

### **5.3 Relative Competitiveness of Cattle Production Systems**

#### ***5.3.1 Extensive (Open – grazing) system***

The data on the open grazing cattle system comprise a herd of 5.6 animals per household. This is composed of 1.5 bulls/oxen, 0.5 immature males, 1.8 cows, 1.1 heifers and 0.8 calves, mainly indigenous breeds due to the agro – climatic potential. Production mainly comprises manure, draught power and milk, mainly used for home consumption with a few instances of sales to neighbours. Land is not a constraining resource; animals graze on natural pasture in common grazing grounds during the day and are enclosed in a cattle shed within the confines of the homestead at night. During adverse weather conditions, pasture shortage forces households to transfer their animals to relatives/friends in other less affected areas.

Labour is mainly required for herding the animals and milking. One outstanding feature in this system is the use of bulls/oxen for ploughing and planting due to the large land sizes. Appendix A1.1 shows the annual average costs and benefits for this system. Milk production in this system is low (average of 588.3 lts per year), resulting in high consumer demand and consequently high average producer milk price of KSh 27.8 per lt. The capital embodied in the flock forms 95 % of the total assets employed in the enterprise. Use of inputs is quite minimal in this system and consists of purchase of salt lick and drugs.

#### ***5.3.2 Semi – intensive (Semi – zero) system***

This system comprises an average herd of 3.0 animals per household consisting 0.2 bulls/oxen, 0.3 immature males, 1.2 cows, 0.9 heifers and 0.4 calves. Milk and manure production are the main purposes for this system. From the data, 28 percent of the cattle in this system are local breeds, 68 percent cross – breeds and 4 percent pure – breeds. Milk production is high compared to the extensive system, 1758.3 lts per year with an average producer price of KSh 27.7 per lt. Appendix A1.2 shows the annual average costs and

benefits for this system. There is minimal use of draught power in this system in comparison to the extensive system. Use of fodder is common and purchase of inputs such as concentrates, salt lick and drugs relatively high in comparison to the extensive system.

### ***5.3.3 Intensive (Zero – grazing) system***

The system is common in parts of Kisii district and the upper midland zones of Rachuonyo district. It comprises a herd of 3.7 animals per household. This consists of 0.2 bulls, 0.3 immature males, 1.1 cows, 1.3 heifers and 0.9 calves. Investment in female animals (3.0) is much higher than male animals (0.7) in comparison to the systems previously discussed. Milk and manure production are the main purposes for this system. The animals are stall – fed and mainly comprise cross and pure – breeds. From the data, 55 percent of the cattle in this system are cross – breeds while 46 percent pure – breed. The system is labour – intensive, requiring labour for cutting and carrying fodder, watering the animals and cleaning the unit. A high amount of working capital is used in purchases of external inputs such as concentrates, drugs and fodder to increase milk output. Capital items such as milk cans and the zero grazing unit form part of the enterprise assets. Milk production in this system is high, 2663.7 lts per year with an average producer price of KSh 27.5 per lt. A summary of the annual average costs and benefits for this system are summarised in Appendix A1.3.

### ***5.3.4 Benefits from cattle keeping***

Various benefits are derived from the cattle enterprise. Table 13 gives a summary of the average annual income parameters for each type of system. The income parameters consist of the net recurrent cash income, recurrent income in kind and the non – market socio – economic benefits. The net recurrent cash income increases as the level of intensification rises. This is attributable to the shift to a more market – oriented (commercial) production as the level of intensification rises. The use of purchased inputs is highest for the zero –

grazing system and lowest for the extensive grazing system. Milk income forms an important source of cash income for the semi – zero and zero - grazing system households. The net recurrent cash income accounts for 32 percent of the annual income in zero – grazing systems compared to 12 percent in the open - grazing system. The recurrent cash income is important as it offers regular income used to meet regular household expenses such as school fees payment, medical treatment and purchase of consumer goods.

**Table 13: Average annual income parameters (US\$) per household and percent contributions (in parenthesis), by cattle production systems**

