



Enhancing dairy-based livelihoods in India and Tanzania through feed innovation and value chain development approaches

Report of a livestock feed assessment in Handeni District, Tanga Region, the United Republic of Tanzania

Walter E. Mangesho (TALIRI), Rose Loina (TALIRI) and Julius Bwire (TALIRI)
Brigitte L. Maass (CIAT) and Ben Lukuyu (ILRI)



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Summary

Feed assessment tool was applied in characterizing the production systems mainly related to feed innovation in Handeni district. The villages involved were Kibaya and Sindeni. The exercise was categorized into two sessions, namely, focused group discussions and individual interviews. A number of 86 (47 males and 39 females) participants (farmers) were involved in the focus group discussion and 24 farmers involved in individual interviews. Feeding practice that dominates in both villages is open grazing system. The key issue is insufficient fodder/pasture for animals especially in dry season. This has an implication of lack of knowledge/skills on pasture/forage establishment, management, utilization and conservation. This may possibly be a potential entry point for interventions in each village.

Acknowledgements

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Photos:

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Characterization of the Livestock Production System and Potential for Enhancing Productivity through Improved Feeding in Kibaya and Sindeni Villages, Handeni District – Tanga Region, Tanzania

1.0 Introduction

The study on characteristics of livestock production system in particular feed related aspects was carried out in Handeni District, Tanzania using Feed Assessment Tool (FEAST) developed by Duncan et al. (2012). Handeni District is one of the eight Administrative Districts of Tanga Region. Others include Korogwe, Muheza, Mkinga, Lushoto, Pangani, Kilindi and Tanga.

1.1 Geographical location of the District

The district lies within the latitudes 4°55' and 6°04' south and within longitudes 37°47' and 38°46' east. It borders districts of Pangani and Muheza to the east, Korogwe and Simanjiro to the north, Kilindi to the west and Bagamoyo to the south. It is best accessed from the south by Chalinze – Segera tarmac road, and by tarmac roads from Korogwe in the North and Mkata in the east.

1.2 Agriculture and economic characteristics

Most of the land is used for crop production, livestock keeping, forestry, mining, and residency.

- Range/pastoral land 367,530 ha
- Agricultural land 340,470 ha
- Forestry reserve 132,000 ha

Livestock keeping is the second important sector of the economy in the district, after crop farming and it is mostly done by pastoralists (Masai) and to the less extent by the Zigua. However, over 98% of livestock kept in Handeni constitute traditional/local breeds which are in very low potential in regard to production.

2.0 Methodology

2.1 The Research team

The research team consisted of 6 researchers from Tanzania Livestock Research Institute (TALIRI) – Tanga and 2 extension officers from Handeni (Appendix 1). The actual sites for PRA differed between villages (Table 1). The total number of participants was 86 (47 males and 39 females) and the interviewed farmers were 6 in each site. Average time taken per PRA and individual interview was 2.30 hours and 40 minutes, respectively. Selection of farmers for PRA was done by village extension officers and was purposively for livestock keepers and for individual interview were selected based on wealth category of farmers (small, medium and large farmers).

Table 1: Number of participants and GPS coordinate of sites for FEAST exercise

Village	Hamlet	PRA Site	Participants (no.)	Males	Females	Village GPS coordinates	PRA sites GPS coordinates
Kibaya	Misale	Farmers home	22	13 (4)	9 (2)	S 05° 19. 633' E 038° 07. 553'	S 05° 18. 259' E 038°08. 413'
	Kichwang'ombe	Primary school class	14	12 (4)	2 (2)		S 05° 20. 377' E 038°08. 413'
Sinden	Misale	Ward Extension office	20	11 (4)	9 (2)	S 05° 21. 021' E 038° 14. 238'	S 05° 20. 856' E 038°13. 536'
	Seza	Lutheran church	30	11 (2)	19 (4)		S 04° 19.902' E 038° 15.368'

NB: in brackets are numbers of farmers interviewed with questionnaire



Kibaya



Sinden



Plate 1: Farmers during PRA in Kibaya and Sinden, Handeni

2.2 Experience in applying the tool

Different observations were made during application of the FEAST tool in the study area, which include;

- Poor time management by farmers -it took long before they all assembled in the venue (about 45 min after the scheduled time)
- Differences in ethnicity lead to differences/variation/misunderstandings in prioritizing problems – Zigua people have few cattle so their problem priority differ with Maasai people who have large herds of cattle.
- Difficult to get actual/proper information from Maasai people – wrong information were given as they expected to be helped by telling.
- Some farmers don't understand Swahili language - translator from their group had to assist.
- Over expectation by farmers – they need immediate solutions from their problems.
- Farmers over participated (30 farmers)
- Farmers vs pastoralists conflict exists

3.0 Results

3.1 Farm demographics

Farm and household sizes averaged 12.5 acres and 7 persons, respectively (Table 2). Labour is available throughout the year and highly required during the cropping season. The average cost of labour per day is Tsh. 3,875/= and for cultivating one acre land is Tsh. 23,500/=.

