

Global dairy farm economics in the crisis years 2015 – 2016: IFCN Perspective

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1. Summary

The milk price declined substantially in 2015

In 2015, the IFCN World Milk Price Indicator dropped by 33% from a very high level in 2014 to an average of 29.4 USD/100 kg milk in 2015. As most national milk prices are tied to the world milk price in some ways, returns decreased significantly on dairy farms in many countries. The decrease continued in early 2016. A strong recovery of the IFCN World Milk Price Indicator started in the second half of 2016.

The costs of milk production were reduced

In the IFCN Dairy Report 2016, 146 typical dairy farm types from 52 countries were analysed. Costs of milk production in 2015 ranged from 8.5 to 106 USD/100 kg milk. Costs of milk production decreased from 46 USD to 40.5 USD/100 kg milk on average of all farms analysed. Apart from cost savings measures, this reduction was mainly caused by the devaluation of most of the national currencies to the USD.

The farm income has decreased significantly since 2014

As the reduction in milk price was stronger than the decline in costs, the farm income experienced a serious cut in 2015 which continued in 2016. Regarding all the countries closely monitored by IFCN, 45 out of 60 have experienced poor or very poor economics for more than two years.

2. Introduction

The years 2015 and 2016 have constituted the third world milk crisis since 2007. After a highly profitable year 2014 with the highest world milk price ever monitored, the world milk price started a free fall and reached its lowest level in May 2016. However, milk production has continued to increase by 1.8% in 2015 to touch 830 million ton ECM (Energy Corrected Milk with 4% fat and 3.3% proteins). Eighty percent of the milk supply increase is estimated to come from the EU and India. China and USA are slowing down production, while Brazil, Turkey and New Zealand are reducing production. To get a clearer perspective on the economic factors behind these developments, the article looks at the development of milk and feed prices and margins over compound feed costs at world level for the last 20 years. Besides, costs of milk production only were analysed for six major milk producing countries since 2000, with the addition of an estimate for 2016. This article provides a detailed understanding of dairy economics including the relation between milk and feed price at world level and milk production costs at farm level. The time series data offer insights of the developments for nearly two decades.

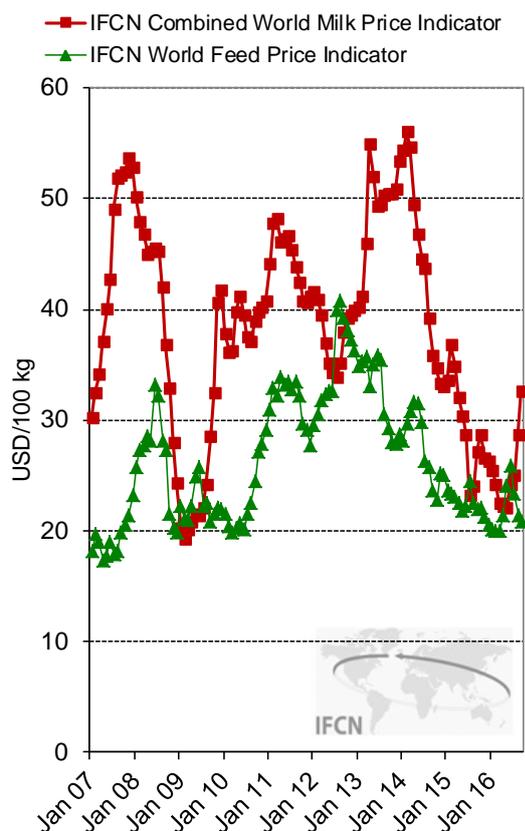
This article follows the approach of the IFCN Dairy Research Network. It is a global network of dairy researchers from over 100 countries and of about 120 agribusiness related companies and institutions. The network focuses on dairy economic analysis to create a better understanding of the dairy world. The main focus is in analysing global milk production trends, milk prices and production costs. The IFCN work is coordinated by the IFCN Dairy Research Centre located in Kiel, Germany (www.ifcndairy.org). This article is based on the IFCN Dairy Report 2016 which was released in October 2016.