	<i>Open grazing (n=132)</i>	<i>Semi – zero grazing (n=111)</i>	<i>Zero–grazing (n=12)</i>
Herd size (animals)	5.6	3.0	3.7
Milk revenue	104.0	358.8	668.7
Less: Recurrent purchased inputs	12.5	153.0	367.2
Less: Hired labour	11.3	15.4	66.6
<i>Net recurrent cash income</i>	<i>80.2 (12)</i>	<i>190.4 (29)</i>	<i>234.9 (32)</i>
<i>Annual income from sale of animals</i>	<i>75.3(10)</i>	<i>97.9 (15)</i>	<i>137.8 (18)</i>
Milk consumed at home	98.5	230.6	233.3
Draught power	251.8	31.5	0.0
Manure	61.0	26.8	30.5
Herd increase (births)	18.7	28.8	70.8
Less: Milk given away	6.9	34.3	35.4
Less: Annual fixed costs	5.4	14.7	32.5
<i>Recurrent income in kind</i>	<i>417.7 (60)</i>	<i>268.7 (41)</i>	<i>266.7 (36)</i>
Non-market socio-economic benefits			
Bulls	43.6	6.8	5.1
Immature males	6.7	6.8	7.8
Cows	50.6	58.2	54.3
Heifers	17.7	25.4	37.1
Male calves	1.4	2.1	
Female calves	1.7	2.7	3.2
<i>Non-market socio-economic benefits</i>	<i>121.7 (18)</i>	<i>101.9 (15)</i>	<i>107.4 (14)</i>
<b><i>Total net annual income</i></b>	<b><i>694.9</i></b>	<b><i>658.9</i></b>	<b><i>746.8</i></b>
<i>Annual return per animal</i>	124.1	219.6	201.8
Factors of production <sup>1</sup>	673.0	578.9	698.2
Value of assets	610.4	544.5	737.5
Return on assets <sup>2</sup>	113%	121%	101%

<sup>1</sup>Includes imputed value of family labour, capital in stock and rental value of land under pasture. Imputed value of family labour is the wage rate in alternative enterprises. This was found to be KSh 100 (\$1.28) per manday. The land rental value is on average KSh 1411 (\$18.1) in Kisii district.

<sup>2</sup> Calculated as (total net annual income/value of assets)\*100

The recurrent income in kind comprises non – marketed recurrent production that is consumed, exchanged or invested. It includes manure, milk consumed by the household, draught power and value of calves born. The in kind costs comprise milk given away and the fixed costs. The recurrent income in kind is highest in the open - grazing systems accounting for 60 percent of annual income compared to 41 percent and 36 percent in the semi – zero and zero – grazing systems respectively. This is due to the predominant use of draught power from cattle in this system. In the semi – zero and zero – grazing systems, high population density leads to small land sizes and draught power is no longer necessary. Consequently, cattle are valued more for manure and milk.

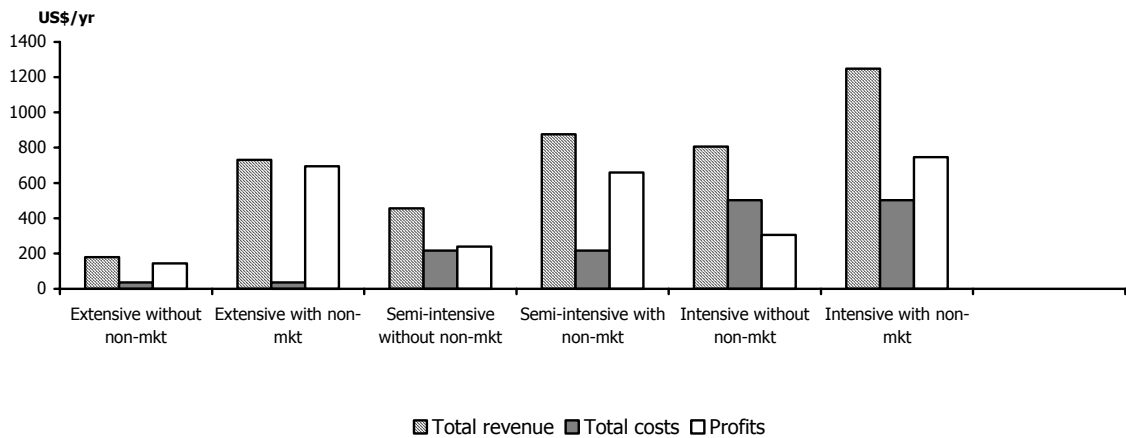
The use of manure for fertilization of agricultural plots is common in all the systems. In addition to its role in fertilization, it also acquires roles in house cementing. The non – market socio – economic benefits comprise 18 percent (\$122) of total annual income in the open- grazing system, compared to 15 (\$102) and 14 (\$107) percent in the semi – zero and zero - grazing systems respectively. For the extensive system this is even higher than the recurrent cash income contribution. These benefits are highly valued by the open - grazing system households relative to the semi – zero and zero – grazing systems. In the former, production is less market oriented, households have relatively large land and herd sizes and milk output per animal is low.

Much of the benefits realized are non – cash; for instance in the extensive grazing system, 78 percent of the benefits realized are non – cash compared to 56 and 50 percent for the semi – grazing and zero grazing systems respectively. Cattle - keeping is seen as a prestigious undertaking offering security to the household in terms of finance and insurance, and providing a means of storing wealth (savings) as well as draught power provision. Institutions offering finance and insurance are generally absent or not accessible to the cattle

keepers, as most of them are not aware of the existence of such institutions. Cattle therefore form the major insurance against unexpected occurrences and acts as an alternative, financing avenue.

