



# **The Economics of Milk Production in Orissa, India, with Particular Emphasis on Small-scale Producers**

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## **EXECUTIVE SUMMARY**

### **Introduction**

Orissa is one of the least developed states in India with very high levels of poverty. Mixed crop-livestock farming is the most predominant farming system for over 80 percent of all rural households in the state. Of the total livestock population, bovines account for about 65 percent indicating their importance in livestock production. In the rural economy, milk is one of the most important products of cattle and buffalo enterprises, contributing over 33 percent of the value of all livestock outputs (Government of Orissa, 1998-99). Other products include meat, bones, skins and hides, manure, and draught power. With very small and marginal operational holdings (less than a hectare) accounting for nearly 80 percent of the 3.94 million farms, increasing milk production could be an efficient way to improve rural livelihoods.

The main purpose of this study was to gain insight into the household and farm economics of small-scale dairy farmers in Orissa, and to obtain estimates of their costs per unit of output in milk production so as to gauge their potential for improvement and vulnerability to international competition. In order to ascertain possible developments in the dairy sector and to broadly identify areas of intervention that favour small-scale dairy producers, the study examines the potential to improve milk production of different farm types. A case study approach is used, the aim being to obtain qualitative insights rather than quantitative extrapolation.

### **Methodology**

The methodology applied for the economic analysis was developed by the International Farm Comparison Network (IFCN) and utilises the concept of typical farms. Farm types are determined by regional dairy experts taking into consideration (a) location of the farm, (b) farm size in terms of herd size and (c) the production systems that make important contributions to milk production in the region. The first category of farms (small) was chosen to represent the size that is close to the statistical average. The other farm types defined represent larger farms to allow the exploration of potentials for economies of size in the region, or a different dairy production system. Management levels on the typical farms are average to slightly above average compared to other farms of the same type. 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. A farm to farm comparison was carried out to identify differences between farms in Orissa and Haryana.

## Results

### Milk Production in India and Orissa

India is a world leader in milk production, contributing about 15 percent to total world output. In 2002, India produced an estimated 84 million MT, second only to the EU. Milk yields in India, at 694 kg per cow per year, however, are extremely low compared to other large milk producing countries such as the USA, Germany or New Zealand. Average milk yields per animal in the US were 11 times higher than those of India, while for New Zealand the figure is 5 times higher. Farm gate prices received in the US were twice as high, while those received in Germany were 50 percent higher than those received by Indian farmers. Only in New Zealand were farm gate prices found to be slightly lower.

Orissa does not contribute significantly to milk production in India. With only 1.7 percent of the dairy cow population and 0.4 percent of the buffalo population in 2002, milk production in Orissa contributed only 1.1 percent to the milk produced in India. Most of the milk in Orissa is produced on farms with marginal to small landholdings, less than 2 hectares, and with 3 or 4 animals. Even by Indian standards, milk yields in Orissa are extremely low (1/4 of the Indian average). Farm gate prices of milk are only slightly lower than the Indian average, but still a little higher than those received in New Zealand. The per capita milk production in Orissa is very low at 26 kg per capita per year while the annual per capita production in India is 82 kg.

### Analysis of 'Typical Farms' in Ganjam and Gajapati Districts of Orissa

Based on the IFCN methodology, six farm types were identified as 'typical' and were subjected to detailed analyses. Two small dairy farms, IN-2CO (2 local cows and less than a hectare land) and IN-2BO (2 buffaloes and 1-2 ha land), represent over 95 percent of the dairy farms in Orissa. The farms IN-6CO (6 crossbred cows in a peri-urban area) and IN-6BO (6 grade buffaloes, also in a peri-urban area) represent the fast growing medium sized commercial farm types in Orissa. These farm types provide a picture of the economies of scale and the effect of location peri-urban and urban areas. Farms IN-15CO (15 local cows) and IN-9BO (9 local buffaloes) represent only 5 percent of the farms in rural areas but have distinctly different production and management characteristics due to their large herd size and access to areas for common grazing.

