

# **SMALLHOLDER DAIRY PRODUCTION AND MARKETING IN KISII, NYAMIRA AND RACHUONYO DISTRICTS: A Review of Literature**

**M. O. Ojowi, R. O. Ogidi, J. N. Obanyi, M. O. Owango  
and Nyamira, Kisii Central and Rachuonyo DLPOs**

**Kenya Agricultural Research Institute,  
Regional Research Centre, Kisii**



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*Please send comments to the authors at Kisii RRC and to the SD (R&D) Project Manager:*

*ilri-ma@AfricaOnline.co.ke*



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## 1.0 INTRODUCTION

Regional Research Centre Kisii mandate area covers nine and four Districts in Nyanza and Rift Valley Provinces respectively. These are Nyando, Kisumu, Rachuonyo, Homabay, Migori, Nyamira, Kisii, Gucha, Kuria, in Nyanza and Transmara, Kericho, Bomet, and Bureti in the Rift Valley Province. Geographically the area extends from latitude 0<sup>0</sup> to 2<sup>0</sup> S and longitude 34<sup>0</sup> to 35<sup>0</sup> 30' E. The mandate area encompasses 12 Agro-Ecological zones (AEZs). Kisii and Nyamira districts cover Upper Midland (UM1, Lower Highland (LH1 and LH2) AEZs. Homabay, Rachuonyo, Migori Kuria and Transmara occupy Lower Midland (LM1 - LM5) while Kisumu and Nyando cover LM1-LM4. Kericho, Bomet, and Bureti are in the Upper highland zones and occupy UH1 – UH2 with some pockets of LH and LM zones (Jaetzold and Schmidt 1982). Other than crops and soils the Regional Research Centre is mandated to conduct adaptive, applied and on-farm livestock research aimed at improving animal nutrition, feeding and management practices for recommendation to various categories of livestock farmers in the region. Three of the districts in the region (Kisii, Rachuonyo and Nyamira) have a combined cattle population of 336118 head of exotic, crosses and Zebu cattle. The cattle are also kept for cultural as well as emergency purposes such as payment of dowry, school fees, as an indicator of wealth and also for ceremonial purposes.

The ultimate goal of dairy farmers is to realize and increase in milk production. Some of the objectives of the Soil Management Project at RRC – Kisii are to assist farmers achieve some if not most of their goals. In 1998, it was therefore proposed that a study be carried out to evaluate the milk production potential of cattle fed Napier grass/legume intercrop grown using different fertilizer regimes. In a related project participating farmers in Bogetaorio village in Rigoma division of Nyamira district understood the value of legumes as important protein sources to their milking cows as well as the role they play in soil fertility. Other studies include DFID funded maize defoliates as a source of livestock feed and good quality feeding of cattle to produce high quality farmyard manure.

The dairy industry in the three districts should pick up in the near future provided steps are taken by the relevant stakeholders to:

- Provide the much needed grade or improved breeding stock
- Improve the current breeding programmes especially artificial insemination
- Introduce better fodder and legume crops, forages and pastures in areas where there are none
- Avail adequate veterinary services to all interested livestock producers
- Provide credit facilities to farmers who are willing to invest in livestock farming
- Improve the infrastructure in the rural areas particularly Nyamira district where poor roads have a big impediment to milk production and marketing.
- Provide adequate and organized milk marketing channels
- The question of extension staff mobility should be urgently addressed.

## 2.0 CATTLE POPULATION AND DISTRIBUTION

### 2.1 Kisii Central District

Central Kisii District is one of the twelve districts in Nyanza Province. It is situated at the south – eastern part of the Province between latitude 0<sup>0</sup> 30' and 0<sup>0</sup> 58' s and longitude 34<sup>0</sup> 38' and 35<sup>0</sup> E. The district covers an area of 645 km<sup>2</sup> of which 499 km<sup>2</sup> is arable and can be used for production of both crops and livestock. The altitude of the district is 1420 m a.s.l. in the lower areas (Suneka and Mosochi divisions) and 2000 m a.s.l. in the higher areas (Keumbu and Masaba divisions). The types of soils in the district include Nitosols Phaezems in Keumbu and Masaba divisions, Nitosols composols in Mosochi and Marani divisions and mainly Ferrasols Luvisols type of soils in Suneka division. The cattle population comprises of 105955 head of which 57% are grade and 43% Zebu.. There are 529 zero-grazing units in the district housing a total of 1343 mainly grade cows. The district is not self sufficient in milk production and relies heavily on milk imports from neighbouring districts such as Bomet, Bureti and Kericho. Some of the milk is also obtained from processing plants such as KCC, Ilara and Premier.

