

THE KENYAN DAIRY SUB-SECTOR

A Rapid Appraisal

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MOA/KARI/ILRI

Smallholder Dairy (Research & Development) Project Report

Funded by

British Department for International Development (DFID)

January, 1999

This publication includes preliminary results of market-oriented smallholder dairy research conducted by the collaborative MoA/KARI/ILRI Smallholder Dairy (R&D) Project in Kenya. The results are published informally to enable early dissemination of research outputs. It has not been prepared in accordance with the formal publication procedure of any of the collaborating institutions. Comments are welcome.

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Acronyms and Abbreviations

ACZ	Agro-Climatic Zone
ADC	Agricultural Development Corporation
AI	Artificial Insemination
approx.	Approximately
CAIS	Central Artificial Insemination Station
Coop.	Co-operative
DANIDA	Danish International Development Agency
DFID	Department for International Development, United Kingdom
ECF	East Coast fever
EU	European Union
FAO	Food and Agriculture Organisation
FMD	Foot and Mouth Disease
FWM	Fresh Whole Milk
GDP	Gross Domestic Production
GM	Gross Margin
GNP	Gross National Product
GTZ	German Technical Co-operation
ha.	hectare
HIT	Heifer-In-Trust
CBPP	Contagious Bovine Pleuro-Pneumonia
HPI	Heifer Project International
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institute
JICA	Japanese International Co-operation Agency
KARI	Kenya Agricultural Research Institute
KCC	Kenya Co-operative Creameries
KDB	Kenya Dairy Board
kg	Kilogram
km	Kilometre
LME	Liquid milk equivalent
<i>MALA</i>	(“ <i>maziwa lala or mgando</i> ”) Soured Milk
MALD	Ministry of Agriculture and Livestock Development
MALDM	Ministry of Agriculture Livestock Development and Marketing
MLD	Ministry of Livestock Development
MoA	Ministry of Agriculture
MT	Metric Tonnes
Mt.	Mount
NAFCO	National Agricultural and Food Corporation
NEP	National Extension Project
NGO	Non Governmental Organisation
RRP	Regional Research Programmes
ODA	Overseas Development Administration
RA	Rapid Appraisal

SDP	Smallholder Dairy (Research & Development) Project
SIDA	Swedish International Development Agency
SMP	Skimmed milk powder
SNV	Netherlands Volunteer Services
TBD	Tick Borne Diseases
KNAIS	Kenya National Artificial Insemination Services.
LDP	Livestock Development Project
NDDP	National Dairy Development Project
TOR	Terms of Reference
KSh.	Kenya Shilling
EAZ	East African Zebu
UHT	Ultra Heat Treated milk
US\$	United States Dollar

Executive Summary

The Rapid Appraisal (RA) report presents the results of a study of Kenya's dairy systems carried out by the MoA/KARI/ILRI Smallholder Dairy Project (SDP). Interdisciplinary teams from SDP examined Dairy Production Systems, carried out Economic and Structural Analysis of dairying, and addressed Policy and Institutional Issues related to dairy development in Kenya. The methodology used in the appraisal is a refinement of that used by ILRI and its national collaborators in Uganda and Tanzania. The RA is an indicative analysis of the dairy systems within the following milk sheds and consumption centres: Lake Basin; Central and South Rift Valley; Central Province; Eastern Province; Greater Nairobi; and, Coast Province.

A brief history of the dairy industry in Kenya is presented that may partly explain its uniqueness in the East African region. The report highlights the increasing opportunities which smallholder dairying represents for income generation and agricultural development, including the opportunities for increasing production and marketed output; the important interaction between access to the market and levels of milk sales and prices; the lack of accurate estimates of demand patterns; the importance of informal milk marketing and concerns over associated public health hazards; the lack of accurate livestock census reports to allow accurate impact assessments; and, the potential for large increases in the productivity and profitability of dairying stimulated by the liberalisation of milk processing, marketing and input services.