3. Milk and feed prices development 1996 – 2016

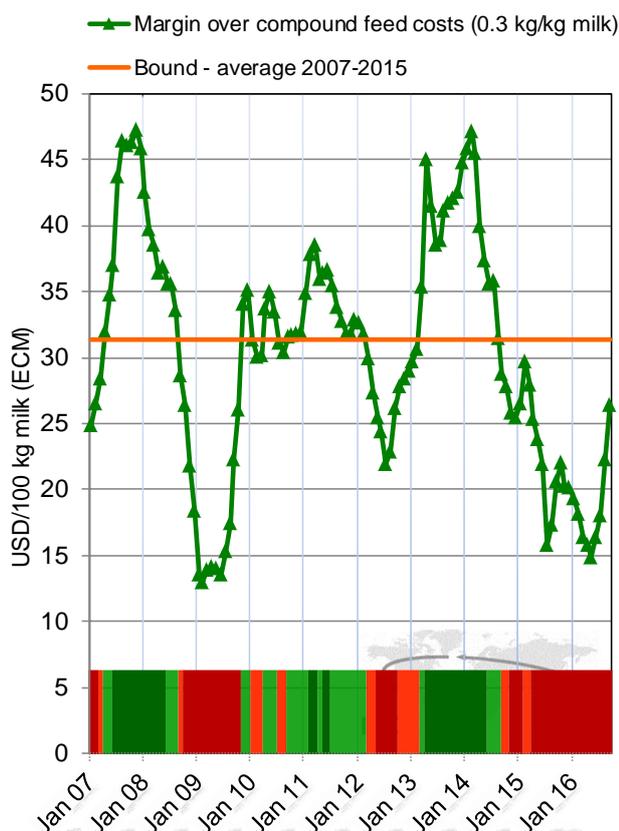
The development of the world market prices for milk and feed are shown in Chart 1. The world milk prices are based on the weighted average of three IFCN World Price Indicators: skim milk powder & butter (35%), cheese & whey (45%), and whole milk powder (20%). The IFCN World Feed Price Indicator represents the world market price level for feed. The calculated feed price indicator is based on the price for a diet comprising 70% corn (energy feed) and 30% soybean meal (protein feed).

Chart 1. World milk prices for milk and feed 2006 – September 2016

Milk and feed price developments



Margin over compound feed costs



Trends in milk price developments

Since 2007, the milk price indicator has shown a roller coaster behaviour, swinging between less than 20 USD per 100 kg ECM (energy corrected milk with 4% fat, 3.3% protein) to peaks of 56 USD. Low milk prices of less than 25 USD/100 kg ECM throughout 2006 were followed by a steep increase to more than 50 USD at the end of 2007, just to be followed by a sharp decrease to 20 USD in early 2009. Between January 2010 and January 2013, fluctuations were less extreme. During this period, the milk price varied around 40 USD, with a range between 48 USD in March 2011 and 34 USD in July 2012. This low point was followed by a strong increase to a level above 50 USD for nearly a year, peaking at 56 USD in February 2014. The ensuing decline continued with two minor recoveries until May 2016. By that time, the milk price had dropped by approximately 34 USD to 22.1 USD within nearly 2.5 years. Since June 2016, a recovery has taken off. Whether this initiated a lasting upturn, remains to be seen.

Trends in feed price developments

The feed price indicator also showed fluctuations, though to a lesser extent than the milk price indicator. Besides, their behaviour was not synchronised, i.e. peaks in the milk price did not necessarily mean peaks in the feed price. Until 2010, the feed price hovered around 20 USD with the exemption of June 2008, where it reached 32.2 USD. Between January 2011 and June 2014, the feed price was generally higher than 20 USD. In August 2011, the threshold of 40 USD was surpassed for one month. Since June 2014, the feed price has declined by more than 10 USD to 22 USD. The highest difference between milk and feed price was noticed in August 2007 at 33.8 USD. The very low milk prices in the first half of 2009, and the summers 2012, 2015, and 2016 were accompanied by feed prices that were actually higher per 100 kg, causing an unfavourable relation between the two commodities. The latest upswing in milk prices was accompanied by declining feed prices, indicating a starting positive trend for farm economics.