**Table: 2.1.1 Livestock enterprises and household per division in the district**

Division	Area km <sup>2</sup>	H. H. No.	Livestock enterprise
<b>Keumbu</b>	149.30	28,141	Cattle, poultry, goats, sheep and pigs
<b>Suneka</b>	123.40	14,723	Cattle, poultry, goats, sheep pigs donkeys
<b>Masimba</b>	88.80	8,720	Cattle, poultry, goats, sheep rabbits bees
<b>Kiamokama</b>	81.50	8,000	Cattle, poultry, goats, sheep rabbits bees
<b>Mosochi</b>	87.00	16,743	Cattle, poultry, goats, sheep pigs bees
<b>Marani</b>	125.00	16,401	Cattle, poultry
<b>Total</b>	<b>655</b>	<b>92,728</b>	

The average milk production levels per cow per day are 8 and 1.5 litres of milk for grade and Zebu cattle, respectively. Most of the milk is produced from grade cattle (96%) with Zebu cattle accounting for the rest.

**Table: 2.1.2 Cattle distribution in the district over the past five years**

Cattle Type	Year				
	1995	1996	1997	1998	1999
<b>Grade</b>	97,119	101,104	49,769	55,989	63,628
<b>Zebu</b>	170,438	172,938	41,039	41,493	42,327
<b>Total</b>	<b>267,557</b>	<b>274,042</b>	<b>90,808</b>	<b>97,482</b>	<b>105,955</b>

### 2.2 Nyamira District

The district has an area of 861 km<sup>2</sup> of land out of which 691 km<sup>2</sup> can be used for various agricultural activities. The altitude ranges from 1280-2100 metres (a.s.l). The bi-modal rainfall patten ranges between 1200-2100mm per annum. The human population in the district is estimated to be 489,883 spread in 60880 households in the district. Dairy

production is the major livestock enterprise in the district. Apart from the settlement area (Borabu division) Most of the dairy activity is undertaken on smallholder farms with one hectare or less of land. Most of the dairy herd (over 70%) is made up of grade cattle and their crosses with an average milk production of 6 litres per day per cow while the zebu cattle produce 2.2 litres per day per cow.

**Table: 2.2.1 Cattle distribution per division in Nyamira district**

Type	Nyamira	Manga	Rgoma	Borabu	Ekrrenyo	Total
Zebu	5,732	8,084	2,296	6,519	7,155	29,786
Crosses	4,902	9,453	6,850	15,143	4,922	41,270
Purebreds	396	1295	798	1,101	874	4,464

Approximately 60% of the cattle in the district are grade. There is a notable decrease in numbers of zebu cattle over the years due to upgrading and replacement through purchase of exotic breeds from neighbouring districts.

## 2.3 Rachuonyo District

The district cover an area of 930 km<sup>2</sup> of which 835 km<sup>2</sup> are dry land and 95 km<sup>2</sup> are covered by Lake Victoria. 744 km<sup>2</sup> are arable land while 91 km<sup>2</sup> are marshy, rocky and badly eroded or too steep for cultivation. The open area for grazing is 223 km<sup>2</sup>. The district has a population of 379725 people with 47905 households and an average farm holding of 4.8 acres distributed in four divisions, 38 locations and 96 sub-locations. Ecological zones in the district cover mainly UM1-2 and LM1-4. The altitude ranges from 1300 – 17700 m a.s.l along the lake Victoria shores to the upper areas bordering Kisii and Nyamira Districts. Rainfall is bi-modal and ranges from 800-1400 mm per annum. The soils are clay loam, sandy loam black cotton and deep red soils.

**Table:2.3.1 Cattle population and distribution in Rachuonyo district**

Type	Kasipul	Kabondo	East Karachuonyo	West Karachuonyo	Total
Grade	1,362	722	55	44	2,183
Zebu	50,960	20,500	50,300	30,700	152,460

The district has a large population of Zebu cattle, which produce 98.5% of the milk in the district. Milk requirement for the district is 32 million while the production is 11.5 million litres annually.