Milk Marketing and Consumption

Based on MoA cattle population statistics and research reports, it is estimated that approximately 3,078 m. litres of milk are produced annually¹, 81% of which originates from approx. 3 m. dairy cattle² (2.5 m. of which are in smallholdings), and the rest from the indigenous herd. Almost all marketed milk comes from the dairy herd and a high proportion (about 70%) originates from the smallholder dairy herd. From the annual smallholder dairy herd production of 1,720 m. litres, about 626 m. litres (36%) are consumed on-farm (456 m. litres consumed by household and 170 m. litres offered to calves), and 1,092 m. litres (64%)

¹ This estimate is about 20% higher than MoA (1997) estimates and is based on reviews by Peeler and Omore (1997) and recent findings from SDP characterisation surveys (see discussion under demographic over-view in Section 2)

² Dairy cattle refers to specialised dairy *Bos taurus* cattle and their crosses with *Bos indicus* (EAZ) breeds

are offered as marketed surplus. This marketed surplus is sold through: (i) direct sales to consumers, either individual or institutional, which account for 600 m. litres (55% of marketed milk); (ii) co-operatives, self-help groups and traders, who market milk in local and urban markets, handle some 414 m. litres (38%), out of which 44 m. litres is sold to KCC; and (iii) sales to the private processors, either directly or through coops, totalling about 164 m. litres. Important market outlets for large scale producers are the few large private dairy processing plants and Kenya Co-operative Creameries. Marketing infrastructure is most advanced in Central Province, especially in Kiambu District, where dairy co-operatives play a major role, while direct sales from producers to consumers are common in Coast, Southern Rift Valley and Western Kenya. Sales of processed milk by KCC and private dairies comprise only 19% of marketed milk, most of which is sold in Nairobi.

Following liberalisation of milk marketing in 1992, an increasing number of private sector participants are getting involved in transporting, processing and distribution of milk, most of which is sold raw, reflecting consumer preference for lower price and high butter-fat. Hawking plays an important role, particularly by increasing consumer convenience and providing employment. Milk traders operate mostly in high population density peri-urban areas, particularly in Kiambu and Murang'a districts, where the competition they provide threatens the survival of some dairy co-operatives. Estimates of marketing margins indicate strong returns for most informal market agents, especially small milk traders whose returns range from 8 - 20% depending on the region. Farm gate prices for raw milk are lowest in milk surplus areas such as Nyandarua and Murang'a districts and highest at the coast, where milk deficits are acute. The prices range from KSh 11/litre (approx. US\$ 0.18) in Nyandarua to KSh. 35/litre (approx. US\$ 0.6) in Mombasa, reflecting extremes in milk surplus and deficit areas. Though sufficient information to assess general consumption and preference patterns is lacking, indications are that most consumers prefer and consume (boiled) raw milk, especially in tea.

Dairy Production Systems

Demographic statistics show the importance of the smallholder dairy cattle herd; it comprises 20% of the cattle population and produces an estimated 56% of the milk from cattle. About 60% (approx. 1,900 MT) of the milk produced in Kenya comes from less than 10% of the country's landmass in the fertile central districts of the Rift-Valley and Central Provinces where 80% of exotic and cross-bred dairy cattle, mostly kept by smallholders, are found. Other areas with significant dairy production include Western Province, Embu, Kisii and Meru Districts. Extensive cattle production with the Small East African Zebu (EAZ), is concentrated in agro-pastoral systems in the Rift-Valley, Eastern and North-Eastern, and in sedentary systems in Coast and Nyanza Provinces. Western and Eastern Provinces also

contribute a small proportion of their milk offtake to local rural markets, including through direct sales to neighbours.