Dairy farm profitability- margin over feed costs

The margin over feed cost indicator assumes an average feed intensity of 300 g compound feed per 1 kg milk. This feed intensity could represent a farm with a milk yield of 8000 kg milk / cow / year using 2.4 ton of compound feed per year. From the IFCN Perspective, the margin over compound feed indicator describes dairy farm economics in real time well, since it considers the feed intensity and weather condition. It also enables IFCN to assess the intensity and depth of farm economics situations. The margin over compound feed cost demonstrates farm economics after having taken into account the milk and compound feed prices given. For farming systems which operate at a lower milk yield and lower use of compound feed per kg milk, the fluctuation of the margin over compound feed is generally only influenced by milk price developments. On the other hand, dairy farming systems with much higher milk yields and higher compound feed use are strongly driven by a combination of milk and compound feed price, especially when exposed to world market prices.

The cause and impact of the global dairy crises

The very high milk and low feed prices in August 2007 followed by low milk and high feed prices quickly led from a very profitable situation at the end of 2007 to a negative margin over compound feed cost by the end of 2008. It was the beginning of a rollercoaster and **the first global dairy crisis** which lasted for 14 months. The next phase was a period of relative stability of the milk price on average of 40 USD/100 kg ECM. Later in 2011, milk price began to decrease while feed price continued to rise. In this period, the margin over compound feed cost started decreasing in March 2011, dipping below the long term average of 32 USD/100 kg in February 2012. That was the beginning of **the second global dairy crisis** which had its epicentre in mid-2012 when milk prices dropped and feed prices rose towards new highs. After 10 months, the recovery of milk prices started in 2013 and the relatively low feed prices in that time brought highly favourable farm economics from autumn 2013 until the end of 2014.

The year 2015, a new roller coaster started when milk prices kept falling to very low levels – the start of **the third global dairy crisis**. Observing the world milk price development and the drop of 60% of the world milk price from February 2014 to May 2016, IFCN assumes that the world milk price has just passed the nadir of the current roller coaster price scenario. The September world milk price showed an increase of about 48% compared to May 2016, besides the world feed price decreased by 16% since June 2016. Despite this positive development of the two world prices and an increase of the margin over compound feed cost from 14.9 USD in May 2016 to 22.3 USD/100 kg milk in August 2016, farm economics has not improved significantly yet due to the depth of the crisis. Farm economics have been judged as poor or very poor for the last 26 months, but there are signs that the trend has reversed and economics will improve slowly. Country-wise the farm economics situation is similarly bad: 45 out of 60 countries analysed face poor and very poor farm economics.

This crisis has dragged on for so long, as the equilibrium of demand and supply got seriously disrupted. On the one hand, the world-wide demand was weakened because of the Russian embargo and a reduced import of dairy products by China, on the other hand, the abolition of the milk quota in the European Union and generally low feed prices enticed the farmers to produce on a high level. The extraordinary length of this crisis has taken its toll as the buffer capacity of farms reached its limits and the structural change has been accelerating. Increases in the world milk price together with decreasing feed prices in the late summer 2016 are taken as positive signs for a recovering world milk market.

4. Cost of milk production 2015 by world region

The annual IFCN work of comparing typical farms around the world has been an on-going process since the year 2000. Since then, the number of countries participating has increased from 8 to over 50. Moreover, the number of dairy farms analysed has increased from 21 to around 150.

The IFCN Methodology applied for data collection, economic analysis and results validation uses the three elements:

- a network approach of researchers continuously co-operating,
- the concept of typical farms described below and
- a standard model TIPI-CAL (Technology Impact Policy Impact Calculation model) to ensure technical comparability of indicators.

