

Outlook for dairying. June 2008

Summary

The world reached a tipping point in 2007/08. In simple terms world demand for food and energy began to outstrip supply. The inevitable outcome is that food prices are rising and will continue to rise - reversing the strongly established trend of falling food prices.

The era of cheap food is well and truly over!

Obviously rising food prices will be great for farmers - especially grass-based dairy farmers. Over the past 50 years declining food prices, in real terms, and rising costs have hammered farm profits and decimated farmer numbers. Price increases are long overdue.

However, it gives me no pleasure to predict some possibly appalling consequences of high food prices for mankind. Based on what I have learnt, I suggest that the 21st century will be characterized by:

- A desperate struggle for sufficiency in food, energy and water.
- Rising food prices in real terms.
- Extreme hunger and famine.
- Social unrest, revolution and wars about resources.

Food demand is being driven upwards by increased population, increased affluence, changed eating habits and competition between food and energy for land use.

Food supply will be restrained by water shortages and desertification, especially in highly populated countries like China and India.

A possible wild card will be innovation. Humans are always most resourceful when the need is most pressing. Presently there is little political understanding or will of this massive emerging threat.

Global warming gets all the publicity but the real imminent threat to the human race is starvation on a massive scale. Taking a 10 -30 year view, I believe that food shortages, famine and huge social unrest are probably the greatest threat the human race has ever faced. I believe future food shortages are a far bigger world threat than global warming.

Outlook for Dairying and Milk Prices

The outlook for grass-based dairy farming is extremely good as I expect milk price will inevitably be driven up. Why? Let's look at the figures.

Some 90% of world milk is produced in confinement dairy units.

Confinement means that cows are housed and fed in buildings for most of their working lives. All the feed is brought in with much of it being bought in as well. Grass and maize silage may be produced on farm but grain must be bought in. Slurry is stored and spread on nearby land.

Confinement units are heavily dependent on and high users of energy and grain. The costs of both energy and grain are rising rapidly. This means that production costs for 90% of world milk production will also rise. I believe that milk prices will inevitably follow upwards to keep these producers in business - not because the world likes confinement dairy farmers, but because dairy products are a staple part of the diet of consumers in developed countries and consumption of milk is rising elsewhere. So, existing consumers will continue to drink milk and demand is rising rapidly in places such as China.

So, unless the world stops drinking milk and eating cheese, world milk prices will have to rise to keep confinement producers in business. Result - a very bright future for efficient grass-based milk producers.

Yes, there is a real risk of price volatility, especially in the next 3 - 4 years. This may happen if the really big boys of world dairy - the US and the EU increase milk production. This may reduce price in the short term but will quickly self correct because EU and US producers cannot survive at low milk prices.

Overall Outlook

Between 1995/96 – 2005/06 prices for food commodities globally declined by more than 75% in real terms. Over the last 2 years food prices globally have risen by 83%. Is this a blip in the long term trend? Or have we entered a new era?

Food markets are very dynamic and notoriously difficult to predict with economic, political and weather effects all kicking in. Nevertheless, in a world where about 90% of milk is produced under confinement conditions, I believe expensive grain and energy strongly underpin an excellent medium to long term future for excellent grass based dairying, whether in New Zealand, or Ireland.

Cheap grain and cheap energy are now history. This will be a much bigger cost to confinement systems of dairying, and milk from grass will have an even bigger competitive advantage in the future than in the past. Over time, confinement dairies with their much higher cost base will need a high price for milk to survive. Grass based dairy farmers; who watch their costs, and don't overpay for land will do very well.

This is a major, and lasting structural change. It is not a cyclical blip. Dairy markets will be more volatile than in the past with very rapid changes up and down in milk price.

Some cautions:

1. I'm not even going to mention exchange rates. They are an important factor but are too difficult to predict.
2. Is my assumption that expensive energy and meal lead to higher milk prices over time, correct? In the period of November 2006 – January 2007, I was probably the first person worldwide to predict an excellent future for grass based dairying. I was confident then, and still am today, that, with agriculture less subsidized now than in the past, that this is a valid assumption.
3. It is very difficult to predict food commodity prices in the short term. However, from 4- 5 years on, the inevitable trend will be a continuous increase in commodity food prices.

Is cheap energy history?

Researching this was frustrating. The experts are hugely divided. Many say "peak oil" has already happened, and supplies will soon fall. Their view is supported by the fact that peak production of oil of 86.13 million barrels per day in 2006 has only increased since then to 86.55 (mb/d). Simultaneously, peak usage has been growing much quicker and is now only about 2.5 – 3% less than peak production.