The major cattle production systems are, broadly, comprised of two large scale and two small scale systems. The large scale systems are: (i) intensive and semi-intensive dairy production with *Bos taurus* cattle that is entirely market-oriented. This system is estimated to have 500,000 cattle found mostly in private dairy farms in central Rift Valley; and, (ii) extensive dairy-meat or pastoralism with *Bos indicus* (EAZ) cattle. This system has about 4.5 m. cattle mostly concentrated in the north and central Rift Valley, Eastern and Coast Provinces. The small scale systems are: (i) intensive rural dairy-manure production with *Bos taurus* and crossbred dairy cattle that is mostly market-oriented. This system has the majority of dairy cattle (approx. 2.5 m.) and the highest concentration is found in the Central and Rift Valley Provinces; and, (ii) semi-intensive dairy-meat-draught-manure production with *Bos indicus* and few crossbred dairy cattle that is mostly subsistence oriented. This system has about 5.3 m. cattle mainly in Nyanza, Western, Coast, Eastern and Rift Valley Provinces. It was concluded that the potential for increased marketed milk production is through increasing individual animal productivity in the small scale intensive rural dairy-manure production system.

Institutional and Policy Issues

The lack of infrastructure, especially roads, water supply, input services and access to markets were cited by producers, market agents and extension staff as the most important constraints in many areas. The liberalisation of milk marketing in 1992 was accompanied by policy changes that led to considerable change in institutional aspects of the dairy sub-sector, including increased private sector participation and government divestiture. Increased private sector participation has, as yet, not filled the gaps in the provision of support services and the supply of inputs, including breeding, veterinary clinical and credit services. Though farmers' organisations, including co-operatives, are already beginning to respond to these needs, many areas outside Central Province do not have these organisations. An increase in public investment in maintenance of roads would increase milk offtake in dairy producing areas. Innovative ways to encourage community participation in working out modalities for solving widespread problems (e.g., lack of maintenance of access roads) are needed to supplement any government efforts.

Primary Constraints

The primary constraints under **milk marketing and consumption** include: (i) poorly understood structure and performance of the informal private sector; (ii) lack of reliable

information on demand patterns, including product differentiation and changes in dairy consumption habits with urbanisation; (iii) limited market information on input (e.g., feed) and output markets; and, (iv) concerns over public health hazards of marketed raw milk, associated with increased informal milk marketing, particularly brucellosis, zoonotic tuberculosis and low standards of milk hygiene. An understanding of these factors can enable the design and promotion of more efficient market mechanisms, and the formulation of informed policies.

The primary constraints to increasing productivity in **intensive and semi-intensive smallholder dairy production systems** include: (i) under-nutrition and seasonal fluctuations in quantity and quality of feed resources and the low rate of adoption of available technologies to address them; (ii) the important disease challenge in extensive areas, especially TBDs and trypanosomosis; (iii) unreliable access to inputs, particularly credit, breeding and veterinary services, especially in areas with poor marketing infrastructure. Underlying all these constraints is the lack of accurate data, including livestock census data, to enable the accurate *ex-ante* impact assessments of potential interventions in specific production systems.

Primary constraints under **policy and institutional aspects** are: (i) poor infrastructure particularly roads, to allow improved access to output markets; (ii) poor rural water supply; (iii) mismanagement in farmers' organisations due to low level of farmer control; (iv) slow changes in the policy environment and the enactment of regulations to back up policy changes; and, (v) poor linkages between input and output markets by farmers' organisations.

1. Introduction

Dairy farming in Kenya is dominated by smallholders who are estimated to contribute approx. 56% and 70% of total and marketed milk production, respectively (Peeler and Omore, 1997). These are farmers who, besides growing crops for subsistence and for sale, mostly keep 2 to 3 cows with their followers on land sizes typically of about 1 ha. in the intensively farmed areas and about 2.5 ha. in the extensively farmed areas (Staal et al., 1998; MoA/KARI/ILRI, 1998). The estimated total population of 2.5 million of dairy cattle in approx. 625,000 smallholdings (MoA, 1996; Peeler and Omore, 1997) suggests that this sub-sector employs many Kenyans who derive a regular source of cash income and balanced nutrition.

Although smallholder dairy production accounts for most of the total milk production in Kenya, individual cow productivity is low (Omore *et al.*, 1996a; Staal *et al.*, 1998), but the potential for increased productivity per animal is considered to be high. Since most Kenyans live in smallholdings and are resource-poor with 47% of rural households living below the poverty line (CBS, 1998), there is consensus that research and development efforts within the agricultural sector are best targeted to the smallholder dairy sector. This is mainly because dairying represents a promising avenue for improving the welfare of resource-poor rural communities. Other reasons cited in favour of focusing research and development efforts on smallholder dairies include: the potential for increasing demand for milk due to growing urbanisation and potentially higher incomes against projected shortfalls in supply; the high income elasticity of demand for milk; the predominance of smallholdings in the most suitable dairy production zones; the central role that livestock play in nutrient cycling in mixed farms; and, increased income generation opportunities.

