

Characterization of the livestock production system and potential for enhancing productivity through improved feeding in Kisumu West sub-County of Kisumu County, Kenya

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Acronyms

AI	Artificial Insemination
CP	Crude Protein
DM	Dry Matter
EAPP	East African Productivity Project
ECF	East Coast Fever
FEAST	Feed Assessment Tool
FGD	Focused Group Discussion
GDP	Gross Domestic Product
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency syndrome
ICIPE	International Centre for Insect Physiology and Ecology
KARI	Kenya Agricultural Research Institute
ME	Metabolisable Energy
PRA	Participatory Rural Appraisal

Abstract

The Feed Assessment Tool (FEAST) was used to characterize the farming system and particularly the feed-related aspects of the livestock production system in Kisumu West Sub-County of Kisumu County of Kenya. The assessment was conducted with groups of farmers through a participatory rural appraisal approach at two sites representing a peri-urban and a typical rural setting. Firstly, focused group discussions with 20 farmers and subsequently personal interviews with nine farmers (consisting of three each) representing small, medium and large-scale farms were carried out. It was found that Kisumu West sub-County is characterized predominantly by smallholder mixed crop-livestock production systems on approximately less than 0.8 hectares of land. Dairy and food crops are the primary sources of household income. Farmers in Kisumu West sub-County keep predominantly local cattle. Improved dairy production is constrained by inadequate feeds/management skills, high cost of disease control and poor breeds. Unorganized milk marketing is also a constraint. To mitigate these constraints farmers prioritised (i) improving skills in forage production and availability of varieties that are tolerant to Napier grass stunt disease and drought; knowledge on feed preservation and processing (ii) improving access to animal health and AI facilities to ensure farmers can rapidly upgrade the genetic merit of their cattle holdings, (iii) access to credit facilities to enable farmers to invest in livestock production enterprises and also milk marketing strategies.

General introduction and background

Livestock farming contributes significantly to the economies of Western Kenya (Ojowi et. al., 2001 and KARI Kakamega annual report, 2006) through the generation of tangible and intangible products (World, 2005). Within the region, most of the milk produced is marketed informally and is thus an important source of employment and income in rural areas from production at the household level to informal transporters and retailers in the urban centres (MoALF. (2010). In addition, a regular supply of milk improves nutritional security for many rural poor families, provides affordable nutrients to improve the well-being of those suffering from HIV/AIDS and generates more regular household income and jobs than many other farming enterprises in Eastern Africa (Nicholson et al., 2003).

The western region is considered a high dairying region because of the favourable climatic conditions and soils (Jaetzold et. al., 2005), but the productivity of its herd is much lower compared to similar regions like Central Kenya and the North Rift Valley because of its the dairy genetic resources kept by farmers. According to estimates by Waithaka et al. (2002), only 13% of the households are keeping improved dairy cattle. There is a potential to improve production and productivity to attain the levels of other regions with similar climatic conditions. Another major constraint to increase dairy productivity in the highly populated regions of Western Kenya is the inadequate quality of livestock feeds (KARI Kakamega annual report, 2006). This is particularly critical during the dry season when dairy herds are forced to rely on low-quality feed resources, which are nutritionally deficient in energy, nitrogen, minerals and vitamins with minimal or no supplementation. Most dairy farming in this region is practised by smallholder farmers in densely populated holdings. These conditions force farmers to allocate most of the available land to food crops leaving very little for planted pasture/fodders and natural grazing. With increased crop productivity dairy cattle are therefore fed on crop residues and Napier grass (*Pennisetum purpureum* Schumach), planted on lands averaging less than 0.2 hectares. However, Napier stunt disease caused by phytoplasma, has since mid-1990's caused forage yield reductions of up to 90% (Mulaa et al., 2010). This is currently the biggest threat to forage production and the dairy sector in the region. According to Mr Sagala of Heifer international Western Region (Personal Communication), there has been a milk yield reduction of 20-40% caused by the lack of feeds, mostly due to the stunt diseases.

The challenges calls for a combination of interventions. There is a need to improve animal productivity through more intensification and utilization of crop-livestock interactions, and promotion and adoption of genetically diverse, high yielding, and climatically adapted grasses that are tolerant to diseases. Therefore, in order to design site-specific strategies for sustainable feed supply and utilization, the current survey was conducted with the following objectives:

- To assess feed resource availability and utilization using the FEAST tool, within the context of the overall dairy value chain, at four specific sites in Western Kenya
- To determine the potential of site-specific feed interventions in selected areas

Background of Kisumu West

Kisumu West is one of the sub-Counties of Kisumu County and is situated along the shores of Lake Victoria covering the area from the Kisumu airport to Maseno, surrounding the whole of Nyahera up the hill and bordering part of western and rift valley. It is located at 0.08°S and 34.5°E and has an area 171 km². It has five administrative Wards namely: South West Kisumu, Central Kisumu, Kisumu North, West Kisumu and North West Kisumu (Figure 1). The PRA was conducted in North West Kisumu and Kisumu Central Wards.