Table 2: Farm demographics

Location	Average farm size (acre)	Household size (no.)
Kibaya - Misale	5	6
Kibaya – Kichwang'ombe	20	7
Sindeni – Misale	20	7
Sindeni - Seza	5	6

NB: 1acre = 0.4 ha

3.2 Wealth classes in the villages

Large farmers were characterized by having more than 150 acre in Kibaya and 200 acres in Sindeni, while a small farmer had less than 20 and 40 acres in Kibaya and Sindeni, respectively. (Table 3).

Table 3: Wealth classes in Kibaya and Sindeni villages, Handeni District

Category of farmer	Kibaya		Sindeni	
	Range of land size (acre)	Households falling into the category (%)	Range of land size (acre)	Households falling into the category (%)
Small	1 - 20	70	1 - 40	80
Medium	51 - 150	15	41 - 200	15
Large	>150	15	>200	5

3.3 Contribution of livelihood activities

Contribution of livelihood activities to household income is mainly from livestock with an average of 73% from all villages, however, agriculture shows to have minor but potential contribution at an average of 20%. Other activities such as labour, off-farm and business have minor contributions (Figure 1).



Figure 1: Contribution of livelihood activities to household income

3.4 Crops and cropping seasons

There are three cropping seasons in the area (Figure 2) named as 'Mwaka' or 'Masika' (long rains), 'Vuli' (short rains) and 'Kiangazi' (dry period). In some cases very short rains occur in some months known as 'Mchoo'.



Figure 2: Cropping seasons in Handeni district

Maize and beans are the most important crops grown in the area (Figure 3). The grown crops are used as a source of food and for income generation, and they are grown during the wet season. Land for cultivation is fairly available although much land is used for grazing animals. Irrigation is not practiced as there is no source of water for irrigation in the area. Land is used for more than one crop per year and fallowing is always practiced.