The opportunities for increased productivity and improved welfare continue to be enhanced through increasing private sector participation and reduced government involvement in both milk marketing and livestock services in producing areas. There is increasing private sector activity through various actors, including small traders, private dairy processors and farmer groups, each innovating mechanisms for collecting and retailing milk and for providing inputs and animal reproduction and health services. The changes have also shifted the patterns of incentives in the dairy sub-sector. This Rapid Appraisal (RA) provides stakeholders in the sub-sector with an overview of the current situation and insights into the main issues that require urgent attention to further enhance the benefits of smallholder dairying. Successful alleviation of those constraints which may currently impair the performance of the dairy sub-

sector and further development, can enhance those benefits in addition to matching projected demand through increased productivity. The central emphasis of this appraisal was to identify those constraints, whether technical, economic, or institutional in nature.

The appraisal is an output under the DFID sponsored MoA/KARI/ILRI Smallholder Dairy Project (SDP) whose purpose is to identify required actions for the creation of a supportive operational environment for market-oriented smallholder dairying. This study, which has been conducted using, as a guideline, ILRI's Conceptual Framework for Dairy Research (Rey et al., 1993), has highlighted the potential that smallholder dairying represents for income generation and agricultural development within the context of current activities. These include: the important interaction between access to the market, agro-ecology (and hence production potential), levels of milk sales and prices; the lack of accurate estimates of demand patterns; the importance of informal milk marketing and concerns over associated public health hazards; and, the potential for large increases in the technical efficiency, expansion and profitability of dairy production stimulated by the liberalisation of milk processing, marketing and of input services.

This report is a summary of individual team reports. The report provides a brief historical and demographic overview and presents the analysis under three themes namely: marketing and consumption aspects; dairy production systems; and, policy and institutional issues. The main issues under each of these themes are summarised at the end of each section.

2. Historical and Demographic Overview

Major Events in the History and Development of the Dairy Industry in Kenya

Market-oriented dairy farming with exotic cattle in Kenya started almost a century ago when European settlers introduced dairy cattle breeds from their native countries. Most of these settlers occupied the most agriculturally productive highland areas in central parts of Rift Valley and Central Provinces. Cross-bred cattle dairy production by Africans started after 1954 when a colonial policy paper, the Swynnerton Plan of 1954, allowed them to engage in commercial agriculture. By 1963, when Kenya attained independence, the dairy herd had expanded to about 400,000 exotic cattle and their crosses with the local East African zebu.

To support the expanding and export oriented dairy production by European settlers, key livestock support and marketing services were initiated. The Veterinary Research Laboratories in Kabete and the Animal Husbandry Research Station in Naivasha were

started in 1903 to assist in controlling livestock diseases and provide animal husbandry research services, respectively. The Kenya Co-operative Creameries (KCC) was founded in 1925 to process and market dairy products (mainly butter and cheese) locally and abroad. The need to control reproductive diseases and improve genotype quality of dairy stock led to the establishment of the Central Artificial Insemination Station (CAIS) in 1946 in Kabete. In 1958 the Kenya Dairy Board (KDB) was established through an Act of Parliament to regulate dairy marketing.

After independence in 1963, many foreign settlers who opted to leave the country sold their farms to Africans or to the government. Many of these farms were rapidly sold to African smallholders resulting in a decline of dairy cattle population in large-scale farms from 400,000 to 250,000 heads by 1965 and a rapidly expanding smallholder herd. To encourage dairy production, the government effected a number of changes in the provision of livestock production and marketing services. By 1966, free or cheap and efficient livestock services were introduced including clinical and daily runs to provide artificial insemination services. In 1971, the government abolished the contract and quota system of dairy marketing to KCC. The system had effectively excluded most smallholder producers from selling milk to KCC.