A typical farm represents the most common production system which produces a significant proportion of milk in a country or a region. Usually, two farm types are used per dairy region – the first represents an average farm and the second a larger farm type. The typical farms were built and validated by a combination of accounting statistics and a panel of dairy experts. The data collection and validation were done by researchers in the represented countries, researchers in the IFCN Dairy Research Network and also during the IFCN Dairy Conference held in Belgium in June 2016.

ECM correction: As the dairy farms operate with milk of very different fat/protein content, the IFCN uses the energy correct milk (ECM) approach to standardise milk volumes to 4.0% fat and 3.3% protein. The following formula was used: $ECM\ milk = (milk\ production * (0.383 * \% fat + 0.242 * \% protein + 0.7832) / 3.1138)$.

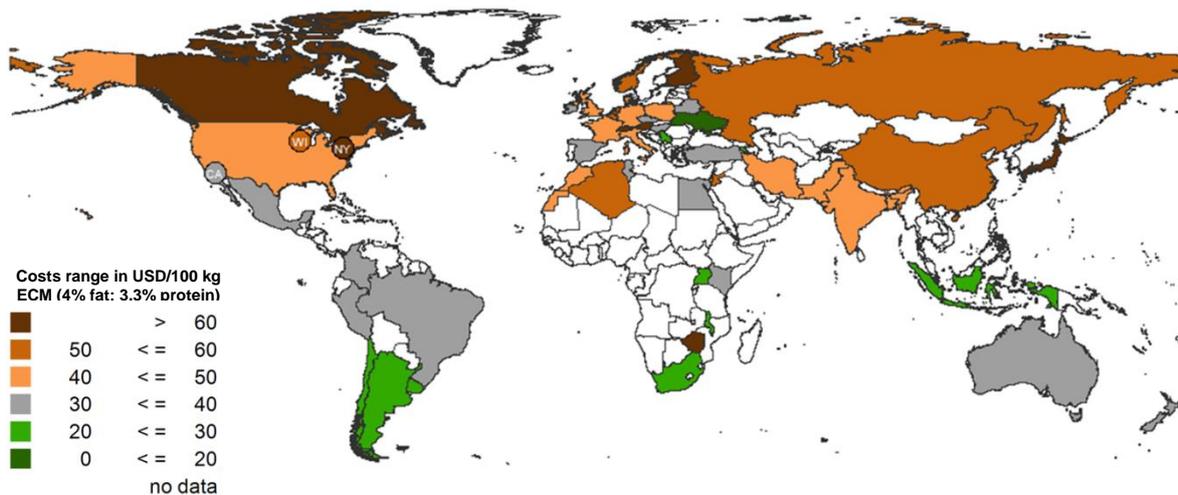
Cost indicator: The IFCN uses the indicator cost of milk production only which can be directly related to a milk price. This cost includes all costs from the profit & loss account of the farm. From this cost level, the non-milk returns from sales of cull cows, heifers, calves, manure, etc. and also returns from coupled direct payments have been deducted. Furthermore, the opportunity costs for own labour, land and capital are also included. For creation of the world map, the average size farm from each country was used.

Competitiveness of milk production in 2015

Cost range: Cost of milk production ranges from 8.5 USD per 100 kg milk in extensive farming systems in Uganda (where beef is the major output and milk is a side product) to 106 USD for an average sized farm in Switzerland. The average cost over all countries analysed was 40.5 USD/100 kg milk.

In Chart 2, a simplified global overview on costs of milk production is shown. The illustration is based on the results of the typical average sized farm analysed per country in 2015. The results can be summarised as follows.

Chart 2: Cost of milk production only on average sized farms 2015



Low cost regions: Based on the average sized farms, three low cost regions have been identified: a) Argentina, Peru, Chile and Uruguay b) Central and Eastern Africa c) Some farms in the CEEC as well as Indonesia.

Western Europe: The leading average sized farms in Western Europe had costs ranging from 40 – 55 USD.

The US: The smaller farm types in the Eastern Region of USA i.e. Wisconsin and New York had production costs ranging between 45 and 60 USD, respectively. In the western region, the large farm in California had the lowest cost of about 35 USD.