#### *Dairy production systems*

Local, non-descript cows are the main type of dairy animals followed by buffaloes and crossbred cows. The family is in charge of the management of the farm but they use the opportunity to hire very cheap labour. Fallow and forest land can be used for grazing. Feed rations are based on agricultural by-products such as rice bran, rice polish, broken rice, paddy straw and pulses meal. Commercial cattle feed is only used by the medium sized commercial farms such as IN-6CO. Milking is done by hand. In terms of non fat corrected milk (ECM), production per dairy animal ranges from 210 to 1,305 kg/year.

#### *Household comparison*

Household incomes range from 420 US-\$ to 1,570 US-\$ per year. Income structure is quite diverse with non-cash benefits being prominent in the small systems. For example, draught power, manure and fuel from cow dung, and milk used in the household account for 16 percent of the household income in IN-2CO. Off farm income is quite important for all the stall fed systems in Orissa and constitutes 5 to 45 percent of the household income.

#### *Whole farm comparison*

The returns from farming range from 460 US-\$ to 2,910 US-\$ per year. The dairy contributes 25 to 85 percent to the whole farm returns. The returns from cash crops are also important, ranging from 15 to 70 percent, depending on farm type. Net cash farm income closely follows the level of farm returns with the exception of the large commercial cow system (IN-15CO), where net farm income is relatively low, mainly due to comparatively high cash costs and hired labour costs in dairy per 100 litres ECM. The highest net cash farm income was obtained in the commercial buffalo based dairy farming system (IN-6BO), mainly due to lower unit costs of milk production.

The net cash farm income ranges from 190 US-\$ to 1,100 US-\$ per year. The low net cash income of 190 US-\$ per year (IN-2CO) is due to low milk yields, small size of land holding, and slightly lower milk prices paid by the cooperative due to lower fat content and remote location.

### ***Comparison of the dairy enterprise - Costs of milk production***

The buffalo-based pastoral dairy farming system (IN-9BO) and the commercial stall-fed crossbred cow based dairy farming system (IN-6CO) have the lowest cost of milk production per 100 litres of ECM at around 12.3 to 12.9 US-\$. The commercial buffalo-based dairy farming system with grade buffaloes, IN-6BO, has slightly higher costs at 14.6 US-\$ per 100 kg ECM, mainly because of slightly higher purchased feed costs. These farm types have the potential to compete in the long run 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.

In the small farm systems, the buffalo-based rural farm (IN-2BO) produces milk at a significantly lower unit cost (at 19.9 US-\$ per 100 kg ECM) than the IN-2CO cattle based farm which could only produce at 31.4 US-\$. This can be explained by higher milk yields and higher labour productivity in IN-2BO. It has to be noted, however, that the main purpose of IN-2CO is to produce milk for home consumption (30 percent of the production) by converting locally available feedstuff into milk, livestock, fuel and draught power for its crop activities. Given that IN-15CO can produce milk at comparatively lower costs (15.3 US-\$ per 100 kg ECM), there is a potential to lower milk production costs, but this requires the realization of economies of scale in similar cattle-based farms through expansion to larger herd sizes. Another alternative could be a herd of a cow and a buffalo for uniform milk production in the year (see Annex A-6).

As in small dairy farms in most other countries, farm IN2-CO will tend to persist as long as alternative employment opportunities (at 0.14 US-\$ /hour in this case) are not available. With the existing wage rate for dairy labour at 0.11 US-\$ /hour, the chances of obtaining available alternative employment seems remote.