There is less investment on equipment and buildings for the open grazing system in comparison to the other systems. The capital embodied in the flock forms 83 percent of the production factors employed by the household for the cattle enterprise in the open – grazing system, compared to 78 and 76 percent in the semi – zero and zero – grazing systems.

With inclusion of both marketed and non – marketed benefits, economic profits are realized in all the three systems; with the highest from the zero – grazing system and the lowest from the semi – zero grazing system. The results suggest that the smallholder cattle enterprise is generally more profitable and competitive when marketed and non – marketed benefits are included relative to the scenario when only physical market inputs and outputs are considered (Figure 17).



**Figure 17: Comparison of Revenue, Costs and Profit with and without non – market benefits**

Thus, the enterprise can compete favourably with alternative enterprises available to the farm household. The non – cash production accounts for 78, 56 and 50 percent of total annual income in open – grazing, semi – zero and zero – grazing systems respectively. These benefits play a significant role to the competitiveness of the open - grazing system relative to the semi – zero and zero – grazing systems. From the results, there is an indication that non – cash contributions are highly important for smallholder dairy farmers, playing a significant role for their survival. The agro – climate of an area influences the cattle keeping system and hence objectives for keeping cattle by the household. These findings compare to those found by Moll *et al* (2001) where 78 % of the returns from the Zambian extensive herd was basically non – cash.

However, profit *per se* may not be the best measure of how efficiently the factors of production have been utilized. The best measure of efficiency is that which recognizes the returns per unit of input. Since capital has been identified as one of the constraints to increased agricultural production in the area (Orodho, 1999), the return per shilling of capital tied up in the enterprise is calculated. This is to help in assessing whether it is worth investing in such enterprise as capital has an opportunity cost. Capital hereby refers to the value of the assets invested in the cattle enterprise (includes the value of the flock, equipment and buildings). Results in Table 13 show that the return to capital is considerably high, about 113, 121 and 101 percent in the open grazing, semi – grazing and zero – grazing systems respectively. This is higher than the interest rate of 12 percent charged on loans by SACCO's. The results suggest that there is efficient utilization of the resources when marketed and non – market benefits are taken into consideration. The capital invested generates enough benefits to payback for the investment and earn profits.

## CHAPTER SIX

### 6. CONCLUSIONS AND POLICY IMPLICATIONS

#### 6.1 Summary

The purpose of the study was to estimate the value of non – market, socio – economic contribution of cattle and determine its contribution to the competitiveness and survival of smallholder dairy cattle systems in Western Kenya. The study was conducted in Kisii and Rachuonyo districts where extensive grazing, zero – grazing and semi – zero grazing cattle systems are practised. It also aimed at highlighting policy implications arising from the study that may be used to formulate appropriate and effective livestock policies aimed at improving the livelihoods of livestock keepers.

The results indicate that cattle keeping is a multi – objective enterprise. Key objectives to cattle keeping include household milk consumption, milk income, calves, manure, draught power and security. This however differs by cattle system types. The objectives of cattle keeping among extensive system cattle keepers are more non – market oriented compared to the semi – intensive and zero – grazing systems, which tend to be more market oriented. This is mainly influenced by the agro – climate, which in turn influences the breeds of cattle kept. Upgraded breeds are mainly kept in the highlands under intensive cattle production systems and tend to be potentially high milk yielding. The investment and operational costs in this system is quite high with a cash oriented objective. The local breeds are kept in the lowland zones. Production is low - intensive, relying mainly on grazing, as land is not a constraining factor. Production is less cash oriented, and milk production is low. Objective of cattle keeping in this system is less market oriented and mainly comprises draught power provision, domestic milk consumption, security, dowry payment and social status

acquisition. Manure features as an important component of cattle keeping in both systems.

The results of the econometric estimation aimed at assessing factors that influence the probability and magnitude of demand for non – market, socio – economic benefits of cattle indicate that the probability of demand is positively influenced by the household size, the household dependency ratio and having local breeds on semi – zero grazing system relative to having local breeds on open grazing system. Local breeds are kept in less market – oriented systems relative to the upgraded breeds, therefore the probability and demand for the socio – economic cattle roles are high for these systems. The positive influence of household size and dependency ratio is due to the high-risk probability and financial obligations associated with large households and dependants, thus requiring a strategy to cope with it.

