



## **The Economics of Milk Production in Chiang Mai, Thailand, with Particular Emphasis on Small-scale Producers**

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### **EXECUTIVE SUMMARY**

#### **Introduction**

The main purpose of this study was to gain insight into the household and farm economics of small-scale dairy farmers in Chiang Mai, 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 farm types in Chiang Mai.

#### **Results**

##### **Milk Production in Thailand**

In the last decade, the Thai government has implemented key policy and market adjustments to enable its relatively young dairy sector to take off. From 1996 to 2003, the Thai milk production doubled, the milk yield per dairy animal per year increased by a factor of 1.7, the number of dairy animals rose by 10 percent higher while the Buffalo population shrank to 60 percent of its 1996 level.

With an average herd size of 20 head, Thai dairy farms achieve a milk yields of above 3,000 kg milk per dairy animal per year, which is 95 percent of the average yield of New Zealand dairies. In 2003, the Thai contribution to the world milk output is a mere 0.1 percent. Protected from international

competition, in 2004, the Thai farm gate price of 0.29 US\$/litre was 1.8 times higher than that in New Zealand, for instance.

### **Analysis of 'Typical Farms' in the Area of Chiang Mai, Thailand**

Based on the IFCN methodology, four farm types were identified as 'typical' and were subjected to detailed analyses. The very small dairy farms (TH-5) with 5 crossbred cows, 0.8 ha land, family labour only and milking by hand; the small farm (TH-14) with 14 crossbreds, 2.1 ha land, family labour only and 1-bucket milking machine; an average size farm (TH-21) with 21 crossbreds, 0.6 ha land, family labour and 2-bucket milking machine; and finally, a large farm (TH-117) with 117 crossbreds, 3.0 ha land, family and hired labour and a 3-bucket milking machine.

#### ***Dairy production systems***

Crossbred cows (Holstein F. with local breeds) are the main type of dairy animals. The crossbred cow is found to be ideal to capitalize not only on the strong demands for milk and beef, but also on the higher-than-world-market prices that Thai producers get for these two outputs. Buffaloes are used only for draught power and do not contribute to milk production in the region. The majority of the dairy farms are run with family labour while medium-sized farm with crop activities and larger ones tend to have hired labour. Grazing of fallow and forest land can be seen at certain times of the year, but typically dairy farms keep animals confined all year long. Feed rations are based on agricultural by-products such as rice bran, rice polish, broken rice and pulses meal. Commercial cattle feed is also used by all types of farms, including mineral mixes and injectable vitamins. Milking is done with a small locally manufactured machine and imported pipeline and portable milking buckets. In terms of energy corrected milk (ECM), production per dairy animal ranges from 3,150 to 3,380 kg per year.

#### ***Household comparison***

Household incomes range from 4,000 US-\$ to 23,000 US-\$ per year. Income structure is quite diverse and includes non-cash benefits (milk for family consumption and farm uses) and off-farm income (milk transportation services and employment).

#### ***Whole farm comparison***

The returns from farming range from 6,000 US-\$ to 135,000 US-\$ per year. The dairy contributes 100 percent to the whole farm returns since only forage crops are grown and fed on the farms. Net cash farm incomes, from 2,500 US-\$ to 23,000 US\$ per year, closely follow the same trends across farms as that of farm returns.

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

TH-21 has the lowest costs of milk production at 19 US\$ per 100 kg ECM whereas the largest farm has the highest at 23.5 US\$. TH-21's lower costs are attributable to lower opportunity costs for family labour and land factors.

These costs of milk production are slightly above those of the New Zealand milk price. Lowering these costs would mean that these farm types could 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.

### **Dairy Chain in Chiang Mai**

Unlike in South Asian countries such as India and Pakistan, 95 percent of the milk produced in the Thai province of Chiang Mai is captured by the formal sector. The rest is sold from farmer to retailer or the final consumer.

Comparing the formal versus informal dairy chains, the formal sector pays farmers 8 percent higher prices, but also gets 1.5 to 1.8 times higher consumer prices than the informal sector for liquid milk. Furthermore, the formal sector's UHT and pasteurised milks have 3.15 to 2.23 times the margin of those from the informal sector.

Farmers' shares in the consumer prices are 38 and 47 percent for UHT and pasteurised milks in the formal channels; while they are 65 percent in the informal ones. These results show that farmer shares in the UHT channel are relatively low when compared to its counterparts in Bangladesh and Orissa, India (with farmers' share of 52 and 45%).

### **Policy Analysis of Typical Dairy Farms in Chiang Mai**

The PAM results show that the farms receive about 30 percent higher output prices (milk and beef) while they also pay about 20 percent higher prices for their tradable inputs (mostly from duties on feed imports) than they would under free market conditions. In addition to that, due to policies, these farms' costs for using domestic factors of production (land, labour and capital) are only 68 percent of the value that would prevail if the market were undistorted.

These policies and market conditions mean that for each 1 US\$ profit made by the farmers, they receive net supports of 1.80 US\$ and 1.19 US\$ for the smallest and largest farm respectively. TH-21 is the exception receiving only 0.66 US\$. This clearly shows that while all of the farms require heavy supports, the smallest farm is capturing being by far the largest reward from the policies in place.

Finally, these results point to both the urgency for and the great opportunities to improve farm efficiency, competitiveness and gain comparative advantage through corrective policy actions.

### **Conclusions**

The present study of four typical dairy farming systems in Chiang Mai clearly shows that:

1. The dairy sector in Thailand in general and in Chiang Mai in particular has experienced tremendous development over the last decade. This development has been driven by the increasing domestic demand for dairy products coupled with strong support to milk (and beef) producers through governmental policies.
2. For the studied farms the costs of milk production only range from 19 to 24 US\$/100 kg milk, which is an intermediate cost level by IFCN comparisons (Dairy Report, 2004). For world competitiveness, however, these farms need to bring their production costs below 18 US\$, the cost of production achieved by low-cost-producers in India, Pakistan, Argentina, etc. (Dairy Report, 2004).
3. Supportive policies and partnerships with the private sector have quickly developed a formal dairy sector / chain with the infrastructure to collect, process and distribute over 95 percent of domestic milk production. This formal sector, through a system of dairy cooperatives, pays farmers higher milk prices than the informal channels and provides them with farm inputs and services otherwise not available or too costly to small-scale farmers.
4. Through a PAM analysis this study shows that the dairy farms greatly benefit from a farm gate milk price, which is over 1.5 times higher than the world market price and from policies that result in dairy farmers having to pay only about 70 percent of the cost of domestic factors of production. Both of these factors (protected milk price and subsidized domestic resources) seem to strongly discourage attempts to increase farm efficiency, particularly for small-scale producers. On the other hand, farms are taxed on their tradable inputs, which increases production costs. The PAM results suggest that significant gains in farm efficiency and competitiveness could be achieved through policy reform.
5. Study results show that there are great opportunities to increase small-scale farms' efficiency and competitiveness. If the creation of a vital and competitive dairy sector is an important policy goal, support given to the smallest farm type could be cut by about 50 percent through policy reform and still allow the small-scale dairy farmers to make a lucrative profit. However, in order to eliminate the other half of the support granted to this farm type, significant productivity increase and cost reductions must occur at the farm level. Therefore, policy reform must be accompanied by programs increasing farm competitiveness through raised production efficiency.

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Pro-Poor Livestock Policy Initiative (PPLPI)

Website: <http://www.fao.org/ag/pplpi.html>

Working Paper: <http://www.fao.org/ag/againfo/projects/en/pplpi/docarc/wp20.pdf>