### ***Comparison of dairy farms in Orissa and Haryana***

A comparison of typical and leading-edge farms in Orissa with corresponding farms in Haryana reveals that milk production in Orissa is relatively cost competitive. Although milk yields in Orissa are much lower than in Haryana, farmers in Orissa produce milk at competitive costs due to lower land costs and lower wage rates. The availability of grazing land in Orissa and cheaper feed also contributes to lowering the costs of milk production. Buffalo milk production was found to be more cost competitive in Orissa than in similar farms in Haryana. However, farm gate milk prices are lower by around 5 percent in Orissa and farm incomes are much lower in Orissa than in Haryana due to low milk yields and lower off-farm income.

### ***Dairy chain in Orissa***

Most of the milk marketing is done through the informal sector with milk being sold to the milkman or locally. Farmers are encouraged to sell buffalo milk with higher fat content to co-operatives by milk pricing based on fat content and assurance of seasonal fixed prices throughout the year.

Producer milk prices are 14 percent higher in the informal sector than in formal sector (milk union cooperative). Consumer prices for fluid milk are also lower in the informal sector through the milkmen and farmers selling directly in the rural market. Both the consumer and the producer markets are mostly captured by the informal sector although the quality of milk handled through this channel is poor. Consumers have a high price elasticity of demand for milk products. Without information on milk quality or means to check for adulteration, consumers will continue to prefer the cheaper products and the informal sector will maintain its hold of the major share of milk markets in Orissa.

It is estimated that only about 5 percent of total marketable supply of milk is handled by the formal sector, the cooperatives. Estimates show that the cooperative milk union selling toned milk with 3 percent fat receives value-added and retail margins of 0.22 US-\$ per kg of raw milk used and of 0.06 US-\$ for other raw materials used (Skimmed milk powder). In the informal sector, the local milkman selling raw milk in the nearby town or city receives a processing and retailing margin of 0.13 US-\$ per kg of milk handled followed by the peri-urban farmer selling milk directly in the town, who

receives a margin of 0.12 US-\$ per kg milk sold. The costs of value-added in the formal sector, however, are significantly higher than in the informal sector.

## Conclusions

The present study analyzed six typical dairy farming systems in Orissa. All the systems cover their cash costs and contribute positively to farm income.

The most common dairy farming system, IN-2CO (2 local cows) produces very low cash farm income and generates negative entrepreneurial profits. The persistence of this system is largely due to the low cash costs of milk production. Moreover, given the scarcity of alternative employment opportunities for family labour, the dairy activity produces a relatively good cash margin of around 10 US-\$ per 100 kg ECM. There is potential for improving farm income by improving milk yields and increasing herd size. The other small dairy farming system, IN-2BO (2 buffaloes), has even lower costs of milk production than IN-2CO, mainly due to its higher milk yields. Although the lowest net costs of milk production are incurred by the pastoral, buffalo-based dairy farming systems (IN-6BO), this production system is not very prevalent in the region given the scarcity of common grazing areas.

The share of off-farm income was the highest in the most prevalent small dairy farming system (IN-2CO). Family labour is a relatively important component of cost in small subsistence farm types like IN-2CO and IN-2BO. In the commercial farm types such as IN-6CO and IN-6BO, purchased feed costs are proportionately higher. Other returns from dairy such as cow dung for fuel and draught power are proportionately higher in the small farms. An important component of the dairy farming system that results in significant differences in farm profits are the returns to labour. The returns to labour are very low for the small farms but much above the existing wage level in case of the commercial farms (IN-6CO and IN-6BO). In case of pastoral systems, IN-9BO had comparatively higher returns to labour than IN-15CO mainly due to the higher milk yields of the buffalo-based system.

A comparative analysis of typical dairy farms in Orissa and Haryana revealed differences in cost and productivity of dairy farming in the two states. A large potential to reduce milk production costs of smallholder dairy farming and increase family farm income through milk production exists in Orissa by better breed, feed and herd management. Smallholders using buffalo for milk production in Orissa were found to be more cost competitive than similar farms in Haryana. Hence suitable strategies to promote such buffalo-based systems should have potential for improving the production and competitive position of dairying in Orissa.