Conversely, the distance to the nearest informal milk collection centre on murrumbidgee road, the cattle type relative to cows and having a male headed household have a negative influence on the probability and magnitude of demand for the socio – economic benefits of cattle. Female - headed households have low access to insurance and finance alternatives, relative to male headed households and therefore tend to have cattle assume these roles. The negative influence of the distance to the nearest informal milk collection centre on the probability and magnitude of non – market socio – economic demand indicates that farmers with low market orientation place low values on the socio – economic roles of cattle relative to those with high market orientation. The decomposition of the marginal effects of the Tobit model shows that the household dependency ratio, the animal breed, cattle type and sex of the decision maker has a substantial impact on the total change in the expected value of the dependent variable, as well as the probability of demand and the level of the non – market socio – economic demand of cattle. The predicted values of the dependent variable indicate that the value of the non – market socio-economic functions of cattle comprise 18%, 15% and 14%

of the animal's total perceived value in extensive, semi – zero grazing and zero grazing systems respectively.

The complete budget analysis results suggest that smallholder cattle production systems are competitive when both market and non – market contributions are taken into consideration. The non – market contributions are more important in extensive systems. Milk production is low in these systems and local breeds predominant. The non – cash contribution forms a substantial 78, 56 and 50 percent of the total returns to the cattle enterprise compared to the cash contribution of 32, 44 and 50 percent for the extensive, semi – intensive and intensive systems respectively. The results further indicate that smallholder cattle production systems are highly efficient in utilization of resources when both market and non – market production are taken into consideration.

The results of the econometric estimation aimed at assessing factors that influence withholding of cows longer than the optimal age indicates that the interaction between the cow breed and the feeding system, socio – economic non – market benefits, distance to the nearest milk collection centre on murrum road, milk price, household size and dependency ratio have a significant influence on holding of cows beyond their optimal age.

## **6.2 Conclusions**

The qualitative and quantitative analyses indicate that non – cash cattle contributions are highly valued by smallholder cattle producers. The agroecology plays a significant role in determining the cattle types and breeds kept and consequently the objectives of production. In the more intensive systems, cash income is highly important and investment is focused on female animals than males. The few male animals kept are mainly for breeding purposes. However, the importance of non – cash contributions is also realized through crop – livestock linkages (manure) and the socio – economic (insurance, finance) roles of cattle. These

non – cash contributions play a significant role to the competitiveness and survival of smallholder cattle systems than when only cash contributions are taken into consideration. For instance, the smallholder extensive cattle production system, would be deemed unprofitable and uncompetitive when only cash contributions are taken into consideration yet, the non – cash contributions highly contribute to its survival. In addition, these systems tend to be more stable in the face of market risks, since most of their returns are not observed through market transactions. The extensive systems invest heavily on male animals for draught power purposes. Land sizes are large requiring mechanical or animal power for crop production. The market oriented smallholder intensive and semi – intensive systems place higher values on the socio – economic benefits of cattle than even the extensive systems.

The results also suggest that producers are willing to hold cows after milk production has declined due to the influence of several factors. The breed of the animal significantly influences this decision. Farmers with indigenous breeds hold their animals longer after the optimal period than those with upgraded breeds due to the differing objectives of cattle keeping. The household dependency ratio, household size and milk price have a significantly negative influence on the decision to hold the cows after their optimal period. The non – market benefits (insurance, finance, social status) derived from cows also lead farmers to retain cows beyond the age when milk production has declined. All these factors confirm the hypothesis that cattle keepers not only keep cows for milk production but also non – market contributions, therefore recommendations by technical staff and researchers ought to go beyond the current knowledge of conventional market dynamics.

### **6.3 Policy Implications**

The following policy implications are identified from the study;

Female-headed households are more likely to value cattle higher for the non – market benefits in comparison to male-headed households. This is attributable to limited alternative sources of income to buffer risks. The alternative use of cattle though useful, is associated with risks such as market risks, theft and deaths incase of animal disease. Therefore, in the long run, these households ought to be integrated into the financial and insurance markets so as to improve their livelihoods. In Bangladesh for instance, the Grameen Bank targets credit to the poorest of the poor in rural areas without any collateral, placing emphasis on social capital. This has resulted in increased income and employment opportunities, giving the rural poor an opportunity to escape from the “poverty trap” (McDonell, 1999).

Secondly, infrastructural development needs to be considered so as to improve market access for the non – market oriented cattle systems. This would enhance the realisation of recurrent cash income, which is important in sustenance of the rural households. Poor infrastructure reduces producer’s margin as it results in high market transaction costs. One policy imperative is to develop the rural road infrastructure. In a case where the country’s resources are not sufficient enough to enable such development, social capital may be mobilised in the construction and maintenance of the rural access roads and payments done through cash or food for work programs. Social capital plays a significant role in reducing transaction costs of searching for contractors (Gabre – Madhin, 2001), hence making it a cheaper alternative to develop the rural road infrastructure.