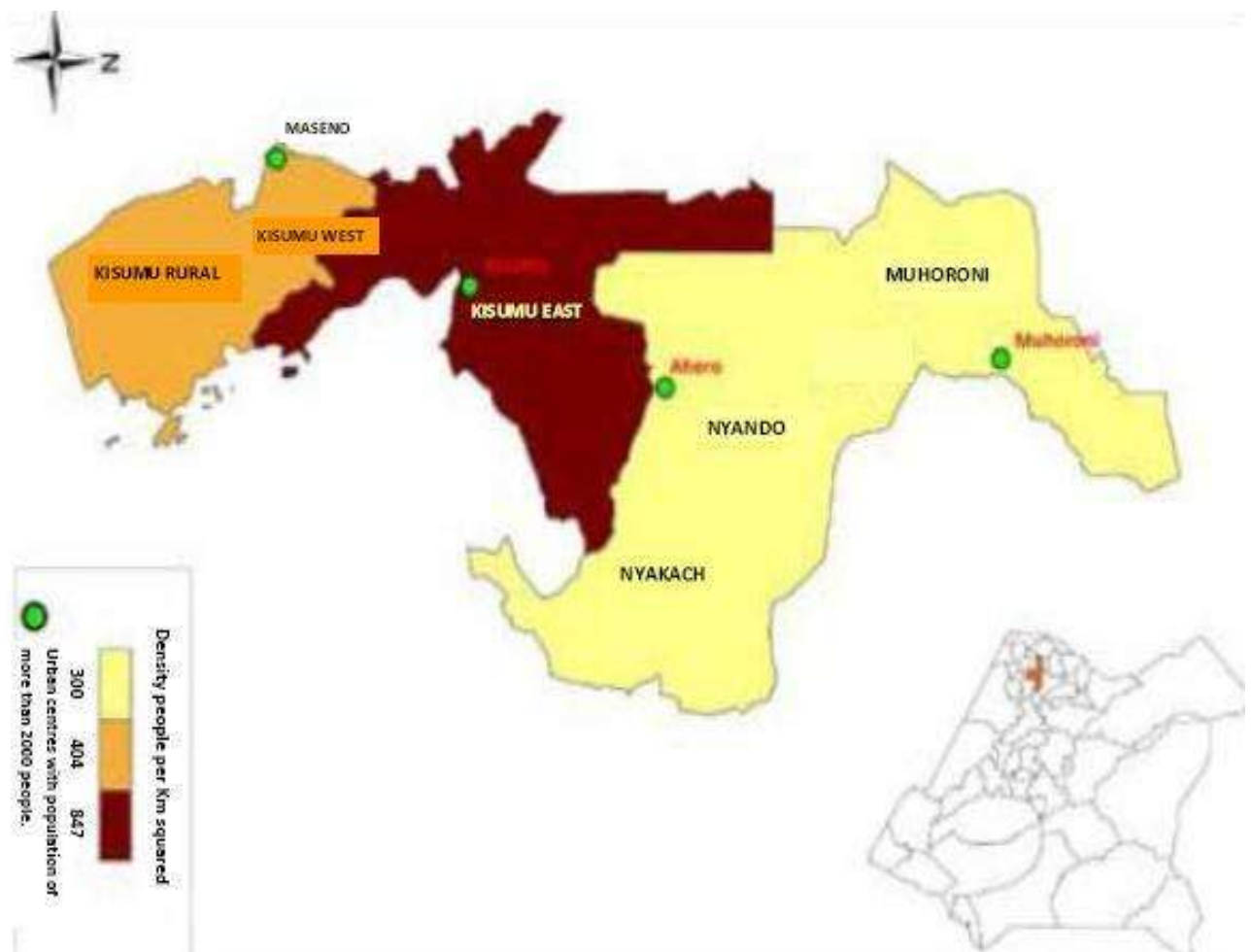


Figure 1: Map showing sub-Counties of Kisumu County

The climate of the whole county is modified by the presence of the lake. The county has an annual relief rainfall that ranges between 1200 mm and 1300 mm with a bimodal pattern. The long rains are reliable while the short rains can be unreliable in the drier parts of the sub-County. The temperature ranges between 20 °C and 35 °C with a mean annual rainfall of 23°C. The humidity is relatively high throughout the year. The altitude of Kisumu West sub-County is approximated to be between 990 and 1470 metres above the sea level. There are three agro-ecological zones namely the Upper Midland Zone 3 (UM3) and Lower Midland Zone 1 (LM1) which have adequate and reliable rainfall and the Lower Midland zone 4 (LM4) agro-ecological zones which are drier with an unreliable short rain season (Jaetzold et al., 2009). The soils are volcanic but vary depending on the parent material they are formed from. In the higher regions Upper Midland zone 1 (UM1), soils are dark red clays which are fertile and well-drained.

General methodology

Study sites

The study was carried out in Kisumu West sub County, Kisumu County which is within the sub-humid zone of Western Kenya. The specific sites were North West Kisumu Ward and Kisumu Central Ward representing a typical rural setup and peri-urban communities.

Participant selection and data collection

Participants were selected by the research team comprising of local agricultural/livestock production officers, a research scientist from Masinde Muliro University of Science and Technology, and local administrators. At each site, 18 to 25 farmers were involved in the Focus Group Discussions (FGD) to provide an overview of the farming system and to identify constraints and opportunities for improving livestock production at the site. Subsequently, 9 farmers were selected from the FGD to take part in the individual interviews.

Data analysis

The quantitative data collected during individual interviews were analyzed using the FEAST excel template (www.ilri.org/feast), a feed assessment tool that has been developed to help to design site-specific strategies for feed supply and utilization. The data were presented in tables, graphs, pie and bar charts. The qualitative data collected using the PRA group discussions were synthesized and summarized.

Specific methodology

The study was carried out in Kisumu Central and North West Kisumu wards of Kisumu County. Secondary data obtained from literature and unpublished reports were integrated and the primary data was collected through focus group discussions and individual farmer interviews using the Feed Assessment Tool (FEAST). This was used to characterize the livestock production system and feed-related aspects. The FEAST tool is a rapid and systematic method that employs the Participative Rural Appraisal (PRA) approach. It also helps identify major problems, issues and opportunities within the livestock production system. The individual farmer interview gathers both quantitative and qualitative information according to major wealth groups based on relative land size owned. The assessment was carried out through two structured group discussions and completion of short questionnaires by key farmer representatives in Nyahera sub-location in Kisumu Central Ward and Marera sub-location in North West Kisumu Ward both in Kisumu West sub-County on 5th December 2013.

The composition of the groups is shown in Table 1. Participating farmers were chosen by ICIPE staff working on push-pull technology and the sub-County Livestock Production Officers (PDO) of Kisumu West sub-County Ministry of Agriculture and Livestock. Overall 24 persons participated in the group discussion in North West Kisumu Ward and 20 in Kisumu Central Ward (Table 4.1). From each PRA group, 3 representatives each from different wealth classes were chosen for the individual interviews. The following are findings of the assessment and conclusions for further action.

Table 1. Group composition of farmer representatives for feed assessment in Kisumu West sub-County, Kisumu County Kenya

Site	Men	Women	Total
Kisumu Central Ward (Nyahera sub-Location) ¹	14 (5)	6 (4)	20 (9)
North West Kisumu Ward (Marera sub-location) ¹	9 (4)	15 (5)	24 (9)

¹Sub-County administrative Wards (what in brackets for the Wards is the venue of PRA)

Number of individual interviewees in parentheses

Results and discussion

Food crop production

The high and reliable rainfall coupled with moderate temperatures and good soils is suitable for growing crops. About 92% (119.7 km²) of the sub-County is arable but currently, only 28.8 km² is utilized for crop production. Crops grown include maize, beans, groundnuts, sweet potatoes, fresh vegetables and bananas. North West Kisumu Ward is dominated by small scale farming households with less than 0.8 hectares of land, while Kisumu Central Ward is dominated by very smallholder farmers with less than 0.2 hectares (Figure 2). In North West Kisumu Ward, maize and beans are the dominant crops, while in Kisumu Central, maize and groundnuts dominate the farming system according to the individual interviews. Other subsistence crops in North West Kisumu include bananas, kales, and groundnuts and in North West Kisumu it is beans, cassava and sweet potato. Figure 4.3 shows the average area (ha) per household of dominant arable crops. Households in the surveyed area are composed of approximately 5-6 people. With 80% of the households having an average of 0.2 hectares, farmers in North West Kisumu utilize substantially less land than those of Kisumu Central where 70% utilize 0.2-8 hectares of land. Both Wards experience four different cropping seasons spread throughout the year. The long rainfall (high rainfall) season '**Chiri**' is from March to June, while the short rainfall season '**Opon**' is from September to November. In the main dry season '**Oro**' from January to February, almost no precipitation occurs. Finally, '**Oro-Opon**' refers to the harvesting season from July to August and December and these months are characterized by very low rainfall (Table 4.2).

Due to the high population and owned by farmers is not enough for all their farming and livestock activities. Farmers mainly practice inter-cropping of legumes and cereal crops especially beans and groundnuts with maize or sorghum. Others lease land for crop production. Due to the shortage of land size, no fallowing or crop rotation takes place. Agricultural inputs such as fertilizer, seeds, agro-chemicals are available from agro-veterinary stores but are reportedly expensive for farmers to afford in adequate amounts. All agricultural activities are rain-fed except for 1% who practice drip irrigation and 20% who practice bucket irrigation on vegetables during the dry season and this is mainly farmers who live near the river or other water sources. Contrary to agricultural inputs, irrigation equipment is not available (except Kisumu) within the community. Labour is generally available and is mostly required in the rain season for land preparation at KES 3,000 (\$37.5) per 0.2 hectares and a daily wage of KES 200 (\$2.5) per day plus lunch for planting, weeding and harvesting. Approximately 80% leave the farms in search of better livelihoods.

