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A Note on the Profitability of Dairy Farms in Selected Areas of Bangladesh: A Comparison with New Zealand Dairy Farms

Jahangir Alam, Gilbert V. Nartea, and M.A. Sarker¹

ABSTRACT

This study determines the profitability of commercial mini-dairy farms in selected areas of Bangladesh using New Zealand financial and production figures as benchmarks. Based on production returns Bangladeshi (BD) dairy farms do not appear to be particularly profitable in spite of the relatively high domestic milk price. To be a truly profitable venture, it is suggested that BD dairy farms should aim at improving their productivity through the use of improved breeds, feeding, health care and management.

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INTRODUCTION

Bangladesh is a net importer of dairy products. In 1994/95, it produced 1.4 million tons of liquid milk but this was only 12.8% of its total milk requirement. New Zealand on the other hand is the world's third largest exporter of dairy products. It accounted for 25% of the total world dairy trade in 1996/97, with a total production of 11.1 million tons of liquid milk (MAF, 1997). Though it produces only about 2% of the world's milk output, it exports 90-95% of its total production (Statistics New Zealand, 1998). The dairy industry was NZ's single largest export earner in 1997 with receipts of \$4.1 billion or approximately 20% of total export value (Statistics New Zealand, 1998).

The Bangladesh Government has recently embarked on a vigorous programme to boost its domestic milk production. In 1993 it introduced a subsidy programme towards the purchase of cross bred cattle to encourage the establishment of mini dairy farms. Cross bred cattle are more than twice as productive as local breeds (Alam, 1995; Alam *et al.*, 1994). The rate of subsidy given to these farms varies from 20 to 25 per cent of the value of the animals depending on the size of the farm. The subsidy is payable to the farmers in cash. Likewise, the Government also expanded its artificial insemination programme for dairy cattle in the rural areas. The Government had also been providing 100 per cent financial support to meet the transportation cost of importing improved stocks of cattle. In addition, liberal credit has been offered by the Bangladesh Krishi Bank (BKB), nationalised commercial banks, private banks and the non-government organisations for the establishment of dairy farms. As a result of these schemes, there has been a significant increase in the number of commercial dairy farms in recent years. However, in spite of this increase in number, this type of farm accounts for less than one percent of total dairy farms.

The sustainability of dairy enterprises depends, among other things, on their profitability. The New Zealand dairy industry is internationally recognised as being a 'cost efficient' producer of milk (Baker *et al.*, 1990). The production system used developed because farm-gate prices have historically been low (Penno, 1992) and because the favourable physical environment for pasture

production has enabled livestock to be grazed year-round on pasture (Bryant, 1990). In addition, the NZ dairy farmer has been required to operate in a largely unsubsidised and deregulated agricultural economy since 1984 (Reynolds and Moore, 1990; Valdes, 1993). This has required farmers to maintain a capacity within their farming systems to quickly respond to changes in international dairy product prices. Judging from the number of dairy conversions in recent years, it appears that there is a general perception that NZ dairying is a profitable venture. On the other hand, despite the presence of government subsidies in Bangladesh, there is concern about the profitability of their dairy enterprises about which little is known. Therefore, this study was conducted to determine the profitability of commercial mini dairy farms in selected areas of Bangladesh using NZ financial and production figures as benchmarks.

DATA AND METHODS

The Bangladesh data were obtained from a survey of ten districts covered by the *Bangladesh Krishi Bank* (BKB) livestock development loan program and selected purposively for this study. A list of farmer-borrowers rearing at least two cross-bred milking cows during the study period obtained from the BKB was used to randomly select 100 dairy cow owners -- 10 from each district. The data was collected in April 1996 for the production year 1995.

The New Zealand benchmark data is based on a survey of 200 randomly selected owner-operators conducted by the Livestock Improvement Corporation (LIC, 1997). Included as owner-operators are those farm owners who employ contract milkers or variable order sharemilkers. In these situations, the amount paid to the contract milker or sharemilker had been included in wages (less any direct farm expenses incurred), and the milk receipts grossed to include the milker's percentage. The actual accounts of each farmer were collected from their respective accountants upon obtaining prior consent from the farmer. Farmers who agree to provide their accounts remain in the LIC survey for a maximum of four years.

RESULTS AND DISCUSSION

Physical Characteristics

The average Bangladesh (BD) dairy farm in the study area is dwarfed by the size of its New Zealand (NZ) counterpart. The average NZ dairy farm is 37 times larger in area, has 23 times more milking cows, and produces more than 100 times the total amount of milk (in litres) (Table 1). NZ cows are also more productive, producing more than four and a half times as much as BD cows. In 1995/96, the average NZ dairy cow produced 3646 litres of milk per year compared with 801 litres for the BD cow². One reason for this is that NZ cows are usually in milk for 266 days/year compared with only 195 days/year for BD cows.³ Another reason could be the difference in genetic merit, despite the fact that 97% of the cows in selected Bangladesh farms are cross-bred, as well as differences in feeding, health care, management, and climatic environment.