## 3.0 MILK PRODUCTION AND MARKETING

### 3.1 Kisii Central District

Most of the milk produced in the district is from grade cattle, which accounts for 96%. There are no organized milk marketing channels. Almost all milk produced in the district sold through hawking and the rest at the farm gate. The milk price ranges from Kshs 20-

35/= in rural and urban areas. Due the efforts of LDP in the district there has been an improvement in milk production and therefore increase in income of the farmer. This has been achieved through upgrading local cattle by using grade bulls and provision of dairy cows to the women groups in the district. Some of these achievements include:

- 38 cows given to 20 women groups
- 20 rotations have exchanged hands
- 31 women groups in the scheme have opened bank accounts
- 10% mortality for the procured cows has been recorded which is an enormous achievement considering the district average.
- 37 bull schemes have been established of which 14 are currently active.

However, there is an urgent need to address the problems of calf and bull mortality at 45% and 59% respectively. The problem has been identified as tick borne diseases. The bull distribution has also been concentrated in the three divisions of Marani, Mosochi and Suneka.

**Table:3.3.1 Milk production, cattle population and other trends in Kisii District**

Year	1998	1997	1996	1995
<b>Grade cattle population</b>	55,989	49,769	101,104	
<b>Zebu cattle population</b>	41,493	40,987	172,938	
<b>Zero-grazing units</b>	529	442		
<b>No of cows per unit</b>	1,343	1,197		
<b>Grade milk million (L)</b>	51.8	47.8	95.8	
<b>Zebu milk million (L)</b>	2.1	4.4	18.7	
<b>Milk sold thro' co-ops (L)</b>	-	743	32,842	55,929
<b>Active coops</b>	Nil	1	2	3
<b>Acres pasture</b>	14,050	11,879		
<b>Acres Napier</b>	3,079	3,388		
<b>Legume trees</b>	4,000	31,000		

**Constraints to Dairy Production in Kisii Central district.**

- Few women groups due to limited funding
- Lack of credit facilities
- Limited land sizes have contributed to less forage establishment
- High cost of acaricides for control of ticks
- Poor management of communal dips which has led to high incident of tick borne diseases



### 3.2 Nyamira District

Dairy farmers in the district play an important role in the agricultural sector. Milk production is projected to increase from 45million litres in 1999 to 61 million litres in the year 2005. This production deficit can be filled if production strategies planned by the Ministry of agriculture extension staff are implemented. Currently there are 28547 and 50230 head of Zebu and grade cattle respectively, which produce 45 million litres annually. There are 22 active dairy societies. The total milk produced in the district in 1998 was 33.9 million litres out of which 1.9 million litres were delivered and marketed through organized cooperative societies

**Table: 3.2.1 Important indices in dairy production**

Item	Zebu	Grade
Calving percentage	29.0	50.9
Calf mortality (%)	27.0	22.9
Adult mortality (%)	25.6	8.0
Lactation period (days)	350-400*	280-290
Calving Interval (days)	430	430

\*The figure needs confirmation.

Lactation period varies between 280 –290 days for the grade cattle with an average production of 8 - 10 litres per cow per for the grade cattle. The average calving interval is 430 days. It is estimated that 41 million litres of milk were produced in the district in 1998 out of which 2.5 million was marketed through dairy cooperatives. Most of this milk ended up in the KCC processing plant in Sotik Bomet district. The average milk price per litre through hawking is Kshs. 20-30/= . Milk delivered at Sotik KCC factory is paid out at Kshs 13/= per litre to the cooperatives who in turn pay the farmers Kshs. 10/= per litre. Nyamira and Keroka farmers' cooperative societies pay farmers Kshs. 15/= per litre and sell the milk locally at Kshs. 18/= per litre. Two third of all farmers who keep grade cattle use artificial insemination while the rest use grade bulls provided by the bull schemes.

### 3.3 Rachuonyo District

The district has the potential to produce 68.4 million litres annually if 60% of the households keep at one grade dairy cow each. However, each of these cows will have to produce 2400 litres of milk per annum under Zero-grazing or intensive system of production for the said level to be achieved. Other conditions that are necessary for the improvement to occur include:

- Reduce calving interval through improved artificial insemination services and provision of bull schemes
- Facilitation of farmers on group solidarity basis through provision of credit facilities or in kind repayment schemes such as the heifer revolving arrangements

The current milk production level is 8.2 million from Zebu against 3.3 million litres from the exotic cattle. The lack of ready organized milk marketing channels has led to hawking milk or sales at the farm gate. However, there is one co-operative milk buying centre which

currently operating below its potential mainly due to availability of cheaper milk imports from other districts. The price of milk ranges between Kshs. 20-35/= depending on location.

