Market-oriented Urban and Peri-Urban Dairy Systems

Urban and peri-urban dairy production systems are among the many forms of dairy production systems in the tropics and sub-tropics. The systems involve the production, processing and marketing of milk and milk products that are channelled to consumers in urban centres (Rey et al., 1993; Staal and Shapiro, 1996). These urban and peri-urban dairy production systems evolved to satisfy the increasing demand for milk in urban centres as a consequence of increasing urbanisation, rising per capita income and increasing cost of imported milk and milk products. They contribute to overall development through income and employment generation, food security, asset accumulation, poverty alleviation and improving human nutrition and health.

The development and sustainability of urban and peri-urban dairy production systems requires a relatively large initial investment and long-term commitment. In addition, the major technical and non-technical constraints associated with these dairy production systems such as availability and cost of genetic materials, breeding systems, feed resources, feeding systems, animal health, processing, marketing, public health, waste handling, management and handling, and policy issues need to be addressed. In this case study, the characteristics of the production systems, feed resources and feeding systems, genetic resource and breeding systems in urban and peri-urban dairy production in Ethiopia is assessed.

A study on market-oriented urban and peri-urban dairy production systems in the Addis Ababa milk shed was undertaken, to test a conceptual framework, developed by ILRI for general characterisation of dairy systems, characterisation of specific sub-systems and identification of major constraints. A total of 147 dairy farms (market-oriented smallholder and commercial) were selected for characterisation, and of the three urban systems 49 farms for a further detailed study.

PRODUCTION SYSTEMS

Seven, market-oriented, dairy production sub-systems were characterised. The 'milk shed' approach, was considered, referring to systems that supply fluid milk to the city. The rural and urban systems develop in a dynamic way and shifts between them occur. All these systems are basically market driven due to the large urban demand for milk. In fact they have developed in response to the market demand and have emerged depending on available resources (land, labour, feed, capital, etc).

Traditional crop/livestock farms in rural areas: These farms are located between 25 and 130 km from Addis Ababa, the average distance being 68 km from the capital. They are small farms with an average of four dairy cows, and provide very little or no specialised inputs (improved breeds, supplementary feed, housing, veterinary care, etc) to their dairy enterprise. They sell fresh milk on a daily basis to the government owned Dairy Development Enterprise (DDE). Excess milk is processed into butter and a local cottage cheese (known as *Ayib*) and sold in local markets.

Intensified dairy/crop livestock farms: These are smallholder farms located around Addis Ababa and exercise some form of intensive dairy production system. These farms have had experiences with dairy development projects under the Ministry of Agriculture. Projects such as the Selale dairy development project and the smallholder dairy development project have been operational in these areas and have influenced the production system. Improved genotypes, artificial insemination, improved forages, concentrate feeding, housing, calf bucket feeding and early weaning are common practices by farmers. Compared to those traditional crop/livestock farmers, land holding is about half the size and milk production is 15% higher, but the number of cows per household is similar.

Crop/livestock farms with intensive cropping: These farms are located relatively closer to Addis Ababa city, between 25 and 60 km. The farms and herds are 25% larger than the traditional crop/livestock farmers. The cropping system is more intensive, particularly with a frequent use of fertilisers. They provide supplementary feeds to their animals. Fresh milk is sold to the DDE and they seldom practice making dairy products.

Specialized dairy farms: These farms are located between 15 and 60 km from Addis Ababa. They are large farms with an average holding of 8.9 ha and 17 cows. They widely use specialised inputs such as improved genotypes, artificial insemination, forage production, improved housing, concentrate feeding, veterinary care, etc. They sell fresh milk in relatively large quantities of over 30 litres per day primarily to local informal markets or to the DDE. Most farm owners have additional off-farm activities often generating more income than livestock.

Photo by René van Veenhuizen

Milking shed in Nairobi

Peri-urban farms in secondary towns: These farms are located in and around secondary towns within 25 to 50 km from Addis Ababa. Cattle are grazed on owned or rented land. Special inputs are linked to the type of genotype and involve artificial insemination and supplementary feeds to grazing and stall-fed roughages. These

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Raw milk brought directly to the consumer

farmers, on average, own five dairy cows. The primary outlet for milk is either the DDE or local informal markets.