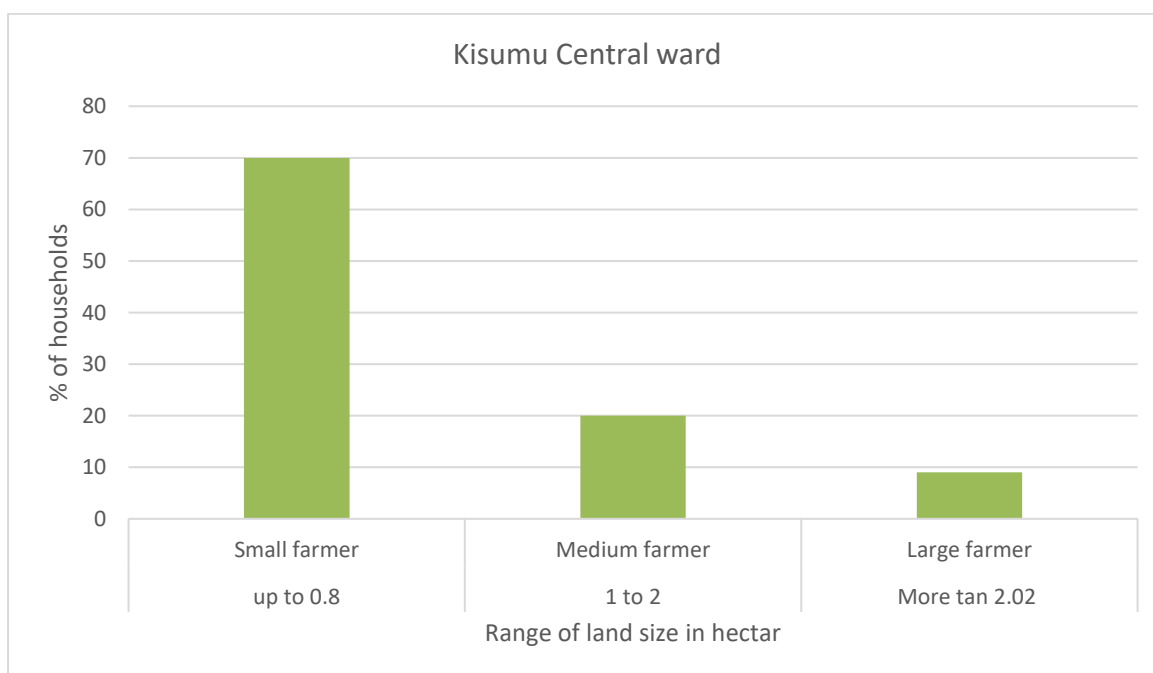
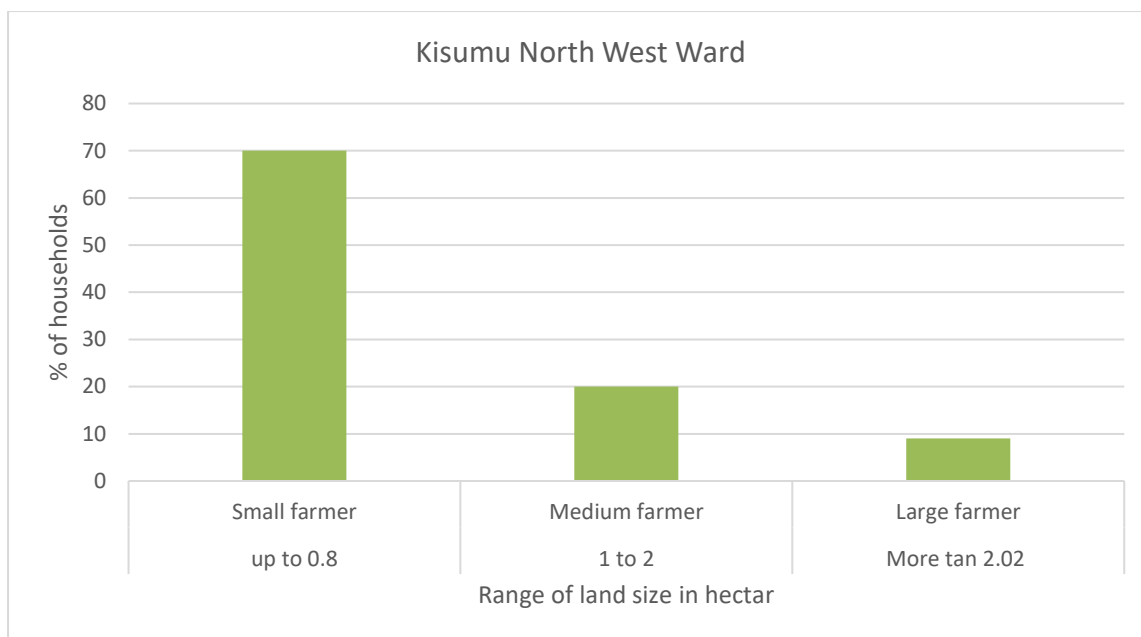


Figure 2: Average landholdings in North Wes Kisumu Ward (above) and Kisumu Central Ward (bottom) Kisumu West sub-County