#### 4.0 PASTURE AND FODDER PRODUCTION

##### 4.1 Kisii Central District

The district has a pasture area of 14050 acres and 3079 acres of established Napier grass. There are 41000 fodder trees, which include mainly Calliandra and Leucaena. Due to the increasing attention to grade dairy cattle there are measures in place to encourage farmers to grow fodder legumes such as desmodium and dolichos. The land allocated to growth of pasture and fodder is therefore likely to increase.

**Table 4.1.1 Fodder and pasture production in Kisii district per division**

Division	Pasture (acres)	Napier grass (acres)	Fodder trees (No)	Sweet potatoes (acres)
Masaba	3,000	549	4,250	0.2
Keumbu	2,400	1,000	6,700	-
Suneka	3,650	870	16,000	2.5
Marani	3,600	290	1,300	3.5
Mosochho	1,400	267	12,750	3.0
<b>Total</b>	<b>14,050</b>	<b>3,070</b>	<b>41,000</b>	<b>9.2</b>

##### 4.2 Nyamira District

The district has an area of 83660 hectares (691 km<sup>2</sup>), which is utilized to grow natural and improved pastures, fodder crops and food crops and woodlots. The breakdown of district land utilization is as follows:

- Natural pastures	9010 ha
- Improved pastures	960 ha
- Fodder crops	1668 ha
- Food crops and woodlots	71400 ha
- Total	83660 ha

There are 6.2 acres of bulking plot established and 16 acres of on-farm demonstration. 16500 fodder tree seedlings have also been distributed in the district.

**Table:4.2.1 Pasture and fodder distribution in the district per division**

Division	Natural Pasture (acres)	Improved Pasture (acres)	Napier Grass (acres)	Fodder Legumes (acres)	Fodder Shrubs (Nos)
<b>Nyamira</b>	1,950	45	1,180	1.3	3,286
<b>Ekerenyo</b>	2,300	105	429	0.8	2,016
<b>Manga</b>	2,000	25	207	0.5	1,365
<b>Rigoma</b>	1,340	23	315	0.6	2,772
<b>Borabu</b>	2,400	762	154	1.8	990
<b>Total</b>	9,010	960	2,285	5.0	10,429

The pasture and fodder utilization in the district is also reflected in its production and consequent utilization:

- Average Napier grass per farm 0.52 acres
- Number of cows per farm 1.10
- Average milk production /cow/day 6.69 Litres
- Average quantity of concentrates /cow/day 0.36 kg
- Quantity of milk sold in district 42.6%
- Average price per litre Kshs. 13.41
- Number of farms using fertilizer on napier grass 20%
- Number of farms with good napier grass management 60%
- Number of farmers that give cows minerals regularly 30%

### 4.3 Rachuonyo District

Fodder and pasture production and management is crucial for continued milk production in the district. There is a protein gap in the dairy cattle feeding which can be narrowed or eliminated through feeding of fodder legumes, multi-purpose trees, sweet potato vines and other legumes. There is an urgent need for intensified fodder conservation for dry season feeding so that milk production is maintained throughout the year.

**Table: 4.3.1 Pasture and fodder production in the district**

Napier grass (acres)	Fodder trees (Nos)	Sweet potatoes (acres)	Natural pastures (km <sup>2</sup> )	Other legumes (acres)
959	346,000	1,240	24	-

## **5.0 ORGANIZATIONS INVOLVED IN DAIRY PRODUCTION**

### **5.1 Kisii Central District**

- National Dairy Development Project (NDDP): 1987 – '95 operates throughout the district (GOK and GON)
- Livestock development project (LDP): 1991 – 2001 operates throughout the district (GOK and GOF)
- Canadian fund for local Initiative (CFLI): 1997 – '98 operates only in Keumbu division and involves Mochengo Women's group (GOK and GOC)

### **5.2 Nyamira District**

- National Dairy Development Project (NDDP): operates district wide (GOK and GON)
- Livestock Development Project (LDP): operates throughout the district (GOK and GOF)
- Rural Dairy Development Project (RDDP)
- Heifer International (GOK and GOF)
- IFAD

### **5.3 Rachuonyo District**

- Heifer International (GOK and GOF)
- Amani Christian Community Development Project: (1993 - 2000) provides cows to poorer members of the society in conjunction with Heifer International Project. (GOK and UK)
- Catholic Diocese