The relatively efficient provision of livestock services continued until the early 1980's when the efficient delivery of the services became impossible due to government budgetary constraints. The serious decline in their provision prompted the government to seriously think about restructuring the industry with a view to increasing the role of the private sector. These changes are contained in various policy documents including: the National Livestock Development Policy (1980); National Food Policy (No. 4 of 1981 and No. 2 of 1994); Sessional Papers (1986; 1994) on renewed economic growth and recovery; and, policy framework papers on economic reforms published between 1996 and 1998.

For the dairy sub-sector, the major policy change was the liberalisation of milk marketing in 1992 (Dairy Development Policy, 1993), which followed recommendations contained in the Dairy Master Plan (1991). This policy change effectively ended KCC's monopoly in milk marketing in urban areas. Its major impact has been a rapid growth of the formal and informal private sector which provides input and output services, and a redistribution and increase of the overall social and economic benefits of market-oriented dairying to smallholder producers, market agents and consumers in Kenya. Changes in the legal framework to support the stated policy revisions have however lagged behind the policy statements.

Demographic Overview

Kenya has a total area of 581,787 km². Of this, only approx. 20% is suitable for arable agriculture and supports over 70% of the population. Population density in many parts of the arable land is estimated at about 500 persons per km². The current (1998) population is estimated at 29 million given the estimated population of 21 million in 1989 and an annual growth rate of 3.3% (CBS, 1994). The population of Nairobi, the biggest outlet for marketed milk, is currently (1998) estimated at 2,000,000 persons comprising approx. 41% of urbanised Kenyans (CBS, 1995)³. Per capita GNP has been declining gradually since 1980 when it peaked at over US\$300, to only US\$260 presently.

Table 1. Ruminant livestock^a populations and annual milk production in Kenya

Province	Indigenous cattle		Dairy cattle		Small Ruminants		Milk Prod. ('000 MT)	Milk per Capita	Milk per Km ² MT
	Pop ('000)	%	Pop ('000)	%	Pop. ('000)	%			
Central	78	<1	810	27	690	4	699	165	52.8
Coast	1,074	11	45	1	1,308	8	100	40	1.2
Eastern	1,498	15	273	9	3,010	17	325	63	2.1
North Eastern	809	8	<1	<1	1,268	7	47	93	<1
Nyanza	2,089	21	149	5	1,612	9	230	48	18.4
Rift Valley	3,358	34	1,666	55	9,258	53	1,571	231	8.6
Western	925	10	102	3	328	2	126	36	15.2
Total	9,831	100	3,045	100	17,474	100	3,098	106 ^b	5.3

^aSource: MoA Annual Reports and Peeler and Omere (1997). Figures exclude milk production from camels, which is significant in parts of Eastern and North Eastern provinces.

^bThe overall milk per capita takes into consideration the population of Nairobi

The agricultural sector is estimated to contribute about 27% of GDP and is the most important sector of the economy, generating about 65% of export earnings (CBS, 1995). Livestock contribute approx. 30% and 10% of agricultural GDP and overall GDP, respectively. Ruminant livestock populations are currently estimated at around 10 million EAZ and 3 million exotic dairy or their crosses, 10 million goats and 7 million sheep (MoA, 1996). No livestock census has been conducted recently to establish the actual livestock numbers, their growth rate and number of households keeping them. Most exotic dairy breeds are found in the central highlands, while most EAZ cattle are kept under pastoral systems in non-arable and low-rainfall rangeland areas in Eastern, North-Eastern Provinces

³ The World Bank (1989) estimated a higher proportion of 57%

and in northern and southern parts of the Rift Valley Province (Table 1 Figure 1). About 2.5 million of the 3 million dairy cattle (83% of the dairy herd) are estimated to be in smallholdings.

