Pran Dairy: Indirect Employment and Poverty Reduction Effects in the Supply Chain

Since fiscal year 2008 IFC has made two investments totaling $21 million in the Program for Rural Advancement Nationally (PRAN), a leading agroprocessing firm in Bangladesh. The first loan helped expand capacity in several operations—including dairy—and the second expanded dairy operations. Based on interviews with farmers, packagers, and distributors of PRAN’s dairy products, the incremental processing capacity of 50,000 liters of milk a day created about 2,200 indirect jobs over three years and 300 direct ones. Almost 80 percent of the incremental indirect jobs were in rural areas. For every $1 million invested in the project, more than 40 indirect and nearly 6 direct jobs were created. Anecdotal evidence also shows that PRAN’s establishment of dairy hubs that provide extension services to farmers to enhance productivity and guarantee offtake of milk at higher prices have likely significantly increased farmer incomes.

In addition, these activities reduced uncertainty about returns to livestock investments, providing incentives to switch to or expand dairy farming. The indirect jobs and extension services have significantly reduced poverty in a country with a rural poverty rate of more than 35 percent.

This study of PRAN’s dairy activities is one in a series on manufacturing, agribusiness, and services that estimates the indirect employment effects of IFC support to clients. IFC’s Development Outcome Tracking System (DOTS) usually measures only the direct effects of IFC support on client employment. But in many cases there may be significant and potentially larger indirect employment effects not covered during regular monitoring, and that need to be evaluated.

While the critical contributions of the private sector to job creation are widely acknowledged, the analysis of the indirect employment effects of IFC support sheds light on the type and amount of such job creation and provides clues about its impact on poverty. This study also highlights other effects of PRAN’s operations on poverty among people in its supply and distribution chain.

The study’s methodology and its limitations are available at the IFC Website on job creation (http://www.ifc.com/jobcreation). Broadly, this analysis is based on interviews with individuals in PRAN’s supply and distribution chain—livestock farmers, milk collection center operators, dealers (distributors) of PRAN products, packaging producers, and transporters. Based on the data collected and on information provided by PRAN, this analysis presents the indirect job creation effects and other impacts of PRAN’s dairy activities since IFC’s investment. Because some assumptions are based on farmer interviews, these estimates have to be treated with caution.

Introduction

Bangladesh’s dairy market is dominated by unprocessed, raw milk, which accounts for 80 percent of the milk market. The branded processed segment of the market is dominated by imported powder milk, which is converted into liquid form for consumption. The branded processed segment has a number of players including PRAN, BRAC, and the state cooperative MILKVITA.

Milk consumption is growing by 2,770 million liters a year, but daily consumption of dairy products in Bangladesh remains low relative to World Health Organization recommendations (47 milliliters instead of 250 milliliters a day per person). Bangladesh’s dairy sector is not well developed. Milk yields are among the lowest in the world, with limited uptake of modern management and technology in dairy farming. 

Prices for processed milk are governed by MILKVITA. Production costs are low compared to global standards, primarily because of the use of older processes and technology.

PRAN: PRAN is the largest producer and processor of agricultural products in Bangladesh. The company supplies more than 150 processed products, including carbonated beverages, mineral water, juices, baked goods, candy, fried snacks, spices, and dairy and aromatic rice products. PRAN leads the market for many food categories, exports to 77 countries, and is Bangladesh’s largest private employer. PRAN focuses its business on low- and middle-income consumers.

PRAN’s dairy operations started in FY2004 on a small scale, primarily with ultra high temperature (UHT) milk. The company has expanded operations into processed milk, milk powder, yogurt, and cheese. Data from FY2009 rank PRAN seventh on milk sales in Bangladesh. It is a leading importer of milk powder, but there is growing demand for processed milk.

PRAN’s innovations have included introducing dairy hubs to help modernize dairy farming by addressing some of the constraints on dairy farmers while enhancing the avail-
ability of local processed milk.

