

Dairying in Malawi

In this Research in Context, agriculture theme lead Steve Wiggins provides context and analysis for DEGRP-funded project [Assessing the contribution of the dairy sector to economic growth and food security in Malawi](#).

Beginning in 2012 and led by Dr Cesar Revoredo-Giha of Scotland's Rural College, the project used supply chain analysis to assess the potential for dairy to aid economic growth and food security in Malawi.

The promise and challenges of dairy development

Dairying is one of the most promising farm enterprises for development. Demand for milk, butter, cheese, yogurt and ice cream tends to grow out of proportion to income as countries advance from low to middle income, and as populations urbanise. Keeping dairy cows can generate high margins per unit area, making them particularly suited to small-scale farms. Cows can be kept at relatively low cost, since they can be fed largely on grass and by-products. Dairying is also labour intensive, not least in twice daily milking, so it suits densely settled rural areas where labour is relatively abundant compared to land. The need to transport and process the milk creates additional jobs in the local economy too. Lastly, more dairy consumption can improve diets in developing countries for people who eat mainly grain and tuber staples (McDermott et al., 2010).

The challenge is to realise this potential. Some countries, such as India (Staal et al., 2008) and Kenya (Baltenweck et al., 2011), have successfully developed their dairy industries, creating many jobs in the process. But doing this is not without its challenges. On the production side, cows have to be kept healthy, fed appropriately, and bred for milk productivity. Transport and processing have to keep milk fresh and safe. On the consumption side, the challenge is to raise demand by broadening the range of products offered, by developing and promoting items such as yogurt, flavoured milks, and pizza-topping cheeses.

If domestic production falters, demand for dairy products can readily be met by imports. Milk powder has often been cheap on world markets, especially when the European Union was dumping its excess production. So a domestic dairy industry also has to compete on cost.

Key features of dairying in Malawi

Malawi is estimated to have 10,000 cows of (*Bos Taurus*) breeds specialised for dairying. Some additional milk comes from the 1.2 million head of Zebu (*Bos Indicus*) cattle that are kept primarily for meat and draught power, and only to a lesser extent for dairy. Milk from the specialised dairy cows in the national herd is produced by between 5,000 and 7,500 dairy farmers who typically have one or two cows each.

Cows in the dairy herd produce between 8 and 15 litres a day when in milk, depending on feed and health of the cow. Of this, an estimated 19% of milk is retained by dairy producers for household consumption. Of the remaining 81%, just over half is sold through milk buying centres that deliver to formal processors, with the other half sold to informal traders. As of 2010, the amount of milk delivered to processors has risen from 15,000 to almost 20,000 tonnes of milk a year.

Processing is dominated by three large companies, two based in Blantyre that collect milk from the south, and one in Lilongwe that sources milk from central Malawi. The processors, however, also import milk powder to augment their supplies: between 1,000 and 2,000 tonnes in the 2010s, apparently mainly to make yogurt, which requires a higher fat content than is typically possessed by the fresh milk collected.

The processing plants pasteurise milk (33% of milk supplied), produce UHT long-life milk (50%), ferment milk to produce 'chambiko' (a popular soured milk drink), and make yogurt. Retailing is through supermarkets and smaller stores.

Informal milk traders also sell unpasteurised 'raw' milk directly to consumers, most of whom boil this milk before consuming it.

Potential for dairy development

Malawi's dairy industry holds much potential for further development.

Average per capita consumption of milk is currently one of the lowest in the world, at 4.9 kg per person, per year (FAOSTAT, 2010). By comparison, neighbouring Tanzania consumes milk at the rate of 40 kg per person, while in only slightly more distant Kenya the figure is 98 kg per person (FAOSTAT, 2012). But dairy consumption will most probably rise significantly with economic growth and urbanisation. Moreover, the increase in demand for dairy will likely grow more than proportionately to the increase in incomes: the income elasticity of demand for dairy is 1.5 in urban Malawi (Revoredo Giha and Renwick, 2016). The low average consumption conceals significant differences between those on low incomes and those, mainly urban people, who are better off.

Malawi also has several areas of cooler highlands where specialised dairy cows could be kept without heat stress, where animal disease is less likely, and where feed can readily be grown and collected for the animals. One of these areas, the Shire Highlands of the south, is close to the major urban centres of Blantyre and Zomba, and therefore close to potential consumers. Moreover, given the lack of other rewarding agricultural opportunities in the Shire Highlands, dairy is particularly promising.