The opposite view is taken by OPEC who say that additions to recoverable reserves over 25 years, are 3 times higher than oil pumped over that period. The International Energy Agency expect peak production to rise strongly to 130ml BOD by 2030. But that demand will rise stronger than supply.

So oil won't run out any time soon but we will never again see cheap oil. Strong economic growth has tilted the balance in favour of sellers, and away from buyers. Speculative investment by hedge funds may have driven prices higher than is justified by present supply/demand balance but we will never again see oil at \$40US/barrel as it was in 2005.

India and China are presently relatively low users of oil. However, their economies are growing rapidly and demand for oil will also increase rapidly.

Conclusion: Cheap oil is history.

Is cheap grain history?.

I believe it is - the figures tell the story.

In 2007, the world grew an all time record total cereal crop of 1.66 bl. tonnes, up 89 million tonnes on 2006, which was also a very good year. Yet stockpiles of cereal crops are down by 53 ml tonnes Dec 2007 compared to Dec 2006. This is the 7th year in a row of declining stocks.

Corn stocks are at their lowest level since 1983. Wheat stocks are at their lowest level since 1947, and there is a similar trend of sharp falls for soyabean and vegetable oil.

Measured in absolute terms, inventories have halved since 2000, Measured in terms of days of supply in hand, global grain stocks have fallen from a peak of 130 days to a current level of 55 days. Unless supply can respond the world will be facing acute shortages in the next few years.

The old approach of, in effect, a just in time delivery model for grain has broken down. The buffer, which inventories of grain supplied in the past are now history. We have entered a new era of dangerously low grain stocks.

Rice stocks have followed the exact same trend and are also run down to dangerous levels. Argentina, China, Russia and the Ukraine have banned wheat exports to drop wheat prices to their own populations. Many Asian countries have done the same with rice.

As a generalization, countries like US, EU, and Japan that heavily support their farmers at the expense of their tax payers often damage other countries farmers by dumping. Countries like Argentina, and most of Africa, damage their own farmers by price fixing to keep food prices down and win the votes of urban consumers.

Supply demand balance in global economy:- Overview.

In commodity production price is chiefly determined by the supply demand balance. More demand than supply leads to price rises; and vice versa.

For about 25 years from the mid 1970's, commodities markets worldwide were in a slump i.e. in a bear market with low prices. Since then, we have seen a huge shift globally in commodity markets. Over the last 10 years we have gradually seen "hard" commodities swing into a "bull" (buoyant) market e.g. oil, cement, zinc, nickel, copper, silver, platinum etc. Occasionally, prices fall somewhat as demand temporarily drops, or more supply is brought on stream as we have seen this month, but essentially we are in a fantastic bull market for hard commodities. The "informed" view is that we are just at the early stages of a period where "soft" commodities (i.e. food stuffs) will join this trend. Sugar in 2005; and grain in 2006 are the first soft commodities to join this bull market. Followed by milk in 2007 and beef in 2008.

What is happening? What is driving this? Quite simply the world economy is growing very rapidly and is creating a huge demand for all kinds of material. From 2004 – 2007 it is estimated that the world economy has grown by 4.75% - the fastest growth for over 30 years.

What is driving the very fast growth? Asia. In particular China, India and Vietnam. They each have partly liberalised their economies (not fully) after years of stagnation under central planning controls.

China	Population	1.3 billion	GDP growth 11.4%
Vietnam	Population	85 million	GDP growth 8.4%
India	Population	1.1 billion	GDP growth 9.2%

When hugely populated countries like China/India grow very rapidly over time it strengthens commodity markets.

In 1984 1.1 billion poor Chinese

Predicted 2010 250 million middle class Chinese - almost the entire population of the US!

This is the largest middle class population in any country out of a population of 1.3 billion; also another 200 million people now have much higher incomes than 20 years ago.

China has averaged growth of 9½ % year for 20 years- which is phenomenal. China is now in the middle of a process of settling about 500 million people in new or expanded cities over a 20 year period. This, in effect, means that China is building 2½ new Londons each year in either new, or expanded cities. This rate of development is unprecedented in world history, nothing previously even comes close. e.g. in 2005, China used 54% of the world demand for cement.