Another potential policy option would be to establish slaughterhouses or processing factories closer to the livestock owners to provide quick markets to farmers. One way of achieving this

is to invite the private sector to establish such factories and offering them incentives like tax rebates. Somalia's private sector has established meat-processing factories, thus opening meat markets for Somalia even though the country has no government (Banadir, 2003). In addition, livestock and livestock product market integration may also be promoted by removing institutions and policies impeding domestic trade such as removing the restriction of once a week livestock market days.

The non – market, socio economic benefits of cattle contribute highly to the competitiveness of smallholder cattle systems and to the overall returns to assets. The additional returns (up to 18 %) resulting from these non – market benefits and the overall high returns to assets suggest that smallholder producers are highly competitive, and might continue to produce milk even at low market prices. This is in context of public debate about threats from milk imports. Importation of milk powder for reconstitution has been blamed for the inability of farmers to sell their milk and for the low producer prices. However, importation has been quite minimal and is insufficient to make an impact on the domestic milk price.

In the short run, ways of maximisation of the non – cash contributions of cattle needs to be pointed out. For instance, when livestock analysts and extensionists recommend the optimal age of disposing cows, contributions of non – market functions need to be taken into consideration, so as to maximise these benefits. Consideration of these non – cash benefits would enable assessment closely from the viewpoint of the producers as they consider proposed changes in the production system in the context of their circumstances.

#### **6.4 Suggestions for Further Research**

One main caveat to this study is highlighted to suggest extensions for future research. The study hypothesises that farmers are willing to hold cows beyond the optimal age as long as they derive the non – market benefits (insurance, financing and social status) and benefits still outweigh costs. The analysis focuses mainly on cows because it is easier to derive their optimal age based on output. Not included in the hypothesis testing are the several other categories of cattle from which farmers also derive non – market benefits.

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## APPENDICES

### Appendix 1: Budget Analysis for Cattle Production Systems

#### A1.1. Annual average costs and benefits (1US\$ = KSh 78) per household for an average herd of 5.6 animals in extensive cattle production system in Western Kenya

	Unit	Quantity	Price/value (\$/value)	Marketed \$ in cash	Non – marketed \$ in kind
<i>Recurrent production</i>					
Milk	Litres	569	0.36	104.0	98.5
Manure	Wheelbarrow	79.4	0.77		61.0
Draught power	Workspan/yr	47	5.39		251.8
<i>Embodied production</i>					
Sale of stock	\$			75.3	
Herd increase	head	0.73	25.6		18.7
<i>Recurrent purchased inputs</i>					
Hired labour	\$			11.3	
<i>Other costs</i>					
Milk given away	Litres	19.3	0.36		6.9
Annual fixed costs	\$				5.4
Family labour	\$				115.2
<i>Non-market benefits</i>					
	\$				123.2
<i>Factors of production</i>					
Land (pasture) <sup>1</sup>	acres				
<i>Capital in stock</i>					
Bulls/oxen	head	1.5	166.7		250.1
Immature males	head	0.5	71.8		35.9
Cows	head	1.3	128.2		166.7
Heifers	head	1.1	76.9		84.6
Calves	head	0.8	25.6		20.5
Equipment	\$				52.6
Total value factors of production	\$				610.4

Source: Survey results, 2002

<sup>1</sup> Cattle are grazed in common grazing areas

**A1.2. Annual average costs and benefits (1US\$ = KSh 78) per household for an average herd of 3.0 animals in semi - intensive cattle production system in Western Kenya**

	Unit	Quantity	Price/value (\$/value)	Marketed \$ in cash	Non – marketed \$ in kind
<i>Recurrent production</i>					
Milk	Litres	1,661	0.35	358.8	230.6
Manure	Wheelbarrow	34.8	0.77		26.8
Draught power	Work span/year	6	5.39		31.5
<i>Embodied production</i>					
Sale of stock	\$			97.9	
Herd increase	head	0.45	64.1		28.8
<i>Recurrent purchased inputs</i>	\$			153.0	
Hired labour	\$			15.4	
<i>Other costs</i>					
Milk given away	Litres	96.6	0.35		34.3
Annual fixed costs	\$				14.7
Family labour	\$				120.32
<i>Non-market benefits</i>	\$				101.9
<i>Factors of production</i>					
Land (pasture)	acres	0.4	18.1		7.2
<i>Capital in stock</i>					
Bulls/oxen	head	0.2	192.3		38.5
Immature males	head	0.3	115.4		34.6
Cows	head	1.1	217.9		239.7
Heifers	head	0.9	125.6		113.0
Calves	head	0.4	64.1		25.6
Equipment	\$				85.9
Total value factors of production	\$				544.5