The DEGRP research

Realising the potential of dairying in Malawi is the subject of the research carried out under the DFID-ESRC Growth Research Programme between June 2012 and May 2015. The research team was made up of researchers from Scotland's Rural College (SRUC), Lilongwe University of Agriculture and Natural Resources, Bunda Campus, and The African Institute of Corporate Citizenship (AICC), Lilongwe.

The research had two main objectives:

- to identify factors hampering the contribution of dairying to economic growth and food security; and
- to assess whether revamping the formal dairy supply chain would be more effective in stimulating dairying than promotion of less formal channels.

The approach taken was to analyse the functioning of the supply chain from producer to consumer. To this end, data were collected from questionnaires completed by 460 dairy farmers. Semi-structured interviews were carried out with managers and members of 25 Milk Bulking Groups in the north, centre and south of the country; managers of processing plants; and policy-makers and implementers from government, non-governmental organisations, and development partners. Visits were also made to retailers.

The research found the following:

- Most dairy producers were not technically efficient: the median farmer in all three zones achieved considerably less than 50% of the efficiency of the best of their peers. Higher efficiency was associated with having pure-bred cows, more experienced farmers, and larger scales of dairying — although bear in mind that this analysis was only for small-scale producers who would rarely have more than half a dozen cows.
- Milk buying centres often suffered from electricity cuts, and since fewer than half had back-up generators, milk could not be cooled when power was cut and hence spoiled. Spoilage was further increased by the failure of tankers from milk processing plants to pick up the milk on scheduled collection days.
- Milk quality was a major problem. It emerged that farmers were used to adding water to their milk to make it go further, as well as bicarbonate of soda to reduce acidity. Poor hygiene at the milking stage and unsterile collection containers also meant that much of the milk delivered carried a high load of bacteria. While the milk centres tested for watering down and acidity, they did not check for bacteria. Of the milk sent to the processors, on average 17% had to be poured away on account of excessive bacteria. When farmers had their milk rejected at the buying centres, they sold it on the informal market.
- Milk processing plants ran at very low capacity: well below 50%, and possibly as low as one third or even one quarter of capacity. This, together with the high rate of milk that had to be discarded, pushed up plant operating costs.

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- Despite high costs from underuse of capacity, processing plants seemed to make profits, because they targeted their milk at middle class customers prepared to pay for safe milk.
- Processors, nevertheless, seemed to operate competitively both in paying for milk from farmers and in selling to retailers.
- Most of the processed milk was sold to domestic retailers. Mark-ups over the price at the processing plants were often very high indeed, between 17% and 149%, especially for small packs of milk preferred by those on low incomes.

Debates over dairy development strategy in Malawi

The DEGRP supply chain analysis feeds into a wider debate about how best to enhance the dairy industry in Malawi.

Two approaches to development are currently being followed. Improvement of the formal supply chain is one of them. Raising quality and cutting costs in the chain allows higher prices to be paid to farmers and lower prices to consumers, and encourages both more supply from smallholders and more consumption of (good quality, safe) milk.

Some donors, including USAID, Oxfam and the EU, and the Flemish government, have worked with producer groups to set up milk buying centres for smallholders, and worked directly with the smallholders themselves to stimulate production. Support for the latter includes lend-a-cow schemes in which farmers are given a pure or cross-bred in-calf heifer of a high milk-yielding variety, on the condition that they return a similar animal when the cow produces its offspring. The returned heifer is then lent to another local farmer, in theory until all local farmers have been able to upgrade their cows.

An alternative approach is being promoted by the Malawi government in cooperation with the Japan International Cooperation Agency. Using the 'one village, one product' strategy, originally developed in Japan as a means of encouraging municipalities to focus production on one distinctive item in which they have comparative advantage, they have been working with village groups to install micro-scale milk processing to raise the quality of the milk that gets sold into informal channels. Many of the producer groups would like, given the chance, to turn their buying centres into micro-processors.

To some extent, these approaches can work at cross-purposes: stimulating the formal channel could divert milk from the informal channel, and vice versa.

The DEGRP study posed the question of whether the formal channel was technically inefficient, or whether it was anti-competitive, or both these things. The study concluded that the processors were not able to use market power to set prices, either those paid to farmers, or those charged to retailers. But technical problems were significant: the collection of milk was costly owing to poor roads, as was the processing of milk owing mainly to low use of capacity and power interruptions. Since both the Malawian government and most donors have backed the first strategy, which can potentially reduce these costs, the finding that the processors act competitively is reassuring.

Unanswered questions

Although wide-ranging, the DEGRP research leaves several questions unanswered.

Retailer margins

One concerns the high retail margins observed. Do these stem from retailers having the power to set prices, without being undercut by rivals? Or are there high costs for retailers in holding dairy inventory with produce that needs to be kept cool, where inevitably some will be lost since it cannot be sold in time?