## **6.0 List of publications on Livestock Research and Development in the Region**

1. Evaluation of economic viability of zero-grazing dairy cows under smallholder conditions in Homa Bay, Nyamira and Kisii Districts. (KARI, RRC Kisii, Annual a Report KARI 1992)
2. Economic evaluation of zero-grazing under napier based system in high yielding cows at smallholder level. (KARI, RRC Kisii, Annual Report, 1993).
3. Survey on livestock feeds, feeding and management practices limiting milk production. \* To identify and prioritize problems for research intervention ((KARI, RRC Kisii , Annual Report, 1994).
4. Effect of sweet potato vines in the diet of Friesian calves on growth rates. Lumen development and feed cost (KARI, RRC Kisii, Annual Report, 1997)
5. Maize defoliates as an alternative source of livestock feed with no effect on the maize grain yield. (KARI, RRC Kisii, Annual Report, 1997)
6. Effect on dm yield and economic implication of using organic and inorganic fertilizer on napier grass inter-cropped with Desmodium and Dolichos in south west Kenya. (KARI, RRC Kisii, Annual Report, 1997)
7. Effect of good quality fodder and legumes on milk production. (KARI, RRC Kisii, Annual Report, 1998)
8. Effect of intercropping forage legumes with maize on grain yield. (KARI, RRC Kisii, Annual Report, 1995)
9. District Livestock Production Officer, Central Kisii. Annual Reports 1998, 1997 and 1996 APD/1V/4 Vol. II (28)
10. Livestock Development Project, PRA report 1999
11. Amani Christian Community Development Project Report, 1999.
12. Participatory evaluation of the efficacy of farmyard manure and inorganic fertilizers as sources of plant nutrients: Effect on napier grass and legume dry matter yields. Mid year report, Soil Management Project (SMP), RRC – Kisii.1997.
13. Ministry of Agriculture and Rural Development, Nyamira District Annual Report 1992.
14. Ministry of Agriculture and Rural Development Nyamira District Annual Report 1989 pages 4, 7 and 13-14.

## 7.0 Appendix

**Table: 7.1.1 Ten year projection and milk production in Nyamira District.**

Year	Human Population	Milk needs Million (L)	Zebu Cattle population	Grade Cattle population	Milk yield Million (L)	Deficit Surplus Million (L)
1996	489,883	44.1	50,493	36,737	32.5	- 11.6
1997	507,029	45.6	29,786	45,734	41.0	- 4.6
1998	524,775	47.2	29,160	47,929	43.1	- 4.1
1999	543,142	48.9	28,547	50,230	45.0	- 3.9
2000	562,152	50.6	27,948	52,641	47.3	- 3.3
2001	581,827	52.4	27,361	55,168	49.7	- 2.7
2002	602,191	54.2	26,786	57,816	52.3	- 1.9
2003	623,268	56.1	26,223	60,591	55.1	- 1.0
2004	645,082	58.1	25,672	63,499	58.0	- 0.1
2005	667,660	60.1	25,133	66,547	61.0	+ 0.9

**Table: 7.1.1 Livestock census for Zebu and dairy cattle in Nyamira District 1998**

	Nyamira	Manga	Rigoma	Borabu	Ekerenyo	Total
<b>Zebu cattle</b>						
Cows	3,182	3,459	1,232	2,374	3,565	13,812
Bulls	648	748	187	764	1,541	3,888
Heifers	577	1,469	318	1,573	1,106	5,043
Calves	1,325	2,408	559	1,808	943	7,043
Sub-total	5,732	8,084	2,296	6,519	7,155	29,786
<b>Crosses</b>						
Cows	3,052	5,337	3,942	12,398	2,802	27,531
Bulls	303	596	570	767	570	2,806
Heifers	560	1,665	1,231	1,026	819	5,301
Calves	987	1,855	1,107	952	731	5,632
Sub-total	4,902	9,453	6,850	15,143	4,922	41,270
<b>Purebreds</b>						
Cows	171	290	290	699	316	1,766
Bulls	74	268	92	66	123	623
Heifers	68	319	98	162	141	788
Calves	83	418	318	174	294	1,287
Sub-total	396	1,295	798	1,101	874	4,464
<b>Total</b>	<b>11,030</b>	<b>18,832</b>	<b>9,944</b>	<b>22,763</b>	<b>12,951</b>	<b>75,520</b>