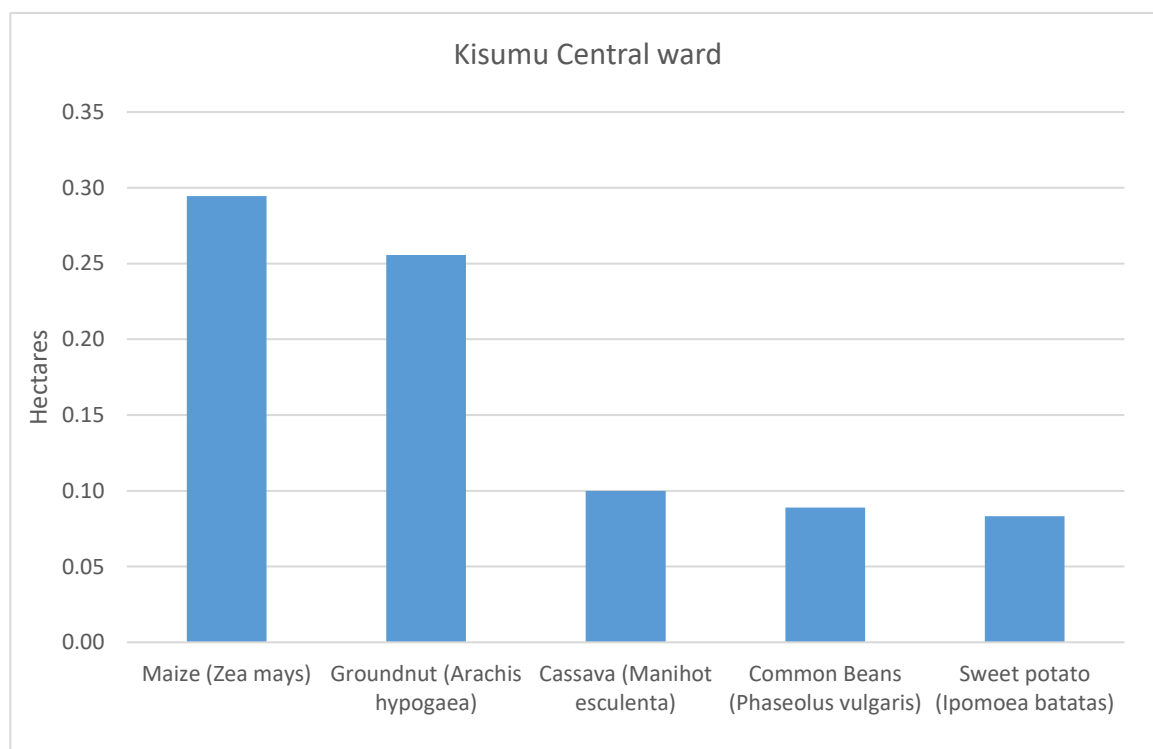
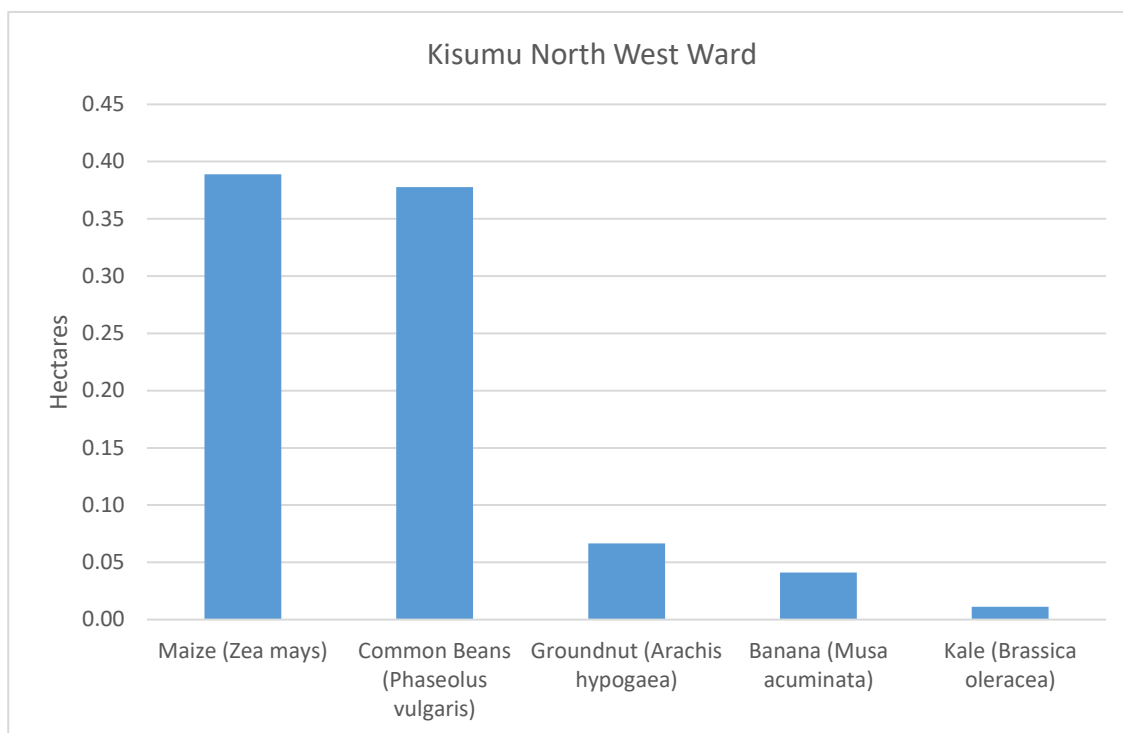


Figure 4. 3: Average area (ha) per household of dominant arable crops North West Kisumu Ward (above) and Kisumu Central Ward (bottom), Kisumu West sub-County

Table 4. 2. Cropping seasons in Kisumu West sub-County

Name of season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Long dry season (Oro)												
Long Rain Season (Chiri)												
Short dry season (Oro-Opon)												
Short Rain Season (Opon)												

Livestock production

Different livestock species which serve various purposes are raised in the areas surveyed. Major livestock species raised, their uses, proportion of households that own the species and mean herd/flock sizes of each ward are shown in Table 4.4. Improved dairy cattle constitute only 4% of the cattle population in the sub-County and there are only 75 dairy goats (Table 4.3). Indigenous chicken is the dominant enterprise in the sub-county with approximately 185,560 birds in 2013. There are only 520 hectares of improved ley pastures and 620 hectares of Napier grass in the whole sub-County. The sources of protein feed are browsed from shrubs (21,215 trees) and 82 ha of Desmodium and Lucerne according to the sub-County livestock production officer. Unfortunately, most of the fodder trees are not utilized as per recommendations. Farm and agro-industrial by-products used as feed include maize bran and cotton seed cake from Kisumu but is utilized by very few farmers. Other feeds commonly used are molasses, fish meal, bean and cereal crop residues, banana pseudo stems and sweet potato vines.

There are only three livestock supported projects in the sub-County, push-pull technology spearhead by ICIPE where Napier and/or Mulato II are promoted with Desmodium for the control of stemborer in maize; Heifer International has been promoting forage crops under the send-a-cow program and Techno-serve has been promoting indigenous poultry as a source of income. Overall, the sub-county is a net importer of livestock products.

Table 4. 3. Estimated Livestock population statistics in Kisumu west Sub County 2013

Type of livestock	Category	Total number
Cattle	Dairy	1,237
	Zebu	27,320
	beef	0
Poultry	Indigenous	185,560
	Layers	684
	Broilers	1724
	Ducks	385
	Turkeys	180
	Geese	65
Goats	Local	12,325
	Dairy	75
Sheep	Local	9,178
	Dorper	0
	Wool	0
Pigs	Boars	27
	Sows	46
	Piglets/fatteners	267
Beehives	KTBH	24
	Langstroth	63
	log	0
Rabbits	Bucks	147
	Does	235
	Kids/weaners	1,568
Donkeys	General	39
Emerging livestock	Guinea/fowls	12
	Quails	2,347

Source: Kisumu West sub-County District Production Officer

Milk production is an important means of regular income generation with many households (35%) in Kisumu Central Ward possessing two improved crossbreed dairy cattle compared to 5% North West Kisumu ward. Farmers in Kisumu Central ward Ward generally keep more local cattle than those in North West Kisumu ward (Table 4.5). In addition to providing milk and manure, these are also sold for meat to supply substantial income when the need arises and payment of dowry. The improved dairy breeds in Kisumu Central are occasionally sold as breeding stock. Majority of the households (60-70%) in North West Kisumu keep local breeds of small ruminants (goats and sheep) for meat, manure and sale for income than those of Kisumu Central. Most farmers also keep indigenous chicken but there were no dairy goats and commercial chicken in both Wards. The average livestock holdings (TLU) per household is shown in Figure 4.4 and generally agrees with those described in the group interview.

The most common livestock production systems in Kisumu West sub-County are:

- The zero-grazing system practised by farmers who have improved livestock, in Kisumu Central Ward. Farmers in this category practise cut and carry feeding systems. Fodder is often chopped before feeding and often supplemented with concentrate feeds. They occasionally mix the grass with molasses and legumes.
- Tethering is practised by 70% of households who keep crossbreed and local dairy cattle in both wards. Cattle are tethered to graze alongside the farm's boundaries, homestead or roadside during the cropping season. They are provided with a supplementary feed from the farm or collected from outside.
- Free-range grazing is practised by 25% of the farmers and mainly for local cattle in both wards by households who have slightly large farms.

Livestock input services such as feeds and veterinary drugs are available but were reported to be costly. Government veterinarians are mainly involved in vaccinations but are unavailable for animal health services. Private veterinary services are generally costly for most farmers. For example, treating East Coast Fever (ECF) costs farmers KES 4,000-7,000 (\$50-87.5) per treatment, black water costs Ksh 2,000 (\$25), Anaplasmosis costs KES 700 (\$87.5) and deworming KES 500 (\$6.25) per animal. Para-vets are available and slightly cheaper but not qualified enough in disease diagnosis.