China will be the dominant economic/political story of the 21st century. The communist party failed China totally with its economic policies. In an effort to retain power it has liberalised its economy while still restricting political freedom. It's an amazing experiment on a huge scale, which has never worked anywhere in the history of mankind.

To have any hope of success they need to keep growing their economy at +8% year for at least another 25 years while about 20 million people/year are switched to industrial/service jobs and away from peasant farming. Expectations for living standards have been raised in China; and haven't yet been met for about 65% of their people. If the communist party are to retain power- China must keep growing quickly. The Communist Party is trying to ride a runaway bolting horse!

It's necessary to understand the "China effect" on world commodity balance before evaluating the meat of this paper which is that demand for grain is going to greatly outstretch expansion of supply of grain, so setting the scene for a prolonged bull market in grain.

Demand for grain

We are in the very early stages of a huge structural increase in demand for grain. This will be a strong and sustained trend over many years.

Three main drivers.

- (A) Population growth of 1.25%/ year.
- (B) Increasing wealth effect.
- (C) Crops grown for energy on farmland.

- (A) World population currently @ 6.7 billion is forecast to grow to 9.2 billion by 2050. The New Zealand population of 4.2 million is equal to three weeks growth of population globally. See appendix 1.

At present arable land and permanent crops grow on 1.5 billion hectares. This land area is predicted to be unchanged in 2050. So farmland per person will decline from 0.23 hectares/person to 0.16 hectares/person.

- (B) Increasing wealth effect.

Increasing affluence leads to more meat and milk consumption in emerging economies. (China and India) e.g. In 1985 the average Chinese ate 20 kgs. of meat/head/year; now he eats more than 50kgs. Demand for milk consumed is on track to grow from 5 billion litres in 2001 to 22 billion litres in 2010.

The Chinese Premier is on record as saying “I have a dream that every Chinese, especially every child should drink half a litre of milk every day.” The Chinese expect increased milk consumption to reduce the incidence of rickets, osteoporosis and hypocalcaemia.

Consumption in China has grown from 4 litres/person/year in 2001 to 13.5 litres/person/year in 2006. It is expected to grow to 22 litres/person/year by 2015. Consumption in western countries runs at 50 - 60 litres/person/year.

To meet this demand for milk and meat farmers are feeding grain to livestock in predominantly confinement units. See appendix 2.

And, meat production demands high inputs of grain.

Examples:

1kg of chicken takes 2 kgs of grain to produce

1kg of pork takes 3-4 kgs of grain to produce

1kg of beef takes 6-8 kgs of grain to produce.

To meet this animal production demand farmers worldwide are now feeding between 200 – 250 million more tonnes of grain to their animals than they did 20 years ago. Since the late 1980's annual increase in demand for feed grains for animals has grown by almost 1.5%/year. Currently China consumes 19% of the global grain harvest. Most projections estimate that Chinese demand will grow to 40% of global grain harvest by 2031. Indian demand is also expected to grow rapidly.

(C) Energy from land usage.

The USA, EU, Brazil and others have decided not to be so dependent on imported oil or gas, supplied by some very unstable (and often unfriendly) regimes. Energy security is now such a major security issue that energy from ethanol and biodiesel is likely to continue See appendix 3.

Political targets for biofuel (as a % of total fuel consumption)

USA	-	20%	by	2022.
Brasil	-	25%	by	2020.
EU.	-	10%	by	2020.
China	-	15%	by	2020.

In the US (see appendix 4) President Bush has targeted that biofuels and ethanol will supply 36 billion gallons of fuel by 2022, of which 15 billion gallons will come from corn maize. Already usage of corn for ethanol has grown from 1 billion bushels in 2000 (5% of corn crop) to 6 billion bushels in 2007 (31% of corn crop).

This is subsidized in various ways by Federal subsidies to the tune of US\$7 billion/year ie about US\$1.90/gallon.

Producing ethanol from sugar cane is very energy efficient, eg Brazil produces about 8 times more energy from cane than is used to grow and process it. However it takes excellent soils and weather conditions to grow sugar cane. In contrast, corn ethanol produces just 1.5 times the energy needed to produce it. Despite this inefficiency, the US continues to support corn growing for ethanol production - a policy that is supported by both Hilary Clinton and John McCain.

A massive shift in land usage is occurring at a phenomenal pace. All indications are that the US, EU etc. will expand land usage for energy despite the knock-on effects on food prices.

Of course, there are other sources of food, especially fish. However, there is no relief there as fish stocks are predicted to fall sharply over the next 40 years. Grain and rice remain the main world foodstuffs.