Table 1. Physical Characteristics of Bangladesh and New Zealand Dairy Farms, 1995/96, Averages.

| | Bangladesh | New Zealand |
|--|------------|-------------|
| Area (hectares) | 2 | 75 |
| Milking cows | 8 | 187 |
| Milk production/year (litres) | 6404 | 670,915 |
| Milk production/cow/year (litres) ^a | 801 | 3646 |
| Milking days/year | 195 | 266 |

^a The farms surveyed in Bangladesh were all commercial dairy farms with 97% of their milking cows being cross breeds. Traditional dairy farms which use predominantly local breeds produce less than half the output per cow of these commercial farms.

² These are cross-bred cows which produce approximately 4 litres of milk/cow/day. Local breeds used in traditional dairy farms produce much less than half of this level. At present, 99% of the farms in BD are traditional farms which have on average only 5% of their herd as cross bred. For a discussion of the productivity of traditional dairy farms and for a comparison of milk production of local versus cross bred cows, see Alam (1995) and Alam *et al.* (1994).

³ In another study, Alam *et al.* (1994) found that milking days for cross-bred cows varied from 236 to 252 days.

Financial Characteristics

Revenues and expenses

A typical New Zealand farm derives about 90% of its revenue from milk sales and around 8% from the sale of stock (Table 2). In contrast the BD farm derives 82% of its revenue from milk sales and 15% from an increase/appreciation of animal stock.

*

Table 2. Farm Revenue and Expenditure of Bangladesh and New Zealand Dairy Farms, 1995/96.

| | Bangladesh | | New Zealand | |
|--|------------------|------------|----------------|------------|
| | NZ\$ | Percent | NZ\$ | Percent |
| Revenue | | | | |
| Milk sales | 3926 | 81.7 | 206,019 | 90.9 |
| Stock sales | | | 17,196 | 7.6 |
| Dung sales | 164 | 3.4 | | |
| Rebates | | | 1,313 | 0.6 |
| Change in inventory | 713 | 14.8 | 1,896 | 0.8 |
| <i>Total revenue</i> | <i>4803</i> | <i>100</i> | <i>226,424</i> | <i>100</i> |
| Expenses | | | | |
| Wages | 560 | 13.2 | 16,717 | 7.3 |
| Feed cost/ Pasture and supplements; Fertiliser | 2130 | 50.4 | 47,598 | 20.9 |
| Animal health, breeding and herd testing | 93 | 2.2 | 13,854 | 6.1 |
| Repairs, maintenance and depreciation | 133 ^a | 3.1 | 28,296 | 12.4 |
| Standing charges | | | 13,756 | 6.1 |
| Administration | | | 5,167 | 2.3 |
| Interest | 1144 | 27.1 | 33,384 | 14.6 |
| Others | 47 | 1.2 | 18,182 | 7.9 |
| Farm manager's wage | 119 | 2.8 | 51,092 | 22.4 |
| <i>Total expenses</i> | <i>4226</i> | <i>100</i> | <i>228,046</i> | <i>100</i> |
| Total expenses (without manager's wage) | 4107 | | 176,954 | |
| <i>Net profit</i> | <i>577</i> | | <i>-1,622</i> | |
| Net profit plus manager's wage | 696 | | 49,470 | |

^a Consists mainly of depreciation on housing and equipment.

In Bangladesh farms, feed is a major expenditure, making up 50% of total expenses (Table 2). This is followed by interest 27%, and wages 13%. In Bangladesh most dairy farms employ stall feeding with very little pasture grazing. The reported feed cost includes paddy straw, green grass, oil cake, bran, concentrate feed, molasses, and salt. Purchased feed was valued according to the average prices actually paid for the items. Home supplied feeds were charged according to the average prices prevailing in the market.

Interest payments were made up of interest on seasonal capital as well as on term loans. The BD farm has an estimated term debt of \$8,868 which is a substantial amount given that the reported farm manager's yearly salary is only \$119 (Table 2).

The wages reported in Table 2 refer to the actual cost of hired labour. The farm manager's salary is an imputed value which includes family labour. Family labour was charged at the prevailing wage rate. The farm manager's salary makes up only 2.8% of total expenses which reflects both the low wage rate in Bangladesh as well as the fact that dairy farming is not the full-time occupation of the family. Dairy farming in Bangladesh is only a part of a mixed farming system, unlike in NZ where the farm manager is fully occupied with management of the dairy farm.

