



A Review of Milk Production in Pakistan with Particular Emphasis on Small-scale Producers

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EXECUTIVE SUMMARY

Introduction

Milk production is considered a livestock enterprise, in which small-scale farmers can successfully engage to improve their livelihood and obtain a relatively constant stream of income, thus moving from subsistence to market orientation. The main purpose of this study was to gain insight into the household and farm economics of small-scale dairy farmers in Pakistan, a country with the vast number of small-scale dairy farmers, and to obtain estimates of their cost of milk production so as to gauge their vulnerability to international competition. Furthermore, although the dairy enterprise is the main focus, income estimates are also made at the household and whole farm level. A case study approach was used, the aim being qualitative insight rather than quantitative extrapolation.

Methodology

The province of Punjab, the major milk-producing province in Pakistan, was chosen for this study. The methodology applied for the economic analysis was developed by the International Farm Comparison Network (IFCN) and utilizes the concept of typical farms. Farm types are determined on the basis of the knowledge of regional dairy experts. In the case of Punjab, typical farms were defined by (a) location in relation to the regional distribution of milk production and (b) size of the farm relative to farm sizes that make important contributions to milk production in this province. Data was collected using a standard questionnaire and a computer simulation model, TIPI-CAL (Technology Impact and Policy Impact Calculations), was used for biological and economic simulations of the typical farms. The farm input data and the related output figures were discussed and validated with local experts and farmers.

Results

Milk Production in Pakistan and Punjab Province

In 2002 Pakistan reached a milk production volume of 32 million tons, slightly higher than that of Germany. Over two third of the milk is produced by buffaloes. Pakistan has over three times as many 'dairy animals' as Germany, the vast majority (over 80 percent) being kept in herds of one to three animals. Annual milk yield per dairy animal is about one fifth of that achieved in Germany and about one third of the yield of a New Zealand dairy cow.

In the province of Punjab, over twenty million tons of milk were produced in 2002, nearly 70 percent thereof derived from buffaloes. Over the past six years, total milk production has increased by around 17 percent, most of the growth resulting from an increase in the number of buffalo and cattle (local as well as cross-bred), while yield increases have contributed relatively little to production growth.

Most of the land in Punjab is irrigated allowing for the cultivation of wheat, rice, cotton, pulses, sugar cane, fodder, etc. More than 70 percent of the farmers own less than 2 hectares of land and over 80 percent of dairy farming is done by these small landholders at subsistence level. Four typical farms were selected for this study, all of which were located in the irrigated area.

Analysis of 'Typical Farms' in Punjab

Based on the IFCN methodology described, four farm types have been identified as 'typical' and were analyzed in detail:

PK-1: This farm represents a rural land-less household with 1 buffalo. The household itself consumes over 70 percent of the milk produced, the rest being sold to the local milkman.

PK-3: This farm, located in a rural area, has 3 ha of land used to grow small grain crops and owns 3 buffaloes. Over 75 percent of the milk produced is sold to a processing company.

PK-10R: This is a rural farm with 6 ha land and 10 buffaloes. The milk produced is sold to a milk processing company. This farm type is rapidly becoming more common.

PK-10U: This is a peri-urban, land-less farm near the major city of Lahore. All the fodder and feed for its 10 dairy animals (8 buffaloes and 2 cows) are purchased. The milk produced is sold directly to the consumers in the city through home delivery.

Dairy Production Systems

All four selected farms are family enterprises. Family labour represents 100 percent of the farm labour on the two smaller farms and 15 to 50 percent on the two larger farms.

On all farms the dairy animals are kept in tied stalls with no grazing. Milking is done by hand. Feed rations are mostly based on fodder and agricultural by-products such as wheat straw and industrial by-product such as cottonseed cakes. Only the two larger farms use some level of concentrate/compound feed. Buffalo are, by far, the main type of dairy animal, followed by crossbred cows. Milk production ranges from 1,100 to 1,980 kg non fat-corrected milk per lactation.

Household Comparison

All farms have a diverse income structure, income sources being the sale of milk, the sale of cash crops, and off-farm employment. Annual household incomes range between US\$654 (PK-1) and US\$ 2,283 (PK-10R).

For the farm type PK-1 the main cash income source is off-farm employment (75 percent). The net cash income just covers the farm's cash costs and only contributes twelve percent to household income. However, the non-cash benefits from the dairy obtained by the family in the form of milk and manure have a market value equivalent to 17 percent of the household income

Whole Farm Comparison

Total farm returns range from US\$ 236 to 6,400 per year. Net cash farm income follows a similar pattern as that of the farm returns. The net cash income of farm PK-1 is only US\$ 79 per year. This is mainly due to the low share of milk sold. The highest net cash farm income (US\$1,950 per year) is achieved by farm PK-10R. Interestingly, although the two larger farms have similar farm returns, net cash farm income of PK-10R is 1.8 times that of PK-10U. This dramatic difference is a result of PK-10R's much lower production costs.