Artificial Insemination (AI) services are available from private service providers. The cost for single insemination is KES 700 (\$8.75) from Kabete (if served by Government staff) and KES 1,200 (\$15) per insemination (inclusive of the service) if served by private service providers. However, Government service is not regularly available. For imported unsexed semen, the cost ranges between KES 3,000 to 4,000 (\$37.5 to 50) and up to KES 10,000 (\$125) for sexed semen. Farmers incur the same costs as the first insemination per repeat insemination cow and repeats are quite frequent according to the farmers interviewed. Improved bulls cost KES 500 (\$6.25) per service and KES 300 (\$3.75) for a local bull, but the breed quality and diseases are of concern to farmers. Therefore, the high rates of repeats coupled with high cost cause a constraint to improve dairy productivity in the sub-County.

Agricultural and livestock inputs (farm implements, crop seeds, fertilizers, herbicides, pumps, acaricides, feed supplements) are available from agro-vets within the sub-county. Credit facilities for crop or livestock production are available from commercial and micro-finance institutions; Village savings, Maseno Green Sacco, Table banking and Merry-go-round, used especially by women enterprise fund and youth. However, many farmers do not access loans from commercial banks and microfinance institutions because of high interest rates, collateral requirements, long loan processing period and defaulting by group members (in cases where groups guarantee each other). Many farmers do not have title deeds to act as collateral to access loans.

Table 4. 4. The proportion of farmers owning different species of livestock, average herds per household (HH) and use in KISUMU WEST sub-County

Livestock species	Use	Kisumu North West Ward		Kisumu Central Ward	
		HHs owning the species (%)	Animals per HH (average no.)	HHs owning the species (%)	Animals per HH (average no.)
Improved dairy cows	Milk, manure and breeding stock sale (income)	5	2	35	2
Local dairy cows	Milk, manure, meat, sale for income and dowry	30	3	65	2
Draught cattle	Ploughing, sale for cash income, meat, manure, breeding and dowry	1	1	1	1
Sheep	Meat, cultural rituals and sale for income	70	2	35	2-4
Local Goats	Meat, manure and sale for income	60	2	18	2
	Milk, Sale as breeding stock for income and manure	-	-	-	-
Dairy goats					
Pigs	Pork, manure, and sale for income	<1	5	-	-
Indigenous poultry	Eggs, meat, manure, sale for income and social activities	80	10	100	10
Commercial poultry	Eggs, meat, manure and sale for income	-	-	-	-
Quails	Meat and Sale for income	<1	15	-	-
Ducks	Meat and sale for income	1	2	-	-
Fish	Food and sale for income	<1	70	18	1,500 per pond
Rabbits	Milk, manure	<1	5	1	2
Donkeys	Transport and draught	<1%	2	-	-
Pigeon	Sale for cash and food	-	-	12	3

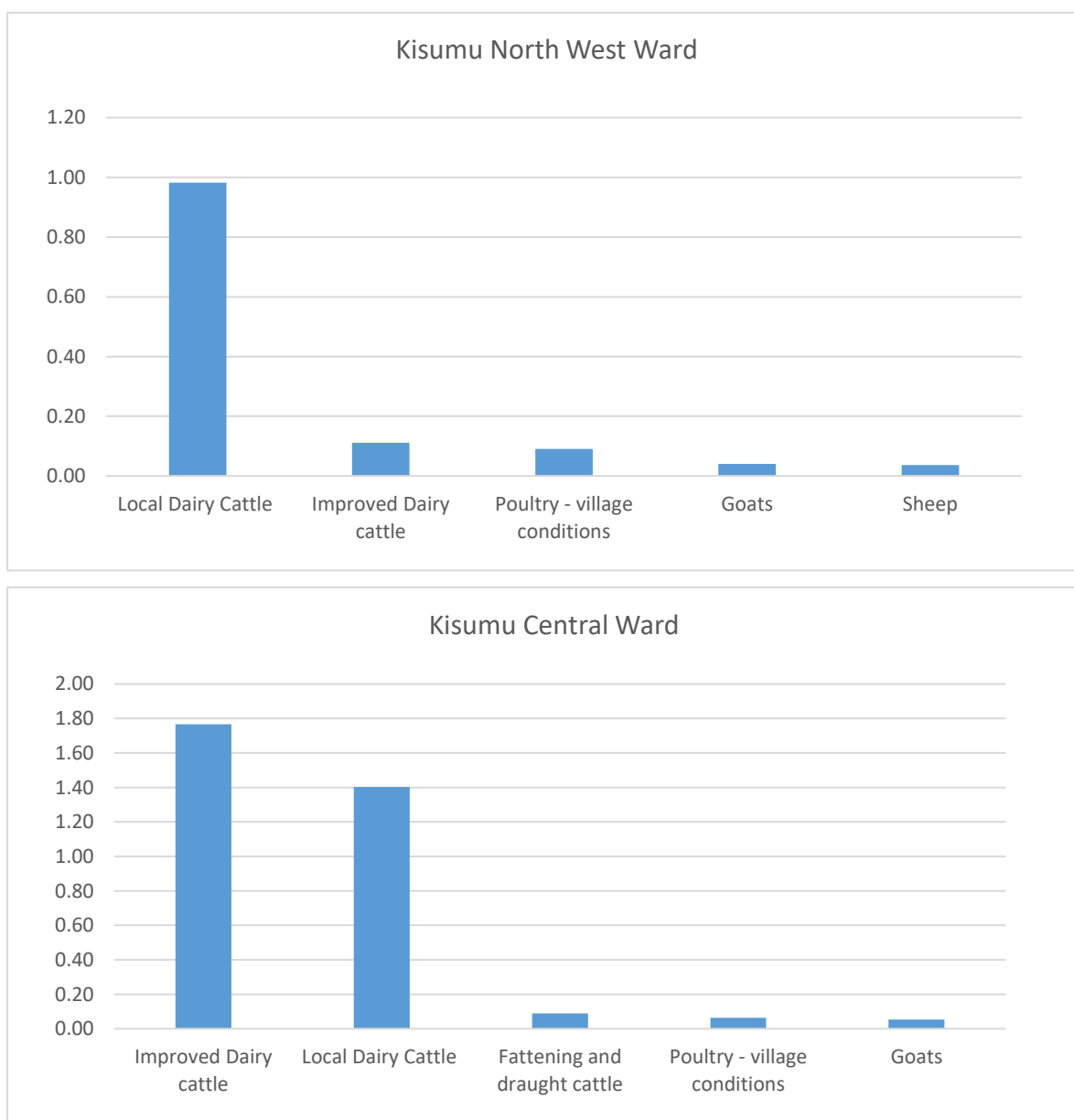
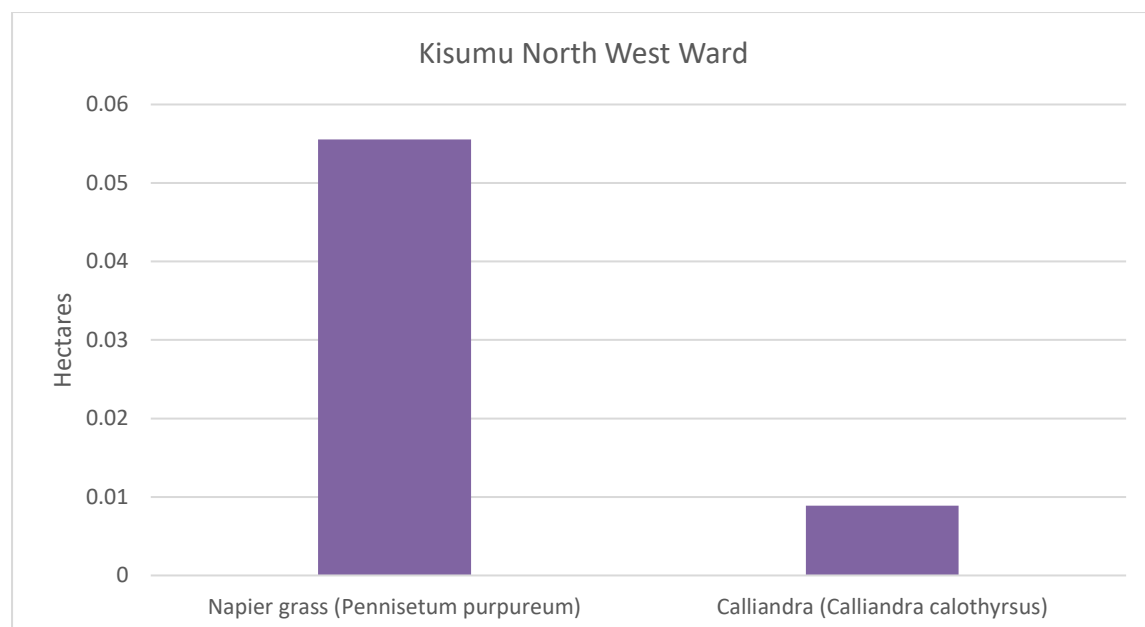