Bangladesh dairy farming is characterised by a low capital intensity compared with systems in developed countries, as reflected by the low proportion of the farm's expenditure on housing and equipment, i.e., 3% of total expenditure (Table 2). In the study area, housing for dairy animals consisted of either tinshed or straw houses. Equipment consisted of simple implements such as earthen drinking jars for the animals and milking buckets. Milking is done manually.

In New Zealand, a major expense is the farm manager's salary making up 22% of total expenditure (Table 2). This is followed by expenditure on fertiliser, and pasture and feed supplements, 21%. The farm manager's salary is an imputed cost which includes wages, as well as board and food (See LIC, 1997) for a fuller explanation). In 1995/96, the Livestock Improvement Corporation (1997) reported an estimated 1.34 farmer and family labour units working on an average

dairy farm. The imputed managerial salary of \$51,092 for 1995/96 indicates that it is a major source of income for the farm owner.

Supplementary feeds include hay, silage, meal, forage crops, and grazing off. Repairs and maintenance together with depreciation charges make up 12.4 % of total expenditures (Table 2). Half of this is depreciation expense indicating the relatively high capital intensity of the farm business.

In New Zealand, animal health, breeding and herd testing make up 6.1% of the expenses compared with just 2.2% for Bangladesh dairy farms.

In New Zealand, land and buildings make up the bulk of the capital in a dairy farm, followed by investment in the herd. In 1995/96, the average dairy farm had total assets worth \$1.5 million, 77% of which was in land and buildings, 12% in the herd, and 4% in machinery and vehicles (LIC, 1997). Interest payments are also a major expense in NZ dairy farms, accounting for 15% of total expenditure (Table 2). Some 22% of the total assets is borrowed, accounting for the high proportion of interest payments in the cost structure. Over the last five years, the average debt level for dairy farmers ranged from 22-29% of total assets (LIC, 1997).

Profitability

In 1995/96 the average dairy farm in BD generated revenue of NZ\$4,803, incurred total expenses of \$4,226, and earned \$577 of net profit (Table 2). In the same year, the average NZ dairy farm generated revenue of \$266,464, incurred total expenses of \$288,046, and made a loss of \$1,622 (Table 2).⁴

Based on the profit margin, BD farms appear to outperform NZ farms. Every dollar spent in BD farms generated \$1.14 of revenue, compared with \$0.99 for NZ farms (Table 3). If we exclude interest payments we will have a measure analogous to production return on assets. On the basis of this measure, the average BD farm in the study area still appeared to be more profitable than its NZ

⁴ Comparisons are being made only for 1995/96 because of the unavailability of data for BD farms in other years. One should note however that the average NZ dairy farm reported a profit of \$9657, \$3661, and \$6624 in 1992/93, 1993/94, and 1994/95, respectively (LIC, 1997). However, the average dairy farm also reported a loss of \$7374 in 1996/97 (LIC, 1997).

counterpart. The average BD farm generated \$1.56 of revenue per dollar of expenditure, compared with \$1.16 for the NZ farm (Table 3).

Table 3. Profitability of Bangladesh and New Zealand Dairy Farms, 1995/96.

| Dollar return/Dollar expenditure | Bangladesh Farm | | New Zealand farm |
|---|---------------------------|---------------------------|---------------------------|
| | \$0.61/litre ^a | \$0.31/litre ^b | \$0.31/litre ^b |
| Including all expenses | 1.14 | 0.92 | 0.99 |
| Excluding interest (ROA) ^c | 1.56 | 1.25 | 1.16 |
| Excluding interest and managerial salaries (ROA and M) ^d | 1.62 | 1.31 | 1.58 |

^a Farmgate price of milk in Bangladesh derived by dividing reported milk sales for the survey farms (\$3926), by reported total milk production (6404 litres).

^b Farmgate price of milk in New Zealand derived by dividing reported milk sales for the LIC (1997b) survey farms (\$206,019) by reported total milk production (670,915 litres).

^c Measure analogous to return on assets.

^d Measure analogous to return on assets and managerial labour.

If we exclude both interest payments and managerial salaries we will get a measure analogous to production returns to assets and managerial labour. Even on this basis, BD farms are still more profitable than NZ farms, generating \$1.62 for every dollar of expenditure compared with \$1.58 for NZ farms (Table 3).

This apparent profitability of BD farms relative to NZ farms is due to several reasons. Two of the obvious ones are highlighted in this study. First, BD farmers receive higher milk prices. In 1995/96 BD farmers in the study area received on average NZ\$0.61 per litre, compared with NZ\$0.31 per litre for NZ farmers.⁵ This price differential is an indication of the level of protection enjoyed by dairy farmers in Bangladesh. Second, the NZ dairy farm pays (imputed) its owner (farm manager) the equivalent of \$273/milking cow/year while the BD farm pays only \$30/milking cow/year. If the farm

⁵ The farmgate price of milk in Bangladesh is derived by dividing reported milk sales for the survey farms (\$3926), by reported total milk production (6404 litres). The farmgate price of milk in New Zealand is derived

manager's salary is excluded from the expenses, NZ farms would appear much more profitable than BD farms (Table 2).