Food ethics

Another concerns opportunism in the formal processing chain, where farmers — and perhaps employees of the milk buying centres — are tempted to water down and adulterate milk to get higher volumes accepted for processing. Is the solution simply technical: that the centres will have to test milk for bacteria, as well as for watering and acidity? This is not done currently for reasons of cost and quite possibly because the centres do not bulk enough milk to reach a threshold at which such testing becomes economic. Are there institutional innovations that could be tried to incentivise farmers to deliver better quality, unadulterated milk? Or, would it benefit all in the long run if enforcement of standards were more systematic and stringent? If such possible solutions exist, they look to be promising candidates for a randomised trial.

Economics of milk production

Further questions surround the economics of milk production on smallholdings. Dairy specialists tend to focus on raising milk yields per cow. Economically optimal yields, however, are often well below the technical maximum, since the marginal costs of achieving very high yields outweigh the value of increased production.

Finding ways to reduce costs, while not overly reducing production, is often profitable. Feed costs, in particular, are an area worth investigating. Farming by-products, such as bran, straw and maize stover (the residue of maize plants left in fields after harvest); fodder from rough grazing land; and planted grasses such as Napier grass, which can give very high yields from small areas, can all be considerably cheaper than feeding grain to cows. Better understanding of the unit costs of production achieved by farmers following different strategies, rather than overall measures of technical efficiency, could be instructive both for advising farmers and for plotting the long-term strategy for dairying.

Competitiveness of Malawian dairy farmers

Following the latter point, how competitive are Malawi's smallholder dairy farmers compared to benchmarks for similar parts of Africa? And compared to world prices? The DEGRP research shows that farmers delivering to processors saw their prices fall, in real terms, between 2008 and 2014. By the latter year, the price was just over MK16 a litre in 2000 values, when the exchange rate was MK60 to one US dollar: hence a 2000 price of \$0.27 a litre, equivalent to \$0.43 in 2015 prices, or around \$460 a tonne of milk.

Since 2007, world milk prices have fluctuated considerably, within a band of \$200 to \$500 per tonne (IFCN, 2013). At first sight, then, Malawi's dairy farmers are getting a price commensurate with

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world averages. If farmers are still producing at this price, and they are, then it suggests that their unit costs may be internationally competitive. Indeed, Dairibord Malawi, one of the milk processors researched, exports some of its output, suggesting that the Malawi dairy industry can and does compete. But it would be useful to confirm this by more detailed enquiries into dairy farm accounts.

Informal dairy marketing

A final question concerns the informal dairy marketing channels. How carefully do consumers boil their raw milk and how effective is this in rendering the milk safe to drink?

As can be seen, the DEGRP study does not (yet) answer all the questions, but it has shed useful light on some questions, and in doing so revealed other questions for consideration. Ultimately, it looks as though improvement of small-scale dairying could form the basis of improved livelihoods for some smallholders in Malawi, as has been the case in the highlands of Kenya and Tanzania.

RELATED CONTENT

The research project's [website](#) has a long list of outputs to date. Of particular note are the following:

Revoredo-Giha, C. and Renwick, A. (2016) 'Market structure and coherence of international cooperation: the case of the dairy sector in Malawi', *Agricultural and Food Economics* 4:8. Available at: <http://agrifoodecon.springeropen.com/articles?query=revoredo&volume=&searchType=&tab=keyword>

Revoredo-Giha, C. et al. (2015) 'Identifying Barriers for the Development of the Dairy Supply Chain in Malawi'. Symposium paper from the 29th International Conference of Agricultural Economists in Milan, August 2015. Available at: <http://ageconsearch.umn.edu/handle/212296>

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IFCN (2013) Combined IFCN world milk price indicator. Online data resource. Kiel, Germany: International Farm Comparison Network. Available at: http://www.ifcndairy.org/en/output/prices/milk_indicator2013.php

FAOSTAT (2010) Online data resource. Rome: Food and Agriculture Organisation of the United Nations. Available at: <http://faostat3.fao.org/home/E>

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McDermott, J. J., Staal, S.J., Freeman, H.A., Herrero, M. and Van de Steeg, J. A. (2010) 'Sustaining intensification of smallholder livestock systems in the tropics', *Livestock Science* 130 (1): 95–109.

Staal, S.J., Nin Pratt, A. and Jabbar, M (2008) 'Dairy development for the resource poor. Part 1: Pakistan and India dairy development case studies'. ILRI/FAO Pro-poor Livestock Policy Initiative Working Paper No. 44-1. Rome: Food and Agriculture Organization.