Figure 4.4: The average livestock holdings (TLU) per household in North West Kisumu (above) and Kisumu Central (below)

Feed types, sources and feeding systems

The major type of feed for improved dairy cattle is Napier grass and is grown on very small plots of 0.05 to 0.08 hectares of land on average both wards (Figure 4.5). In addition to small area planted, Napier stunt disease is a major constraint to herbage productivity per unit land in the sub-County that needs to be addressed. Calliandra, Leucaena and Sesbania were mentioned as leguminous browse species grown by farmers to provide supplementary protein. However, when the number of these shrubs planted was computed in hectares the amount grown was very small except for Calliandra in Kisumu Central Ward (Figure 4.5). A few of the farmers in the group interviews grew Desmodium and Mulato II as a component of the push-pull technology but the maximum area grown is 30 x 50 metres which provide very little feed for the dairy cow.

In North West Kisumu Ward the most commonly purchased concentrate according to the individual farmer interviews was Maize bran and commercially mixed ration (dairy meal), while in Kisumu Central Ward Napier grass (45%) and natural occurring pasture (52%) were the predominant feed purchased (Figure 4.6).



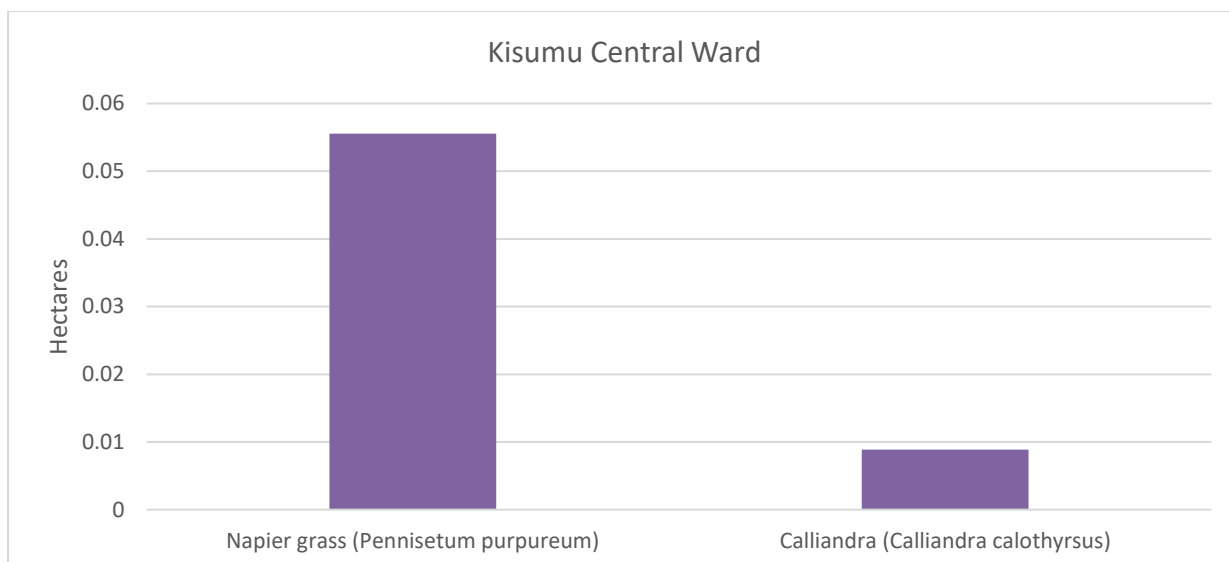


Figure 4. 4: The dominant fodder crops grown in North West Kisumu Ward (above) and Kisumu Central Ward (bottom), Kisumu West sub-County

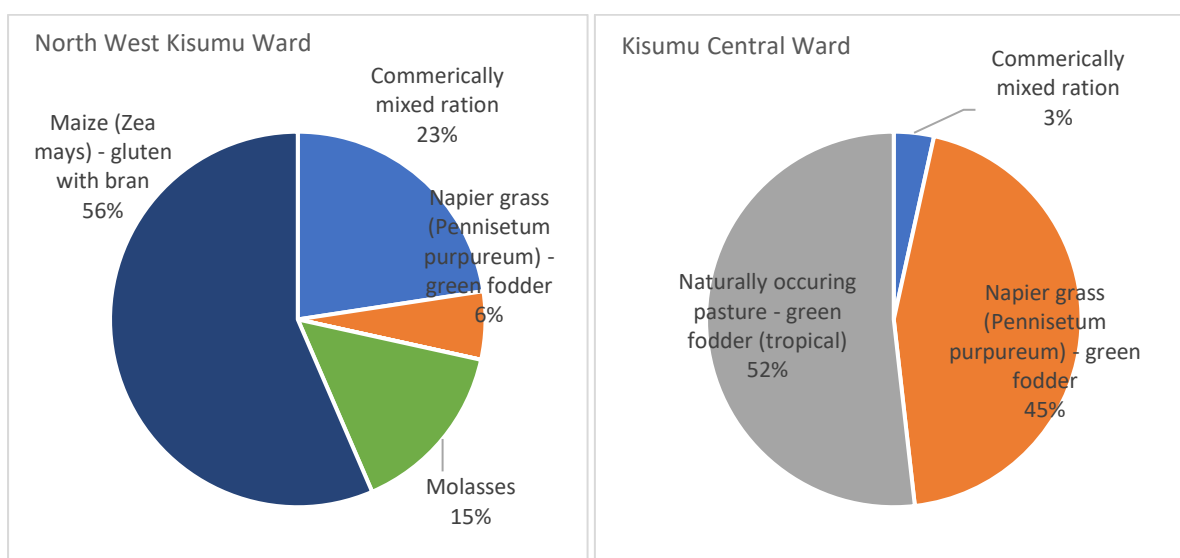


Figure 4. 5: Quantity of feed purchased over a 12mth period grown in North West Kisumu Ward (left) and Kisumu Central Ward (right), Kisumu West sub-County

In both Wards, grazing followed by naturally occurring and collected forage contributed to the largest proportion of DM and ME (Figures 4.7 and 4.8). Planted fodder on the hand contributed significantly more to DM (28%) and ME (26%) in Kisumu Central than in North West Kisumu Ward where they only contributed to 16%. The highest CP in North West Kisumu came from grazing and purchased feed (Figure 4.9), while in Kisumu Central Ward the major contribution was from cultivated fodder (39%), followed by grazing and naturally occurring and collected feed at 29% each. Purchased feed contributed very little (1%) to CP in Kisumu Central Ward.