Conducting the analysis for both countries on the basis of NZ milk prices, while excluding both interest payments and managerial salaries, we find the NZ farm to be more efficient. The NZ farm generates \$1.58 of revenue for every dollar of expenditure compared with \$1.31 for the BD farm (Table 3).

Equating only the prices and excluding only the interest payments from the expenditures, shows the BD farm outperforming the NZ farm with the former generating \$1.25 of revenue for every dollar spent compared with \$1.16 for the NZ farm (Table 3). The BD farm in this case still outperforms the NZ farm because of the low salary paid to the farm and family labour. This indicates the disparity in the amount of managerial salaries paid in the two farming systems. We can also illustrate this disparity by comparing unit costs of production.⁶ If we only exclude interest payments, the cost of production per litre of milk in BD (\$0.48) is about one and a half times the cost of production in NZ (\$0.29). However, excluding both interest and managerial salaries which is a major cost item in NZ farms, the cost of producing a litre of milk in BD (\$0.48) amounts to more than twice the cost in NZ (\$0.21). Considering all expenses, the cost of producing a litre of milk in NZ (\$0.34) is still about half that in the BD farm (\$0.66), indicating that despite the high imputed managerial salaries, NZ is still undoubtedly a cost efficient producer of milk.

Finally, using the NZ price of milk and comparing all revenues with all expenses, the BD farm's profit margin drops to \$0.92 of revenue per dollar spent, indicating a loss situation compared with NZ's rate of \$0.99 for every dollar spent (Table 3). This indicates that had the BD farmers been paid the same price as their NZ counterparts, they would have also reported a loss in 1995/96.

This study examined the profitability of dairy farms in BD based only on production returns. Though these commercial dairy farms reported a profit during the study period, this profit is very

by dividing reported milk sales for the LIC (1997) survey farms (\$206,019) by reported total milk production (670,915 litres). In 1991, Alam *et al.* (1995) found the farmgate price of milk in Bangladesh to be NZ\$0.51.

much dependent on the relatively high farmgate price of milk in BD compared with NZ. In spite of this, Bangladeshi farmers in the study area are still complaining that milk prices are not high enough (Centre for Policy Dialogue (CPD), 1997). Bangladeshi commercial dairy farms are also substantially more productive than the traditional dairy farm, however they still significantly lag productivity levels relative to NZ. This is of some concern for Bangladesh given its current push for the establishment of mini-dairy farms.

Likewise, New Zealand dairy farming does not seem to be as profitable as it is perceived to be. This is also of some concern for NZ given the fact that it is considered as one of the most cost efficient producers of milk in the world. Though the NZ dairy farm pays its manager well, its production return is not enough to provide a good return on its assets when all expenses aside from interest payments but including managerial salaries, are accounted for. In a recent study of NZ dairy farming, Nartea and Dhungana (1998) reported an average annual production rate of return on assets of 1.5 % over the period 1966-1996. The average total annual rate of return on assets over the same period is still a robust figure at 14.4%. However the bulk of this is due to capital gains, mainly from the appreciation of land values. Capital gains over the same period averaged 12.9% per year. What seems to have been propping up the dairy industry in recent years is the rise in land values. In fact for 1996/97 where land values started to ease, the average dairy farm reported a negative rate of return on assets (LIC, 1997).

⁶ Found by dividing expenses by the reported milk production. Of course we are assuming here that all expenses apply towards the production of milk when in fact other “by-products” are produced such as additional animal stock as well as cow dung which is sold in Bangladesh.

CONCLUDING REMARKS

The two farming systems are very different in terms of size, sophistication, and productivity, with the New Zealand system being a high-technology and capital intensive system compared with Bangladesh's low-technology and low capital farming system. However, the average BD dairy farm in the study area appears to be generating more revenue for every dollar spent than its NZ counterpart. This is partly due to the higher milk price received by BD farmers compared with NZ farmers, in addition to the low imputed wage of the BD farm manager and family labour. In terms of unit costs however, NZ is undoubtedly a cost efficient producer with a unit cost that is at about half that of BD. However, if based on production returns alone, both farming systems do not appear to be particularly profitable. Bangladesh farms seem to be too reliant on a high domestic milk price while NZ farms are relying too much on capital gains. To be a truly profitable venture, BD dairy farming should aim at improving its productivity through improved breeds, feeding, health care, and management.

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