Supply of grain

Demand for grain is rising rapidly. Can supply increase rapidly? Let's look at the record.

1950-1990

World grain yields + 2.1% year. Driven by increased use of fertiliser, irrigation and spraying. Land under irrigation increased from 94 million hectares in 1950 to 277 million hectares today.

1990-2005

+1.2% year. Slower growth because irrigation water supplies are limited in some regions.

The principal grain exporters are the US, Australia, Canada, EU and Argentina who produce 85% of grain exports and steadily increased their exports from 60 million tonnes in 1960 to 200 million tonnes by 1980. Since 1980 there has been no increase in world grain exports.

Can they grow in the future?

- (A) U.S. Production increases off existing grain area are estimated to grow only at a rate which will meet the +1% a year increase in the U.S. Population. Even this may be optimistic. The American

Midwest is the world's largest grain-producing belt, yet much of the water on which it depends is pumped from the massive Ogallala aquifer. There are now over 150,000 pumps bleeding this once-mighty source. It could be drained within a decade.

The U.S. has 39 ml acres in Conservation reserve. It is expected that some or all of this may be released over time but only for ethanol production. It will not be available for export.

(B) Australia and Canada are both heavily dependent on dry land farming. Little or no, increase likely, after adjusting Australian harvest to pre drought yields.

(C) EU. Stocks have reduced from 30ml tonnes down to 8 ml tonnes. Some scope to grow extra if land is released from setaside – but not material in a world context. 10 million acres setaside back into production in 2008.

(D) Argentina. Probably more scope in South America – especially Argentina and Brazil – to ramp up grain/corn/soya production than anywhere else. Argentina could double exports easily but its now only 5% of world exports. Grain growing is replacing beef and milk.

Brazil is one possible source of major increase in agricultural production. See appendix 5.

Arable crops have increased from 32 million hectares in 1970 to 78 million hectares in 2006. Arable crops are expected to grow to + 150 million hectares of which biofuels and ethanol will take up about 120 million hectares.

If Brazil is to change land usage as dramatically as this, then either the cattle herd, currently estimated at 180 million head will be reduced hugely, or else felling of the rain forest, currently estimated at 1.7 million hectares/year will be hugely increased.

In Russia land under cultivation fell from 120 million hectares in 1990 (fall of USSR) to about 80 million hectares in 2004. Average fertiliser use fell from 90kgs/hectare to 26kgs. Total grain production halved.

Kazakhstan, The Congo and Sudan also have considerable usable land. But much of the “new” land is very remote and would require a big investment in roads and other infrastructure which would take decades.

Another factor reducing supply would be the yearly attrition caused by desertification and land going for development which jointly averages 0.4% of world's agricultural area being lost to farming. This usually means a loss

of 5-8 million hectares/year from agriculture. Eg 25% of China's agricultural land was lost between 1975-2006 to the advancing Gobi desert. Australia, Africa, Brazil, Russia and Kazakhstan are at major risk also, especially if global warming intensifies.

On the supply side the real story over coming decades will be the decline of Chinese grain production. Worldwide less than 20% of grain production is irrigated. China irrigates 70% of its' grain production. Without irrigation wheat yields fall in China by more than 60% And China has major, major problems with water. It has only 25% water available per capita compared to the rest of the world.

The story of water in China can be divided into two.

- (1) The humid south of China. 55% of population has 80% of water, principally the vast Yangtze River, but only one third of the cropland. This area doesn't have major water problems apart from really bad pollution.
- (2) The more arid northern China has 45% of the population and two thirds of the cropland, and only 20% of China's water – hence major water problems. Northern China has been “mining groundwater” i.e. depleting aquifers rapidly, and dropping the water table under the North China plain by 5 feet per year since the mid nineties.

People settled in cities consume ten times more water per capita than people in rural areas because of use of flush toilets, showers etc. At present, 440 out of 669 Chinese cities regularly suffer water shortages of note. The Chinese minister for water estimates that “40% of Chinese population is at severe risk due to inadequate water consumption”

Demand for water for industry is growing at 8-10% per year.

Projected water demand in China. (Billion tonnes)

	1995	2030
Residential	31	134
Industrial	52	269
<u>Agricultural</u>	<u>400</u>	<u>665</u>
Total	483	1,068

China is already short of water. As aquifers are depleted, less water is available for the future. Politically, it is difficult /maybe impossible for any Government to deny people water for their showers and toilets if they can afford to buy it – and China's urbanising population increasingly can.

