of foods* . Retrieved from 4306.0 - Apparent Consumption of Foodstuffs, Australia, 1997-98 and 1998-99 : http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/3CDE7A3E9BEF68F3CA256982007E8CD6/$File/43060_1997-98%20and%201998-99.pdf

ABS. (2016). Retrieved October 8th, 2016, from http://www.abs.gov.au/ausstats/abs@.nsf/lookup/3101.0Media%20Release1Mar%202016

ABS. (2016). *3101.0 - Australian Demographic Statistics, Mar 2016*. Retrieved September 28, 2016, from http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0

Business Insider. (2013, January 24). Retrieved 2016, from http://www.businessinsider.com.au/global-ice-cream-consumption-per-capita-2013-1

DAFWA. (2013). *News and media*. Retrieved September 28, 2016, from https://www.agric.wa.gov.au/news/media-release/wa-dairy-industry-milks-united-states-expert-advice

Dairy Australia . (2016, September). *Per Capita Consumption* . Retrieved from http://www.dairyaustralia.com.au/Markets-and-statistics/Production-and-sales/Consumption-Summary.aspx

Dairy Australia. (2015). *Australia dairy industry focus*. Retrieved oct 3 2016, from http://www.dairyaustralia.com.au/Industry-information/About-Dairy-Australia/~/media/Documents/Stats%20and%20markets/Australian%20Dairy%20Industry%20In%20Focus/Australian%20Dairy%20Industry%20In%20Focus%202015.pdf

Dairy Australia. (2015). *Australian Dairy Industry Focus 2015*. Retrieved 2016, from Dairy Australia : http://www.dairyaustralia.com.au/Industry-information/About-Dairy-Australia/~/media/Documents/Stats%20and%20markets/Australian%20Dairy%20Industry%20In%20Focus/Australian%20Dairy%20Industry%20In%20Focus%202015.pdf

Dairy Australia. (2015). *Australian Dairy Industry Focus 2015 .* Retrieved from http://www.dairyaustralia.com.au/Industry-information/About-Dairy-Australia/~/media/Documents/Stats%20and%20markets/Australian%20Dairy%20Industry%20In%20Focus/Australian%20Dairy%20Industry%20In%20Focus%202015.pdf

Dairy Australia. (2016, September 28). *Latest production and sales statistics*. Retrieved 2016, from http://www.dairyaustralia.com.au/Markets-and-statistics/Production-and-sales/Latest-statistics.aspx

Dairy Australia. (2016, September 28). *Milk production report*. Retrieved from http://www.dairyaustralia.com.au/Markets-and-statistics/Production-and-sales/Latest-statistics.aspx

Dairy, R. L.-". (2016, October). Land area per dairy cow. (A. Weinert, Interviewer)

FAO. (2013). Retrieved from http://faostat3.fao.org/browse/Q/QL/E

Investopedia. (2016). *Market failure*. Retrieved September 28th, 2016, from Investopedia: http://www.investopedia.com/terms/m/marketfailure.asp

Lahmeyer, J. (2006). *AUSTRALIA - historical demographical data of the states*. Retrieved october 3, 2016, from POPULATION STATISTICS: http://www.populstat.info/Oceania/australp.htm

NZ Government . (2001). *Dairy Industry Restructuring Act 2001*. Retrieved from http://www.legislation.govt.nz/act/public/2001/0051/latest/DLM106751.html?src=qs

Rabo Bank. (2016). Retrieved from https://www.rabobank.com/en/images/global-dairy-top-20.pdf

Reserve Bank of Australia. (2016). *Inflation Calculator*. Retrieved September 28, 2016, from Inflation Calculator: http://www.rba.gov.au/calculator/annualDecimal.html

The Western Australian Dairy Industry Authority. (1989). *Annual Report.*

Western Australian Government. (1932, December). Retrieved September 28, 2016, from https://www.slp.wa.gov.au/pco/prod/FileStore.nsf/Documents/MRDocument:27149P/$FILE/Metropolitan%20Milk%20Act%201932%20-%20[01-00-00].pdf?OpenElement