Intra-urban dairy farms in Addis Ababa: These dairy farms are specialised and intensive production units based on zero grazing of crossbred and high grade cows. There is little or no grazing within the city and stall-feeding is based on purchased hay and concentrates. The level of exotic blood in the herd is among the highest found in the sample. Annual milk production per cows is high and milk is directly sold to the local market.

Urban dairy in secondary towns: These are specialised dairy farms found in most secondary towns within the milk shed. In these small towns, farmers have more access to grazing; stall-feeding is therefore less intensive. The level of exotic blood in the herd is high, but herd size is the smallest of all types and averages about two cows per farm. Milk is sold fresh to local markets or the DDE, or processed into butter and *ayib* and sold. Most farm owners have off-farm activities representing about two-thirds of their income.

Detailed study conducted on three production sub-systems showed that 76%, 22% and 54% of the farms in secondary towns, peri-urban and intra-urban areas respectively are owned by female farmers. The percentage of illiterate farmers (owners) was highest in intra-urban (50%) farms followed by those in secondary town (37.5%) and peri-urban (12.5%) areas.

Conserved hay, agro-industrial by-products and commercial concentrate rations are the major feed resources used by urban and peri-urban dairy farmers. Hay makes up almost the entire basal diet of the peri-urban dairy farms. Agro-industrial by-products are fed as supplement to roughage based diets, and are mainly accessed by peri-urban production systems, due to the fact that most of the by-product processing industries are located around cities and towns where the demand for the edible major products is high. The use of commercial concentrates is restricted to institutional farms and certain large peri-urban dairy farms. Non-conventional feed resources like hulls of pulse and other crops, traditional brewery and alcohol residues, poultry waste, vegetable and fruit wastes (Yoseph Mekasha, 1999) are cheaper and play a significant role in peri-urban dairy production system.

Crossbred and grade animals are preferred by 85%, 67% and 44% of farmers, while pure temperate breeds are preferred by 10%, 33% and 56% of farmers in secondary towns, peri-urban and urban areas, respectively. Among the temperate dairy breeds, the Friesian is the most preferred one. About 92% of urban farmers produce their own animals through crossbreeding zebu cows with exotic bulls. Purchase of heifers or cows from other dairy farms is the main source for 29% of the farmers in secondary towns and 17% in peri-urban areas. The criteria for selection of animals are variable. Milk yield potential, reproductive efficiency, disease resistance, breed or size are the most important criteria for bull selection.

Cash income from sale of milk and/or breeding animals and utilisation of available resources (land, feed, labour, capital) are the most important reasons for keeping dairy animals in urban and peri-urban dairy production systems.

CONSTRAINTS AND OPPORTUNITIES FOR DEVELOPMENT

Market-oriented urban and peri-urban dairy production systems are emerging as important components of the milk production systems in Ethiopia. These systems are contributing immensely towards filling in the large demand-supply gap for milk and milk products in urban centres, where consumption of milk and milk products is remarkably high.

A recent survey undertaken by the Addis Ababa Agricultural Bureau shows that there are a total of 5,167 small, medium and large dairy farms in and around Addis Ababa city. The total milk production from these dairy farms amounts to 34,649,450 litres per annum. Of this, 73% is sold, 10% is left for household consumption, 9.4% goes to calves and 7.6% is processed mainly into butter and *ayib* (Azage Tegegne and Alemu Gebrewold, 1998). The total amount of milk available to Addis Ababa is 43,849,675 litres per annum.

The large demand for milk on the one hand and the small supply of milk and milk products for the major urban centres in Ethiopia on the other hand shows the untapped potential for development of urban and peri-urban dairy farms. Market-oriented smallholder peri-urban dairy production systems have tremendous potential for development and could play a significant role in minimising the acute shortage of dairy products in urban centres. Current increases in economic pressure, competition for limited resources and market forces have led to an increase in the level of intensification in these production systems.

In order to sustain high productivity and profitability, high levels of management in appropriate feeding, health care, and reproductive management are essential. These urban and peri-urban dairy farms are currently facing new challenges associated with intensive production systems. Availability of land, management skills, labour force, feeding resources and systems, genetic improvement, control of diseases and parasites, udder health and mastitis, calf mortality, reproductive problems, waste management, quality control, processing and marketing and other socio-economic considerations are becoming important factors influencing and determining the survival of these production systems.

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