Comparison of the Dairy Enterprise - Costs of Milk Production

Farms PK-3 and PK-10R, both having land to grow crops and forages, are able to produce milk at a cost of US\$ 11.65 and 8.50 per 100 kg. These farm types have the potential to compete with imports of dairy products and also to produce milk for export, provided international quality standards can

be achieved and the dairy chain being internationally competitive. It should be mentioned that the farm PK-10R is one of the most competitive dairy farms analysed by IFCN in 2002 (IFCN Dairy Report 2003) and has lower production costs than the farms in Australia and New Zealand included in the international comparison.

The cost of milk production of farm PK-10U is over 2.20 times higher (an additional 10 US\$ per 100 kg milk) than that of PK-10R. This is due to much higher input costs as a result of PK-10U depends on purchased green fodder and concentrate. However, the high milk prices obtained (an additional 10 US\$ per 100 kg milk compared to PK-10R) compensates for the additional production costs. PK-10U fully covers its production costs and should be economically viable in the long run.

The cost of milk production of farm PK-1 amounts to US\$18 per 100 kg and is thus significantly higher than the cost incurred by farms PK-3 and PK-10R. This can be explained by economies of scale of the other farms and low milk yields of PK-1. Without major improvements farm type PK-1 will, in the longer run, have difficulties to compete with the other farm types. At the moment, however, the main purpose of PK-1 is to produce milk for home consumption by converting available roughages into milk, livestock for sale, and fuel as well as to provide the female members of the family with an income-generating activity.

As in small dairy farms in most other countries, farm PK-1 will keep its dairy animals as long as alternative employment opportunities (at US\$ 0.16 per hour in this case) are not available. Keeping livestock for PK-1 households is the function of asset storage as poor households rarely have access to savings institutions. Therefore livestock is an important asset, which can be liquidated at any time in case of a financial crisis. Apart from these financial considerations, personal preferences and family traditions are likely to slow down the speed of structural change in these subsistence milk production systems.

Dairy Chain in Punjab (Preliminary Estimates)

Consumer prices for fresh milk are 1.5 times higher in the formal than in the informal sector. If milk adulteration (i.e. adding water to increase milk volume) is not taken into account, the margin for milk processing and retailing in the formal dairy sector in Punjab seems to be around half of what dairy chains in Europe take to deliver the milk to the consumer. The informal sector has a margin of US\$ 0.06 to 0.11 per kg of fresh milk (6 percent fat), while the margins in the formal sector amount to US\$ 0.18 to 0.36 per kg fresh milk (6 percent fat milk). The highest margin is obtained in the UHT milk chain, 5 percent of Lahore's milk consumption, which has a processing and retailing margin of US\$ 0.36 per kg of fresh milk (6 percent fat). The value of the extracted cream lies between US\$ 0.05 and 0.09 per kg of fresh milk with a 6 percent fat content.

Key Conclusions

Milk production in Pakistan has increased by 17 percent from 1996 to 2002. This increase in production was mainly achieved by a growth in the number of dairy animals (15 percent for the same time period) with only slight gains in milk yield per animal with the use of artificial insemination (AI) techniques for breed improvement. Considering that most of the increase in inventory and milk production stems from small-scale farms, there should be a great opportunity to improve the livelihoods of these small-scale producers by providing enabling framework conditions.

Assisting farm type PK-1 is key to impacting the bulk of dairy farmers in Punjab, who also represent a high proportion of the rural poor in the province. This type of farm requires interventions that allow the household to make an entrepreneur's profit. Finding a sustainable technology or policy interventions aiming at improvement of subsistence production and at the same time avoiding market distortions could be a valid starting point. But it is doubtful if it is possible to increase market integration of the majority of subsistence oriented dairy producers. Nevertheless, low cost technology interventions such as vaccination and AI campaigns also benefit the rural poor in terms of decreasing the animal mortality loss and increasing the yield. The small dairy farms with some land, such as PK-3, probably have the resources to capitalize faster on most new opportunities than the smaller farm type (PK-1). Also, PK-3 clearly shows a much more intensive and commercial management approach to its crop enterprise than to its dairy business. Thus, this type of farmer

knows how to produce commercially and presumably could, under the right conditions, transfer his know-how from one enterprise to the other quite quickly.

A sound intervention strategy to strengthen the position of the small scale dairy farms would focus simultaneously on at least three fronts: (1) lowering farm production costs, (2) increasing productivity and (3) promoting a “higher” farmers’ share in the consumer milk prices. A more competitive milk marketing system that is designed to cater for the needs of small-scale dairy farmers would send strong positive signals for small farmers to mobilize their own resources and develop their operations.

Dairy chain is the central stimulus for all the developments in dairy sector of the country. Due to the central development role played by the dairy marketing chain, a more comprehensive analysis of its operations than that presented in this study is required. The way the dairy sector operates can, in a couple of years, either boost small-scale dairy farming or eliminate progress made during decades of efforts.