Oceania: The cost level in Oceania was very homogeneous about 31.5 USD with very small deviations. It is important to note that New Zealand cost estimates refer to the seasonal year i.e. July 2014 – June 2015.

Facit: Hence, on an average, the milk production costs for the year 2015 were lower than in 2014. As the milk price decreased to a larger extent than the production costs, farm economics were difficult for many dairy farmers in the world.

Cost of milk production developments 2000 – 2015/2016 (estimated)

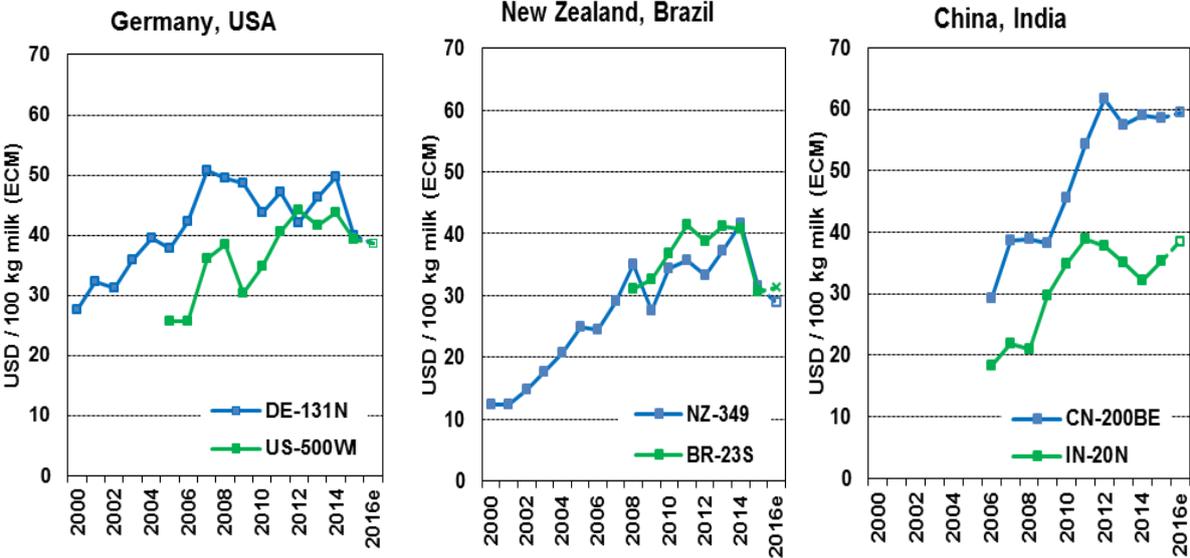
It is very important to comprehend the average cost trends of typical farms over a period of time to understand the factors behind the competitiveness of milk production. It also enables IFCN to take a view on the levels of milk production costs to sustain milk supply levels or the milk price level in the short and medium term. Hence, in this part of the analysis, IFCN tends to compare the cost trends of average typical farm types from the six major milk producing nations representing the major regions of the world.

Germany (DE-131N): This farm type stands for an average farm in Northern Germany representing 13% of the farms and 46% of cows in the country. The farm has grown from 68 cows in 2000 to 131 cows in 2015 at an average annual growth rate of 5.7%. In the year 2000, the costs were 28 USD/100 kg milk and increased towards 42 USD per 100 kg milk in 2006. The key driver was the appreciation of the Euro (+36%) and moderate increase of costs in Euro terms. From 2008 – 2012, the costs showed a declining trend towards 42 USD per 100 kg milk. The key drivers were a devaluation of the Euro by 14%. Costs increased again to 50 USD in 2014 due to higher feed and energy prices and labour costs in Euro

terms. There was a decrease to 40 USD per 100 kg milk as a result of the depreciation of the Euro.