Naturally occurring and collected feed, green feed and grazing followed the rainfall pattern with more feed available from June to July and September to December (Figure 4.10). Crop and legume residual were more available during harvesting period June to August and December to January.

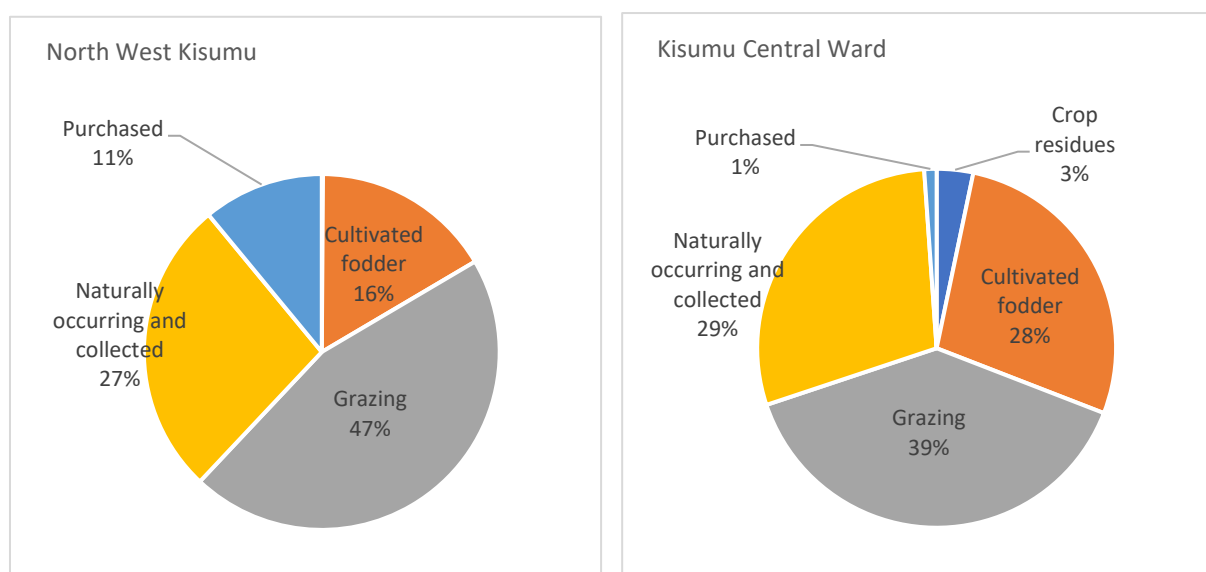


Figure 4. 6: Proportion of dry matter (DM) content in the total diet North West Kisumu (left) and Kisumu West Wards (right), Kisumu West sub-County

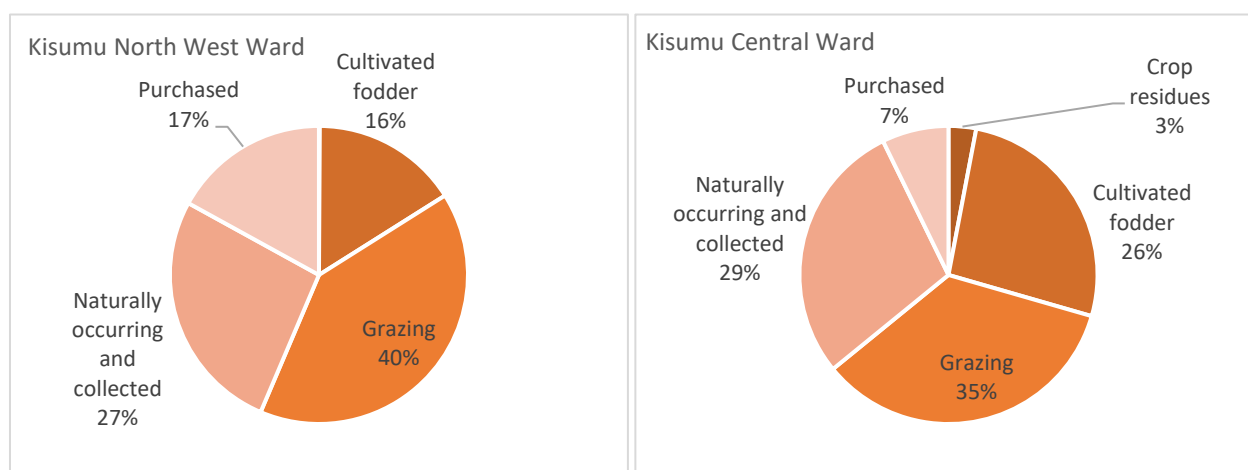


Figure 4. 7: Proportion of crude energy (ME) content in the total diet North West Kisumu (left) and Kisumu Central (right), Kisumu West sub-County

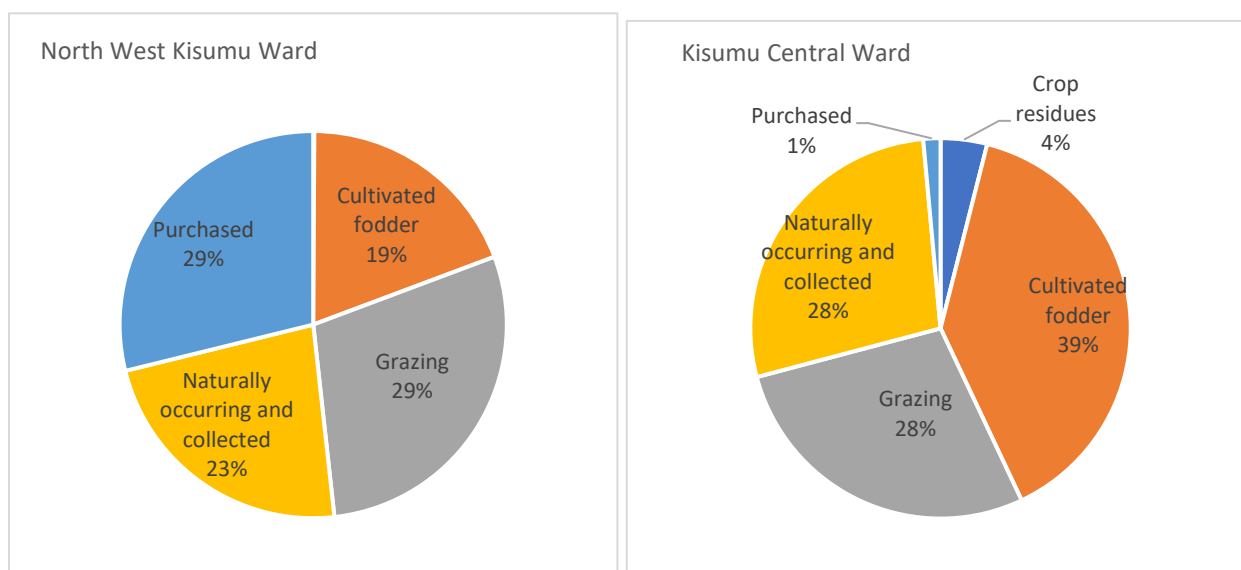


Figure 4. 8: Proportion of crude protein (CP) content in the total diet North West Kisumu Ward (left) and Kisumu Central Ward (right), Kisumu West sub-County