Economically, farms can't compete with factories for water. Eg. 1000 tonnes of water produces 1 tonne of wheat worth \$200. Via industry, 1000 tonnes of water is valued @ \$14,000 i.e. 70 times more valuable; and also extra jobs.

Inevitably, agriculture loses out over time. So the 70% of grain land now being irrigated will decline substantially over time. Already Chinese wheat production has fallen from a peak of 125 ml tonnes in 1998 to 95 ml tonnes last year. Although part of this 24% drop in yield could be attributed to the very dry summer in 2006.

The key message is that if industry and cities use 320 billion tonnes more in 2030 than in 1995 then the main source of this extra water will be the 400 billion tonnes used for agricultural crops in 1995. In the north of China extra water for industry and cities can only come from agriculture. There is no other major source.

Another major effect is that significant stretches of China's main rivers are now heavily contaminated with heavy metals. Visitors flying over China compare it with the early industrial era with tens of thousands of smoke stacks belching noxious fumes.

The Chinese will inevitably take many measures to offset this but still the total effect on Chinese grain production will be devastating. The US National Intelligence Council (NIC), the umbrella body over all US intelligence agencies has projected forward that by 2030 China will need 200 million tonnes of grain imports. The equivalent of total world grain exports now. What will happen to the other 100 countries who now import grain?

The world is now facing a climate-driven shrinkage of river-based irrigation water supplies. Mountain glaciers in the Himalayas and on the Tibet-Qinghai plateau are melting and could soon deprive the major rivers of India and China of the ice melt needed to sustain them during the dry season. In the Ganges, The Yellow, and the Yangtze river basins, where irrigated agriculture depends heavily on rivers, this loss of dry-season flow will shrink harvests.

The world has never faced such a predictably massive threat to food production as that posed by the melting mountain glaciers of Asia. China and India are the world's leading producers of both wheat and rice – humanity's food staples. China's wheat harvest is nearly double that of the United States, which ranks third after India. With rice these two countries are far and away the leading producers, together accounting for over half of the world harvest.

The Intergovernmental Panel on Climate Change reports that Himalayan glaciers are receding rapidly and that many could melt entirely by 2035. If the giant Gangotri Glacier that supplies 70 % of the Ganges flow during the dry season disappears, the Ganges could become a seasonal river, flowing during the rainy season but not during the summer when irrigation water needs are greatest.

Yao Tandong, a leading Chinese glaciologist, reports that the glaciers on the Tibet-Qinghai Plateau in western China are now melting at an accelerating rate. He believes that two thirds of these glaciers could be gone by 2060, greatly reducing the dry-season flow of the Yellow and Yangtze rivers. Like the Ganges, the Yellow River, which flows through the arid northern part of China, could become seasonal. If this melting of glaciers continues, Yao says, "(it) will eventually lead to an ecological catastrophe."

Even as India and China face these future disruptions in river flows, overpumping is depleting the underground water resources that both countries also use for irrigation. For example, water tables are falling everywhere under the North China Plain, the country's principal grain-producing region. When an aquifer is depleted, the rate of pumping is necessarily reduced to the rate of recharge. In India, water tables are falling and wells are going dry in almost every state. Particularly hard hit is the Punjab. Only 1.5% of India's land area, it produces grain and rice for 400 million people. Free electricity for irrigation of land has led to the rapid depletion of the Punjab's aquifers.

On top of this already grim shrinkage of underground water resources, losing the river water used for irrigation could lead to politically unmanageable food shortages. The Ganges River, for example, which is the largest source of surface water irrigation in

India, is a leading source of water for the 407 million people living in the Gangetic Basin.

In China, both the Yellow and the Yangtze rivers depend heavily on ice melt for their dry-season flow. The Yellow River basin is home to 147 million people whose fate is closely tied to the river because of surface irrigation water, helping to produce half or more of China's 130-million-ton rice harvest. It also meets many of the other water needs of the watershed's 368 million people. (See data at http://www.earthpolicy.org/Updates/2008/Update71_data.htm.)

The population in either the Yangtze or Gangetic river basin is larger than that of any country other than China or India. And the ongoing shrinkage of underground water supplies and the prospective shrinkage of river water supplies are occurring against a startling demographic backdrop: by 2050 India is projected to add 490 million people and China 80 million.