Source: Survey results, 2002

**A1.3. Annual average costs and benefits (1US\$ = KSh 78) per household for an average herd of 3.7 animals in intensive cattle production system in Western Kenya**

	Unit	Quantity	Price/value (\$/value)	Marketed \$ in cash	Non – marketed \$ in kind
<i>Recurrent production</i>					
Milk	Litres	2,563	0.35	668.7	233.3
Manure	Wheelbarrow	39.6	0.77		30.5
<i>Embodied production</i>					
Sale of stock	\$			137.8	
Herd increase	head	0.92	76.9		70.8
<i>Recurrent purchased inputs</i>					
Hired labour	\$			66.6	
<i>Other costs</i>					
Milk given away	Litres	100.5	0.35		35.4
Annual fixed costs	\$				32.5
Family labour	\$	120	1.28		153.6
<i>Non-market benefits</i>					
	\$				106.7
<i>Factors of production</i>					
Land (napier)	acres	0.6	18.1		10.86
<i>Capital in stock</i>					
Bulls/oxen	head	0.2	192.3		38.46
Immature males	head	0.3	115.4		34.62
Cows	head	1.1	217.9		239.69
Heifers	head	1.3	125.6		163.28
Calves	head	0.9	64.1		57.69
Equipment	\$				192.9
Total value factors of production	\$				737.5

Source: Survey results, 2002

**Appendix 2: Field Questionnaire**

**AN ANALYSIS OF THE ECONOMIC VALUE OF CATTLE IN  
SMALLHOLDER LIVESTOCK PRODUCTION SYSTEMS IN KENYA**

**(CASE OF KISII and RACHUONYO DISTRICTS)**

**February – April 2002**

**Name of Enumerator:** \_\_\_\_\_

**Date of interview:** (DD/MM/YY)/\_\_/\_\_/2002

**Time started** \_\_\_\_\_ **Time ended** \_\_\_\_\_

**Reviewed by** \_\_\_\_\_ **Date (DD/MM/YY)/\_\_/\_\_/2002**

<b>DISTRICT</b>	<b>DIVISION</b>	<b>SUB - LOCATION</b>	
3 = KISII	31 = MASABA	685 = Metembe 691 = Ichuni	695 = Mogweko 696 = Kiamokama
	32 = SUNEKA	741 = Bomorenda 743 = Bomokora	745 = Bogitaa 746 = Bomariba
6 = RACHUONYO	61 = KENDU BAY	116 = Kanyipir 124 = Komulo Njira	199 = Kamser Seka 201 = Kajiei
	62 = OYUGIS	185 = Kachieng 187 = Kawere Kamagak	215 = Kakangutu West 325 = North Kachien

**District:** [ \_\_\_\_\_ ]

**Division:** [ \_\_\_\_\_ ]

**Sub – location:** [ \_\_\_\_\_ ]

**Household questionnaire No:** \_\_\_\_\_ *(same as in the characterisation survey)*

**FAMILY NAME** \_\_\_\_\_

**NAME OF HOUSEHOLD HEAD** \_\_\_\_\_

*(Ensure that it is the same part of the household interviewed during characterisation survey especially in case of polygamous and extended homesteads)*

TYPE OF HOMESTEAD [\_\_\_\_\_] (Use codes below)

1 = Monogamous (married)

2 = Polygamous (married)

3 = Single household head (unmarried)

What part of the polygamous household is being interviewed? [\_\_\_\_\_] (Use codes below)

1 = Entire homestead (husband and all co-wives)

2 = Only the "household" (property and activities) of one co-wife, who is wife number [\_\_\_\_]

**SECTION A: HOUSEHOLD CHARACTERISTICS and CHOICE OF RESPONDENT**

A/1. Who is the main decision maker in relation to cattle management in the household? (Use codes below)

Name(s) of decision maker (s)	Relationship to <b>household head</b>
1.	[ ]
2.	[ ]

**Relationship to household head**

1 = Household head

6 = Son

2 = 1<sup>st</sup> wife to household head

7 = Daughter

3 = 2<sup>nd</sup> wife to household head

8 = Hired manager

4 = Husband

9 = Other (specify) \_\_\_\_\_

5 = Co - wife

A/2. Who is the main decision maker in relation to cattle sales and purchases (ownership) by the household? (Use codes above)

Name(s) of decision maker (s)	Relationship to <b>household head</b>
1.	[ ]
2.	[ ]

Any of the decision makers in A/2 should be the respondent.