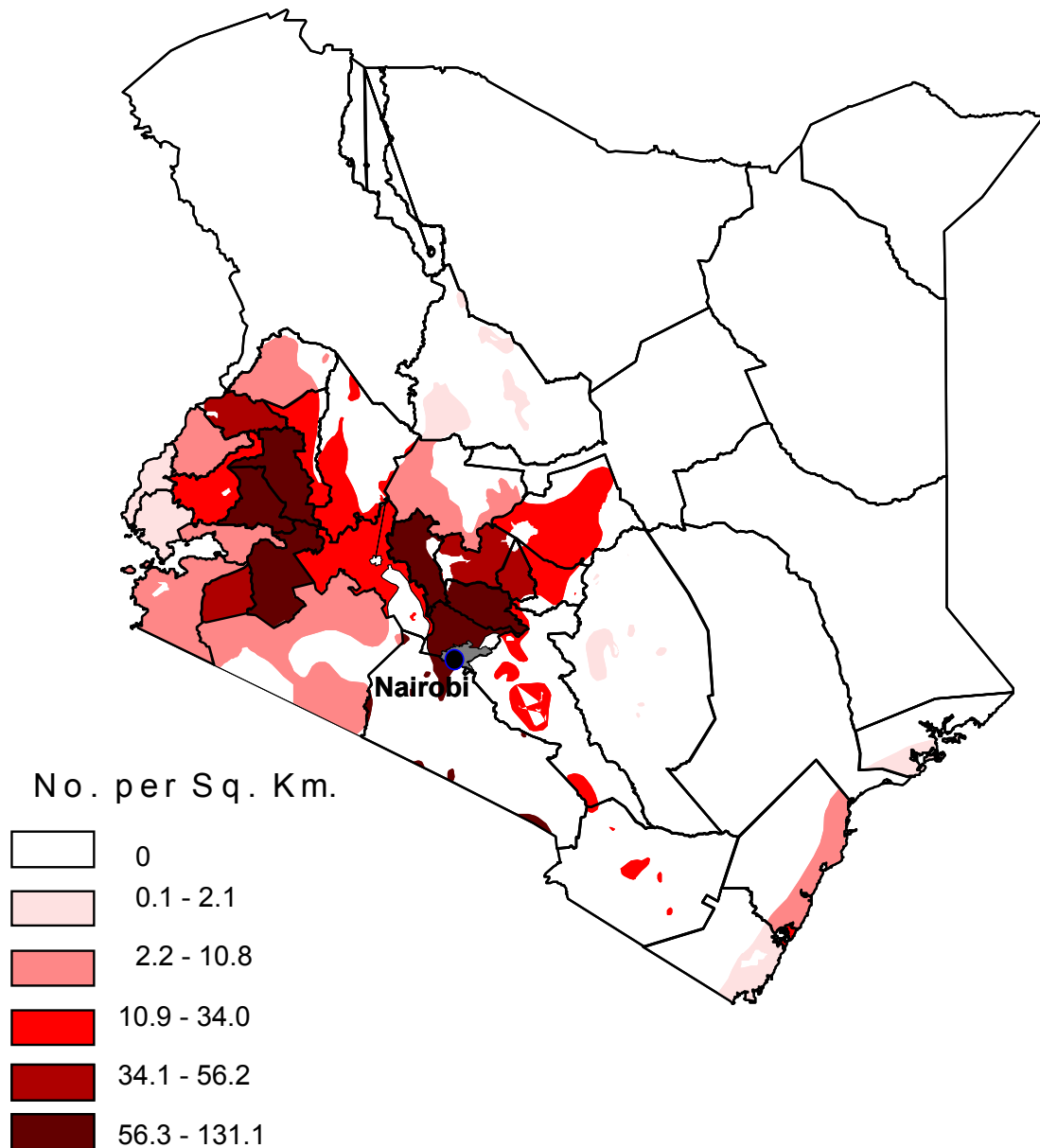


Figure 1. Dairy herd density

Total milk production is estimated at 3 million MT from both the local and the dairy herd, equivalent to KSh 43 billion (US\$ 717 million)⁴ in 1997, which constitutes approximately 50% of total value all livestock products (Peeler and Omore, 1997). Though accounting for

⁴ 1US\$ was equivalent to approx. KShs. 60 in 1998