**IFC’s Investment:** IFC has made several investments in PRAN. In FY2008 IFC partly financed PRAN’s expansion plan and working capital requirements across its entire product range (total project cost of $51 million) through a $15 million loan, with $2.1 million earmarked for the dairy sector to increase milk collection and processing. In FY2011, IFC provided another loan of up to $7 million (total project cost of $14 million) that aimed to increase PRAN’s capacity to process UHT and pasteurized milk, milk powder, and packaged juice.

Processing capacity rose from 100,000 liter a day in FY2008 to 150,000 liters a day in FY2011. This increase forms the basis for this study’s analysis of incremental job creation due to IFC engagement. First, it explores the direct employment effects of this capacity and activity expansion.

**Direct employment effects**

In FY2011 PRAN’s dairy operations employed about 1,060 people in its processing plant, milk collection centers, and sales force. This was up from about 770 employees in FY2008.

PRAN believes in regular training for its employees to keep abreast of latest trends in the global dairy sector. It has a Dairy Academy that trains and raises awareness among employees. PRAN also uses international experts to help staff learn about the latest techniques and processes in its dairy hubs.

**Indirect employment effects**

Data collected through interviews and directly from PRAN suggest that between FY2008 and FY2011 about 2,200 indirect jobs were created by capacity expansion—in addition to the estimated 6,640 indirect jobs linked to PRAN operations in FY2008.

PRAN’s dairy operations begin with the procurement of raw milk from farmers and end with the delivery of processed milk and milk products to a countrywide network of retailers (figure 1).

Milk is the main raw material in this process and accounts

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**TABLE 1: PRAN’S FARMER NETWORK AND JOB CREATION EFFECTS**

<table>
<thead>
<tr>
<th>NUMBER OF COWS OWNED</th>
<th>SHARE OF FARMERS IN THIS CATEGORY (%)</th>
<th>CHANGE, 2008-11</th>
<th>FARMERS WHO GREW LARGER</th>
<th>JOBS CREATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>50</td>
<td>5,750</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6-10</td>
<td>30</td>
<td>3,450</td>
<td>863</td>
<td>863</td>
</tr>
<tr>
<td>More than 10</td>
<td>20</td>
<td>2,300</td>
<td>575</td>
<td>575</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>11,500</td>
<td>1,438</td>
<td>1,438</td>
</tr>
</tbody>
</table>

Note: It is assumed that 25 percent of the increase in farmers in the second and third categories grew from the first.
for nearly 95 percent of the cost of production of PRAN's three main products: powdered, UHT, and pasteurized milk. The other main input, packaging, accounts for about 6 percent of production costs. Besides these raw materials, the other main identified source of jobs is the dealer network that PRAN uses to distribute products. 3

**Milk Collection Centers:** Milk collection centers are at the heart of PRAN's dairy model and spread across Bangladesh. These simple one-room structures house 1,000 liter cooling tanks and quality control equipment. Farmers bring milk to these centers once or twice a day. After being tested for quality, the milk is stored and sent to the processing plant once a day. As PRAN's dairy operations have grown, so has the number of collection centers—doubling from 46 in FY 2008 to 93 in FY 2011.

**Dairy Hub:** In FY 2010 PRAN pioneered the dairy hub concept, which organizes activities around a group of milk collection centers by providing extension services to farmers supplying the centers. PRAN organizes and supports small dairy farmers by providing dedicated services and logistics support such as veterinary care, animal husbandry, dairy shelters, and advice on feeding and breed improvement. The objective is to make dairy farming a profitable opportunity for small farmers in rural Bangladesh.

PRAN operates a dairy hub in northwest Pabna and another close to the first in Natore. It plans to build another 47 such hubs across the country by 2020. The two current hubs cover 40 milk collection centers and about 1,400 farmers.

**Farmers:** About 7,500 dairy farmers supplied PRAN in FY 2008. Today there are 19,000. But the demand for non-household labor among these farmers has been limited by the nature of dairy farming in the country.