In a world where grain prices have recently climbed to record highs, with no relief in sight, any disruption of the wheat or rice harvests due to water shortages in these two leading grain producers will greatly affect not only people living there but consumers everywhere. In both these countries, food prices will likely rise and grain consumption per person can be expected to fall. In India, where just over 40% of all children under five years of age are underweight and undernourished, hunger will intensify and child mortality will likely climb.

For China, a country already struggling to contain food price inflation, there may well be spreading social unrest as food supplies tighten. Food security in China is a highly sensitive issue. Anyone in China who is 50 years of age or older is a survivor of the Great Famine of 1959-61, when, according to official figures, 30 million Chinese starved to death. This is also why Beijing has worked so hard in recent decades to try and maintain grain self-sufficiency.

As food shortages unfold, China will try to hold down domestic food prices by using its massive dollar holdings to import grain, most of it from the United States, the world's leading grain exporter. Even now, China, which a decade or so ago was essentially self-sufficient

in soybeans, is importing 70 percent of its supply, helping to drive world soybean prices to an all time high. As irrigation water supplies shrink, Chinese consumers will be competing with Americans for the U.S. grain harvest. India, too, may try to import large quantities of grain, although it may lack the economic resources to do so, especially if grain prices keep climbing. Many Indians will be forced to tighten their belts further, including those who have no notches left.

Effects of supply/demand trends.

World food prices have increased by 83% since 2006. Governments will continue the policy of more land for energy purposes. Over time, it is expected that research will reduce the direct clash between land for either fuel or food. It is expected that material other than food eg cornstalks, prairie grasses, fast growing trees, or even algae will be productive sources of fuel. But any progress on this is quite a few years away.

World economic growth is predicted to be 3.7% in 2008 and 3.8% in 2009 (source I.M.F. April 2008), despite the slowdown (or recession) in advanced economies (G8). China at 9.3% growth in 2008 and 9.5% in 2009 and India 7.9% and 8.0% respectively have effectively decoupled from the U.S. economy. This guarantees that the “wealth effect” on people’s diet will continue at nearly the same pace as the last 5 years.

Innovation and new technology may increase the grain yields eg. Monsanto claim that using genetically modified grain will lead to production increases of 2.5% /year for grain crops. It’s possible now to alter 3 characteristics of a plant simultaneously eg. 1. Drought resistance. 2. Disease resistance; and perhaps, 3. An ability to fix nitrogen from the atmosphere. In a hungrier world, it’s likely that genetic modification will be used far more widely.

There were 850 million people who were classed as hungry in 2006. This figure is likely to rise rapidly. Before rises in food prices, typically consumers in the advanced world spent 10-15% of household income on food. In the 3rd world household spend on food

typically was 50-60% of income. Nowadays the strain on these people will be huge.

Hunger, famine and major social unrest will greatly increase. Political instability and revolution are very likely; terrorists will have a fertile breeding ground. Many wars will be fought this century over water, energy and food prices.

Effects on milk price.

Expensive grain and energy will be devastating to confinement dairying unless milk price on average is much higher than 2005/2006 levels.

For New Zealand dairy farmers there are still risks, eg. See appendix 6.

- (1) E.U. is now committed to phasing out milk quotas in 2015; and began the first of what will likely be yearly quota increases, in April this year with a 2% increase, which is equivalent to 1/6 of total N.Z. milk production. Will the E.U. fill this extra milk quota? I expect not; but it is a key question.
- (2) U.S. has grown production rapidly and supplied 8% of world market in 2006. Will this growth continue? Despite major U.S. dollar devaluation over last 4 years which improves U.S. competitiveness, I believe that with milk price to feed ratio deteriorating over recent months that U.S. supply growth will slow down.

With the world traded market at only 7% of production it only requires quite minor shifts in production from the big blocks like the U.S. and the E.U. to quickly move the market. If that happens and it very well may, then I don't believe that the larger majority of U.S. and E.U. farmers have a low enough cost base to stay in business long at a low milk:feed price ratio.

I expect short periods of high price volatility, both up and down, but the long-term graph is definitely upwards.

Appendix 7 shows how very small changes in stocks, from 2004-2006 led to very large swings in price, so I'm expecting very high volatility in milk price over the next few years but on average at much higher levels than the period of 2003-2006/7.

I believe the world has huge problems with food availability going forward. But an efficient grass based N.Z. dairy farmer has an excellent future, as long as the cost base is always kept low enough to survive occasional low priced milk seasons. There is every reason for N.Z. milk producers to be optimistic about their future.

Ends