Figure 4. 9: Variation of feed availability throughout the year in North West Kisumu (above) and Kisumu Central Ward (bottom) Wards in Kisumu West sub-County

Major income sources

The main contributors to income in both Wards are food crops (41% in North West Ward and 47% in Kisumu Central Ward). According to the individual farmers interviewed, dairy was found to contribute more in the North West Kisumu (22%) than in Kisumu West Ward (15%). This perception is contrary to the high number of improved cattle in Kisumu West (Table 4.5). The environmental constraints (rather than genetic) may be the cause of low production. Poultry meat was the second most important livestock species in terms of income generation in North West Kisumu Ward. More farmers in North West Kisumu Ward compared to Kisumu West Ward were involved in off-farm business and this could be attributed to the presence of retirees and wives whose spouses are employed elsewhere. Figure 4.11 indicates the importance of agriculture and livestock in the livelihood of farmers in Kisumu West sub-County.

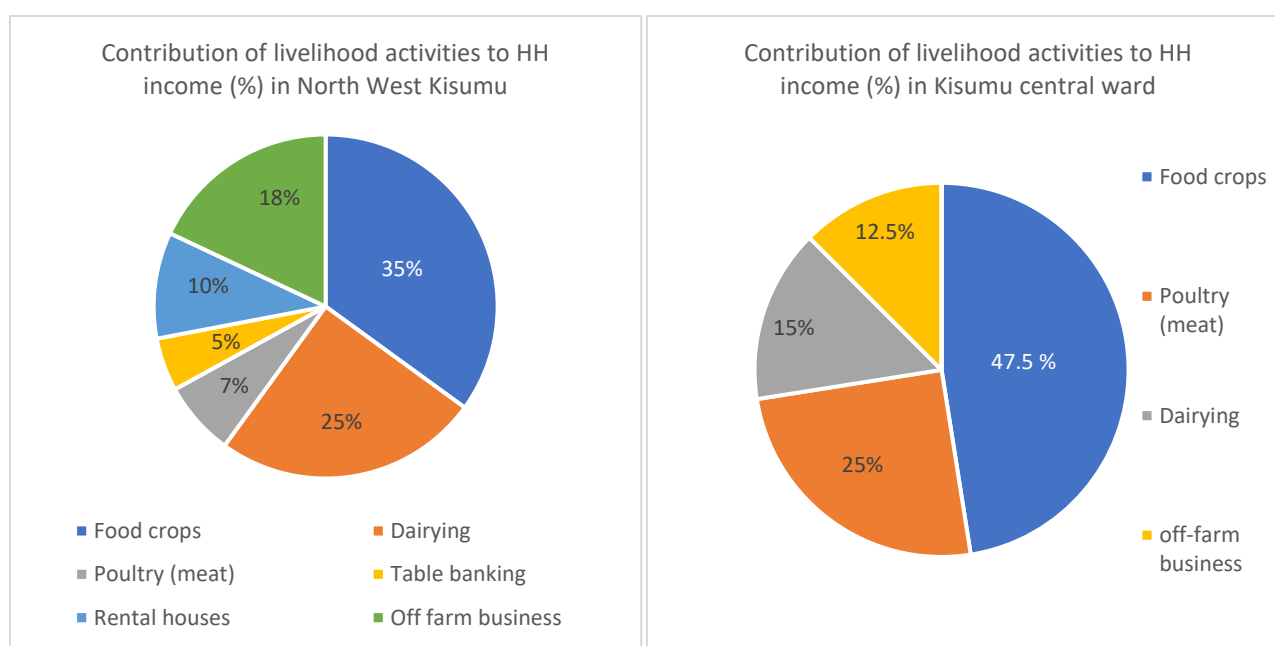


Figure 4. 10: Contribution of livelihood activities to household income (as a percentage) in North West Ward (left) and Kisumu Central Ward (right), Kisumu West sub-County

Challenges and opportunities

Overall, the main issues that farmers face in the farming system and the potential solutions are listed in Table 4.5. Lack of initial capital to invest in crop and livestock production was a key priority in North West Kisumu Ward, while those in Kisumu West considered inadequate knowledge in livestock production/feeds as their number one priority. Costly animal health services were also considered important in both Wards. Inadequate feeds were majorly attributed to small farm sizes, Napier diseases, lack of varieties that can tolerate drought. Control of tick-borne diseases is a major concern to farmers since they solely depend on private service providers that are expensive. Inadequate improved breeds were considered a key problem in both Wards. Artificial Insemination (AI) services that could help disseminate improved genetics are only provided by private service providers, and the transport distance causes repeats and contributes to the high costs.

A lack of credit facilities is also a clear constraint to the further development of crop and dairy production in Kisumu sub-County. Credit facilities exist from commercial banks and microfinance institutions but lack of collateral, unfavourable repayment schedules together with unstable prices of agricultural products, discourages farmers from using loans. Internally generated credit from Merry-go-round and Table banking does not provide enough capital to invest in agricultural activities. Milk marketing was also highlighted as a problem North West Kisumu Ward but could also apply to other Wards within the sub-County. Farmers depend on markets from neighbours, but due to high poverty levels, this marketing channel is not reliable. There are organized transport to reach urban markets. There are no cooling plants in the sub-County.

Table 4. 5. Pairwise ranking of main problems in livestock production and proposed solutions by farmers from North West Kisumu, and Central Wards Kisumu West sub-County

Challenges	Rank North West Kisumu Ward	Rank Kisumu Central Ward	Possible solutions
Inadequate feed	4	2	- Plant a variety of fodder crops that are tolerant to drought and Napier stunt disease - Need for affordable quality concentrates - Group purchase of commercial feeds - Knowledge and skills in fodder and livestock management
Lack of improved breeds	3	3	- Train and provide initial capital for local A.I. services providers - Initial capital to acquire improved breeds - Address issues of dairy cattle fertility - Initiate group breeding - Skills on heat detection
Inadequate technical knowledge on fodder, feeding management	-	1	More technical knowledge in feeds production, processing and feeding through training and tours
Costly animal health services	2	2	- Preventive strategies through effective tick control - Vaccination campaigns
Lack of/access to markets	5	-	Initiate group transportation and marketing of milk
Lack of affordable credit facilities	1	-	- Provision of starter capital for the purchase of improved breeds - Credit facilities to hire land and invest in feed production
Cattle theft (rustling)		3	Provincial administration to assist

Ranking: Ranking: 1= Most important problem in terms of farmers priority and 4= Least important problem

Conclusions

Kisumu West sub-County is characterized predominately by smallholder mixed crop-livestock production systems on approximately less than 2 hectares of lands. Dairy and food crops are the primary sources of household income. Farmers in Kisumu West sub-County keep predominantly local cattle. Improved dairy production is constrained by inadequate feeds/management skills, high cost of disease control and poor breeds. Unorganized milk marketing is also a constraint. To mitigate these constraints farmers will be required to (i) improve skills in forage production and exposures to varieties that are tolerant Napier grass stunt disease and drought; knowledge on feed preservation and processing (ii) improving access to animal health and AI facilities to ensure farmers can rapidly upgrade the genetic merit of their cattle holdings, (iii) access to credit facilities to enable farmers invest in livestock production enterprises and also milk marketing strategies.

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