For most farmers, dairy is a complementary and secondary activity to agriculture. Most farmers selling milk have five or fewer than cows and sufficient spare household capacity to absorb the work and time that dairy production requires. Hence it appears that the main short-term employment effects are reducing underemployment in local households. The demand for non-household labor emerges at two thresholds: when the number of cows exceeds 5 and 10. In both cases an extra worker is needed. Further, local farmers suggested that it may take about three years to expand from 1 to 5 cows or from 5 to 10.

If one in four of the 11,500 additional farmers had expanded from the smaller category, approximately 1,440 indirect jobs would have been created among farming households between 2008 and 2011 (table 1). This estimate depends critically on the number of new large farmers compared to those transferring to work with PRAN because of the benefits of the dairy hub. Cattle farm workers earn about $80 a month, compared with the minimum wage of $37 a month for unskilled workers of legal age.

**Agents:** In addition to buying directly from farmers, PRAN purchases milk from agents who source from farmers. Farmers selling to agents do not receive extension services, but are subjected to similar quality standards at agent collection centers.

Agents also own milk collection centers and employ people there. Between FY 2008 and FY 2011, PRAN doubled its number of agents to 27. Based on interviews with some PRAN agents, this expansion created about 85 new jobs among this group.

**Suppliers of Dairy Product Packaging:** PRAN requires different packaging for its main products—tetrapaks for UHT milk, polyfilm for pasteurized milk, and tins for ghee. While all tetrapaks are imported, 90-100 percent of the two other packaging materials are supplied by two local manufacturers.

In FY 2008 these two manufacturers employed about 700 people. This number did not change between FY 2008 and FY 2011 even though their revenue has increased by 60-100 percent. Hence, no incremental job creation can be attributed to IFC’s investments.

**Job Creation in the Distribution Channel:** PRAN relies on a dedicated dealer network to distribute its products, with the number of dealers rising from 476 in FY 2008 to almost 700 in FY 2011.

Most of these dealers are relatively small—90 percent have annual turnover of less than $60,000. Most work for food companies besides PRAN and employ two to four to carry PRAN dairy products. The employees operate simple auto rickshaws or small motorized vehicles to take orders and deliver PRAN dairy products to retailers.

Based on interviews with dealers in Dhaka and the Pabna dairy hub, the dealer network created about 675 jobs between FY 2008 and FY 2011.
These semiskilled jobs require some driving skills with average wages of about 4000-6000 takas a month (US $50-75), and benefits such as a daily food allowance or ownership of cardboard boxes that bring additional income when sold.

**Employment in Other Parts of the Supply Chain:**
Transportation of raw milk between milk collection centers and processing plants and between plants and dealers is handled by PRAN’s cooling tankers. This reflects the absence of an adequate logistics chain in Bangladesh. The company also employs a small number of contractors at the plants to handle maintenance and civil works.

The supply chain also includes suppliers of cattle feed and veterinary and other products that support milk production. The feed supplements come from three or four local companies not accounted for in this analysis, while most of the veterinary products come from international companies.

In sum, approximately 2,200 incremental indirect jobs were created due to the 50,000 liter a day increase in PRAN’s dairy processing between FY2008 and FY2011. These were primarily unskilled and semiskilled jobs that paid more than the minimum wage. This translates into more than seven indirect incremental jobs created for every direct job. For every $1 million of project costs, this effect translates into more than 40 indirect jobs created for almost 6 direct jobs (figure 2).