A/3. RESPONDENT'S NAME \_\_\_\_\_

A/4. Of the land that the household owns now, what is the total size in acres? \_\_\_\_\_ Acres

A/5. Give details of household members (including HH head) living permanently on the compound and are dependent on the household (Use codes below)

Name (first name)	Sex	Year of birth	Relationship to hh head	Highest education level attained	Primary activity
	1 = Male 2 = Female				
Household head	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	[ ]	[ ]	[ ]	[ ]

\* A person is in permanent residence if he/she sleeps in the house a majority of nights per week

Relationship to hh head	Education level	Primary Activity
1= Household head	0 = No formal education	0 = None
2 = 1 <sup>st</sup> wife	1 = Nursery school	1 = Farm management/Farmer
3 = 2 <sup>nd</sup> wife	2 = Standard 1 through 4	2 = Civil servant
4 = Husband	3 = Standard 5 through 8	3 = Employee in private enterprise
5 = Co - wife	4 = Form 1 or 2	4 = Businessman/Businesswoman
6 = Son	5 = Form 3 or 4	5 = Labourer on – farm
7 = Daughter	6 = Post secondary school (“A” level)	6 = Labourer off – farm
8 = Daughter - in - law	7 = Technical college	7 = Retired with pension
9 = Son – in - law	8 = University	8 = Retired without pension
10 = Grandchild	9 = Adult literacy education	9 = Religious leader
11 = Niece/Nephew	10 = Others (Specify) _____	10 = In school
12 = Housemaid/house boy		11 = Pre – school age
13 = Grandparent		12 = Other (Specify)
14 = Sister		
15 = Brother		
16 = Cousin		

A/6. What are the household’s main cattle grazing systems? [ \_\_\_\_ ] [ \_\_\_\_ ]

1 = Pasture or free grazing	3 = Semi – zero grazing	Others (Specify) _____
2 = Stall – feeding or zero - grazing	4 = Roadside grazing	

**SECTION B: CATTLE INVENTORY AND CHANGES SINCE LAST VISIT**

**B/1. Local zebu:** Indicate the numbers of **local zebu** cattle **owned** and/or **not owned but kept** by the household

Local zebu	Owned and	Owned but	Arrangement	Kept for others	Arrangement	Any changes	Source of
Bulls (>3yrs)	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Castrated adult males	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Immature males (<3yrs)	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Cows (calved at least once)	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Heifers (post – weaned, pre	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Pre – weaning males	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Pre – weaning females	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]

\* Arrangement in terms of use of products

# Refer to sheet with livestock inventory from **last visit and compare with current inventory**

**Source of change**

- 1 = Births
- 2 = Death
- 3 = Sales
- 4 = Purchases
- 5 = Gift from relatives/friends
- 6 = Gift to relatives/friends
- 7 = Received as dowry
- 8 = Dowry payment
- 9 = Slaughtered
- 10 = Others (specify) \_\_\_\_\_

**Arrangement with keeper**

- 1 = Keeper uses the manure
- 2 = Keeper uses the milk
- 3 = Keeper uses the animal for draft
- 4 = Owner uses the milk
- 5 = Owner gets the offspring (calves)
- 6 = Keeper gets the offspring

**Arrangement with owner**

- 1 = Keeper uses the manure
- 2 = Keeper uses the milk
- 3 = Keeper uses the animal for draft
- 4 = Owner uses the milk
- 5 = Owner gets the offspring (calves)
- 6 = Keeper gets the offspring

**B/2. Dairy cross:** Indicate the numbers of **dairy cross** cattle **owned** and/or **not owned but kept** by the household

Dairy cross	Owned and	Owned but	Arrangement	Kept for others	Arrangement	Any changes	Source of
Bulls (>3yrs)	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Castrated adult males	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Immature males (<3yrs)	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Cows (calved at least once)	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Heifers (post – weaned, pre	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Pre – weaning males	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Pre – weaning females	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]

\* Arrangement in terms of use of products

# Refer to sheet with livestock inventory from **last visit and compare with current inventory**

**Source of change**

- 1 = Births
- 2 = Death
- 3 = Sales
- 4 = Purchases
- 5 = Gift from relatives/friends
- 6 = Gift to relatives/friends
- 7 = Received as dowry
- 8 = Dowry payment
- 9 = Slaughtered
- 10 = Others (specify) \_\_\_\_\_

**Arrangement with keeper**

- 1 = Keeper uses the manure
- 2 = Keeper uses the milk
- 3 = Keeper uses the animal for draft
- 4 = Owner uses the milk
- 5 = Owner gets the offspring (calves)
- 6 = Keeper gets the offspring

**Arrangement with owner**

- 1 = Keeper uses the manure
- 2 = Keeper uses the milk
- 3 = Keeper uses the animal for draft
- 4 = Owner uses the milk
- 5 = Owner gets the offspring (calves)
- 6 = Keeper gets the offspring