USA (US-500WI): This farm type is a larger family farm in the range of 200-1000 cows and represents 3% of the farms and about 12% of the cows in the USA. This farm has been in the data base since 2000. In the US, costs were relatively stable from 2000 to 2006 as inflation driven change of input prices could be compensated by increasing milk yields. Once feed prices started rising, this had a direct impact on these farms and costs, which increased by 50% to a level of 38.5 USD per 100 kg milk. The sharp drop in costs in 2009 can be interpreted as a result of very bad milk prices, when farmers tried to cut costs wherever possible. Until the year 2012, cost had increased – mainly driven by feed prices - towards 44 USD per 100 kg milk. They have stayed between 40 and 45 USD per 100 kg milk for the last five years. Costs are estimated to drop below 40 USD in 2016 because of falling feed prices.

Chart 3: Cost of milk production 2000 – 2015/2016 estimates of typical dairy farm types in 6 countries



Legend on farm types: DE-131N: 131 cow family farm in Germany-North; US-500WI: 500 Cow family farm in Wisconsin; NZ-349: 349 family farm in New Zealand; BR-23S: 23 cow family farm in Brazil-South; CN-200BE: 200 cow business farm in China, Beijing; IN-20N: 20 cow family farm in India-North. Data for 2016 were estimated based on the average milk and feed prices (January to August 2016) and exchange rate.

New Zealand (NZ-349): The typical farm representing an average sized farm covers about 45% of the farms and 68% of the cows in New Zealand. This dairy farming system was a world leader in cost competitive milk production in the year 2000. IFCN identified costs of 12 USD per 100 kg milk, which was the lowest cost level in those days. Driven by an increase in input prices and an appreciating currency, costs increased to a level of 40 USD per 100 kg milk in 2014, but decreased to 30 USD in 2015 and 2016. This decrease was based on a depreciation of the NZD against the USD and cost saving measures on farm.

Brazil (BR-23S): This typical farm in the South of Brazil stands for 22% of farms and 31% of dairy cows in Brazil. The costs of this farm were steadily increasing since 2009, due to a revaluation of the Brazilian Real in 2011 which pushed production costs in USD. The increase in labour costs in 2012 was stronger than the devaluation of the Real, leading to increased costs in 2012. Costs remained stable at around 40 USD for three years. The

devaluation of the Real was stronger than the increase in costs which led to a decrease in production costs in USD by 25% in the last two years.

China (CN 200BE): This typical farm represents 30 to 40% of the farms and is a larger farm type in China in the range of 200-500 cows. It has been monitored since 2006. It enables IFCN to understand the dynamics of cost trends in China. Since 2006, a strong increase in cost due to the appreciation of the Yuan could be seen. In 2012, the Yuan had gained value by + 25% to the USD compared to 2000. The costs on Chinese farms did not drop sharply in 2009 as was observed in most other countries, because the drop in prices in national currency was almost fully compensated by the appreciation of the Yuan. In 2010, rising feed prices were a strong driver for increasing cost of production to about 60 USD per 100 kg milk where costs have remained since.

India (IN-20N): This farm denotes a larger family farm type in India in the range of 5-35 cows, currently representing 3% of the farms and 15% of the cows. However, it contributes a large proportion of the milk delivered to the processor. This farm has been monitored since 2006. The herd size has been fluctuating between 18-22 cows. The production costs showed a permanent upward trend until 2011. The main drivers were increasing feed and land prices as well as the extraordinary rise in salaries. This increase stopped in 2012 as rising input costs were compensated by a higher milk yield per cow and a depreciation of the currency. In the last two years, costs per 100 kg milk increased again, mainly because of rising feed costs and salaries.

Facit: Dairy farm benchmarking - a tool for dairy development

In times of significant changes in dairy related output prices, farm input prices, and exchange rates, it is extremely important to benchmark the competitiveness of the current dairy farming system annually. Competitiveness in this sense has two meanings: the farm should be competitive on the market for dairy products and should also be competitive on the local market for production factors, especially land and labour. Such benchmarking exercises enable all dairy stakeholders to see and react faster to threats, but even more to anticipate opportunities which will arise.