**Poverty impact of PRAN dairy**

One of the most important effects of PRAN’s dairy operations has been providing market access to dairy farmers with guaranteed offtake and prices. This directly addresses one of the key challenges identified by the World Bank for Bangladesh—poorly functioning input and output markets. With the introduction of dairy hubs in two regions, PRAN also provides extension services to dairy farmers including access to modern techniques, equipment, veterinary services, and advice. The farmer interviews listed several effects on dairy farming activities and income:

- Milk yields have improved in the dairy hubs. Interviews with farmers and PRAN officials suggest an increase of about 2 liters per cow between FY2008 and FY2011.
- With better-quality milk and dairy farming techniques, less milk being rejected by PRAN’s collection centers.
- Animal mortality is now close to zero in the hubs due to dissemination of new technology.
- PRAN’s dairy operations have eliminated most middlemen between farmers and PRAN, raising prices for farmers. Farmers seem to prefer PRAN over its competition.
- Compared to the informal market for unprocessed milk, which accounts for 80 percent of the market, PRAN pays farmers 10-15 percent more for their milk—the same price offered by branded competition.

Bangladesh’s poverty rate is 32—35 percent in rural areas—and any increment in farmer income in rural parts of the country is significant which makes PRAN’s activities relevant in their poverty reduction impact. Moreover, the regions where PRAN’s two dairy hubs operate are among the poorest in the country. More income for farmers has meant more fodder for cows, more cows, more education for children, and money being invested back in farms.

PRAN’s operations have also had a broader impact on low-income customers. By expanding the UHT milk market and providing smaller packs, the company has increased access to milk for customers who might not have refrigeration facilities or be able to afford larger packs.

PRAN is not the only player in the dairy sector taking this “value chain” approach. BRAC, a social enterprise supported by the Bill and Melinda Gates Foundation, has been working with dairy farmers to provide similar extension services. Its progress report suggests that incomes of farmers associated with this program have risen 50 percent.

While increasing productivity in the dairy sector has been taken up by government and social enterprises, PRAN, as a private sector player, has been proactive in adopting this approach as a sound business model and to maximize its development impact.
Dairy cows in Bangladesh produce about 250 liters of milk a year—compared with 1,100 liters in neighboring India and more than 9,000 liters in the United States.

For liquid milk sales, PRAN is third behind MILKVITA and BRAC.

PRAN’s processing facilities for UHT milk also impacts PRAN’s fruit juice supply chain. The technology and facilities are the same, and PRAN’s use of this technology and expansion of its processing also have indirect employment impacts on mango farmers and juice distributors that were not assessed.

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5 Based on World Bank poverty maps; see http://go.worldbank.org/A91MVOASU0.


Estimating a job multiplier

Based on the direct and indirect jobs created by PRAN’s 50,000 liter a day increase in production, the job multiplier can be calculated in several ways (table 2). One could argue that due to PRAN’s activities to increase productivity between 2008 and 2011, seven indirect jobs were created for every direct job. But using the same ratio for another dairy investment in another region or with another client could be misleading for several reasons. A project with modest employment generation achievements will have a bigger multiplier if the number of direct jobs is comparatively small. The regional and industry context is also crucial and will differ by project and across countries even in the same industry if it is at different stages of lifecycle. In Bangladesh, for example, the dairy sector is underdeveloped, with large amounts of spare capacity for work in farming households. So this increase in farmer supply did not always translate into additional indirect jobs, but instead reduced underemployment. Further, due to the lack of logistics infrastructure in the country, PRAN is almost entirely vertically integrated—which means little indirect employment being in its supply chain. If these defining characteristics of the sector change in other projects, the indirect job effects, and hence the multiplier, will likely be different.

Conclusion and lessons

The effects of expansion and productivity-enhancing activities on PRAN’s direct employment are small relative to the indirect employment effects in its supply and distribution channels. In rural Bangladesh, which contains 80 percent of the country’s population, this job creation is critical.

This study was led by Ruchira Kumar, Development Impact Department (CDI), IFC, along with Dr. Vegard Iversen, Senior Research Fellow at the University of Manchester, under the guidance of Roland Michelitsch, Chief Evaluation Officer, CDI. Valuable inputs have also been provided by the sector and regional teams, particularly Syed Estem Islam of the Dhaka office.

Endnotes

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