**B/3. High – grade dairy:** Indicate the numbers of **high – grade dairy cattle owned** and/or **not owned but kept** by the household

High – grade dairy	Owned and	Owned but	Arrangement	Kept for others	Arrangement	Any changes	Source of
Bulls (>3yrs)	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Castrated adult males	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Immature males (<3yrs)	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Cows (calved at least once)	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Heifers (post – weaned, pre	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Pre – weaning males	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]
Pre – weaning females	_____	_____	[__][__]	_____	[__][__]	[__]	[__][__]

\* Arrangement in terms of use of products

# Refer to sheet with livestock inventory from **last visit and compare with current inventory**

**Source of change**

- 1 = Births
- 2 = Death
- 3 = Sales
- 4 = Purchases
- 5 = Gift from relatives/friends
- 6 = Gift to relatives/friends
- 7 = Received as dowry
- 8 = Dowry payment
- 9 = Slaughtered
- 10 = Others (specify) \_\_\_\_\_

**Arrangement with keeper**

- 1 = Keeper uses the manure
- 2 = Keeper uses the milk
- 3 = Keeper uses the animal for draft
- 4 = Owner uses the milk
- 5 = Owner gets the offspring (calves)
- 6 = Keeper gets the offspring

**Arrangement with owner**

- 1 = Keeper uses the manure
- 2 = Keeper uses the milk
- 3 = Keeper uses the animal for draft
- 4 = Owner uses the milk
- 5 = Owner gets the offspring (calves)
- 6 = Keeper gets the offspring

**SECTION C: CATTLE SALES AND PURCHASES**

C/1. Indicate individual details on cattle **SALES since the year 2000 to date**. (Separate row for **each** animal)

Cattle Type	Month and year of	Reasons for sale	Age at sales (Yrs)	Breed type	Price received	Point of sales
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]	[ ]

**Cattle type**

- 1 = Bulls (>3 yrs or used for service)
- 2 = Castrated adult males (>3 yrs)
- 3 = Immature males (< 3 yrs)
- 4 = Cows
- 5 = Heifers
- 6 = Pre – weaning males
- 7 = Pre – weaning females
- 8 = Other (specify) \_\_\_\_\_

**Reasons for sale**

- 1 = Financing unexpected expenditures (insurance)
- 2 = Financing expected (planned) expenditures (finance)
- 3 = Old age
- 4 = Animal disease
- 5 = Poor performance
- 6 = Slaughtered for meat
- 7 = Unwanted (bull calves)
- 8 = Ritual/ceremony
- 9 = Other (specify) \_\_\_\_\_

**Breed Type**

- 1 = Holstein – Friesian (pure)
- 2 = Holstein - Friesian (cross)
- 3 = Ayrshire (pure)
- 4 = Ayrshire (cross)
- 5 = Jersey (pure)
- 6 = Jersey (cross)
- 7 = Guernsey (pure)
- 8 = Guernsey (cross)
- 9 = Local zebu

**Point of sales**

- 1 = Market
- 2 = Middleman/Trader
- 3 = Farm gate
- 4 = Neighbour
- 5 = Butcher
- 6 = Other (specify) \_\_\_\_\_

C/2. Indicate individual details on cattle **PURCHASES since the year 2000 to date.** (Separate row for each animal)

Cattle Type	Month and year of	Reasons for	Breed type	Purchase price (KSh)	Point of purchase
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]
[ ]	[ / ]	[ ] [ ]	[ ]	[ ]	[ ]

**Cattle type**

- 1 = Bulls (>3 yrs or used for service)
- 2 = Castrated adult males (>3 yrs)
- 3 = Immature males (< 3 yrs)
- 4 = Cows
- 5 = Heifers
- 6 = Pre – weaning males
- 7 = Pre – weaning females

**Reasons for purchase**

- 1 = Security (finance future unexpected expenditures)
- 2 = Store of wealth (savings)
- 3 = Financing future expected expenditures
- 4 = Increase social prestige (status display)
- 5 = Replacing old stock
- 6 = Obtain more manure
- 7 = Increase milk production
- 8 = For animal draft
- 9 = Replace animal that died
- 10 = Others (Specify)

**Breed Type**

- 1 = Holstein – Friesian (pure)
- 2 = Holstein - Friesian (cross)
- 3 = Ayrshire (pure)
- 4 = Ayrshire (cross)
- 5 = Jersey (pure)
- 6 = Jersey (cross)
- 7 = Guernsey (pure)
- 8 = Guernsey (cross)
- 9 = Local zebus
- 10 = Others (specify) \_\_\_\_\_

**Point of purchase**

- 1 = Market
- 2 = Middleman/Trader
- 3 = Farm gate
- 4 = Neighbour
- 5 = Other (specify) \_\_\_\_\_