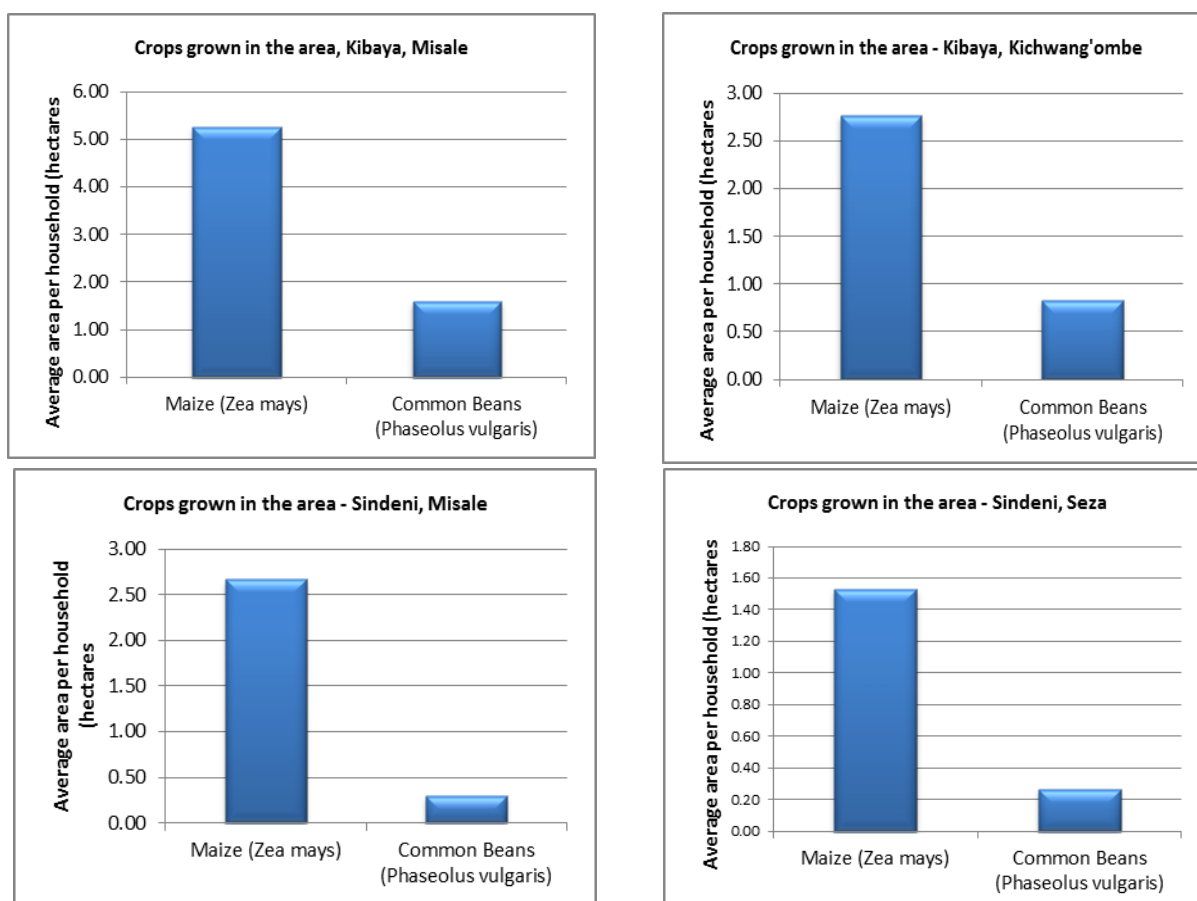


Figure 3: Crops grown in the area (dominant crops)

3.5 Livestock and livestock systems

Livestock species raised in the area include local dairy cows, improved dairy cows, draught cattle, fattening cattle, sheep, goats and poultry-village condition (Table 4). All livestock species are mainly used as a source of food and income, except for draught cattle and donkeys that are used to provide draught power. There were no major differences between the two sites on the proportions of households that own them and average number of animals per HH

Other use of cattle, sheep and goats is for dowry purposes and it also includes provision of manure.

Table 4: Summary of estimated proportions of household that own a livestock species and average number of animals (range in brackets)

Livestock species	Proportions of households that own the species (%)	Average No. of animals per household
Local dairy cows	91 (85 - 100)	28 (10 - 50)
Improved dairy cows	1 (0 - 5)	1 (0 - 3)
Draught cattle	51 (0 - 100)	4 (1 - 12)
Fattening cattle	15 (0 - 40)	4 (0 - 10)
Sheep	90 (30 - 150)	55 (20 - 100)
Goats	88 (50 - 100)	73 (20 - 100)
Poultry-village condition	120 (80 - 200)	41 (5 - 100)
Donkeys	58 (10 - 100)	6 (2 - 10)

Management of animals is as follows

- Open grazing is a common practice and in the evening animals are left in kraal. However, sick animals are always zero grazed. During dry periods farmers move with their animals (to as far as 50 km) for searching feeds and water
- Natural suckling is applied to calves for an average period of 6 months before weaning and de-worming is seldom done to calves at three months of age.
- No records are kept due to large herds of animals i.e. difficult to keep records.

Main diseases highlighted by farmers include East Coast Fever (ECF), Contagious Bovine Pleuro Pneumonia (CBPP), Heart water and Foot and Mouth Disease (FMD). Other diseases and their treatment/control modality are shown in table 5.

Table 5: Major livestock diseases

Location	Diseases	Treatment/control
Kibaya – Misale	East Coast Fever (ECF), Contagious Bovine Pleuro Pneumonia (CBPP), Foot and Mouth Disease (FMD), Babesiosis, Trypanosomosis, Mange, Newcastle, Chicken- pox, Mange, Heart water and otitis.	Treatment of animals is mainly done by farmers themselves, prevention by vaccination is done by extension officers. Cost of treatment varies depending on type and severity of disease e.g. for ECF is Tsh. 20,000/=
Kibaya – Kichwang’ombe	ECF, CBPP and heart water.	
Sindeneni – Misale	(ECF), CBPP and heart water, FMD, lumpy skin and otitis.	
Sindeneni – Seza	ECF, CBPP and heart water	

Bulls are commonly used for reproduction (natural mating); there is no Artificial Insemination (AI). This could be due nature of production system (open grazing system with large herds) and the availability of AI service especially when animal have moved far during dry periods. The bull service is free and the ratio of bull to cow is 1:5.

Milk productivity is very low (1.2 litre, per cow per day). Milk is usually sold and the price ranges from Tsh. 200 – 600/=, however, reasonable amount of milk is left for home use (1 – 10 litres per day). Prices of cattle ranges from Tsh. 80,000 – 1,050,000/= depending on seasonality of the year i.e. higher after crop harvesting (July - December) and lower during crop cultivation (January - June).

3.6 Feeds and feeding systems

3.6.1 Availability of feed resources

Grazing contributes the largest proportion on average of the feed based on a dry matter (DM) basis (85%), metabolizable energy (ME) (84%) and crude protein (CP) (84%) in the area throughout the year. Maize (*Zea mays*) - gluten with bran is the only used purchased feed resource by few farmers

(25%) in the area and the average price is Tsh. 1600/= There is no fodder cultivation in the area, crop residues contribute to a lesser extent (14%) as feed source (Figure 4).

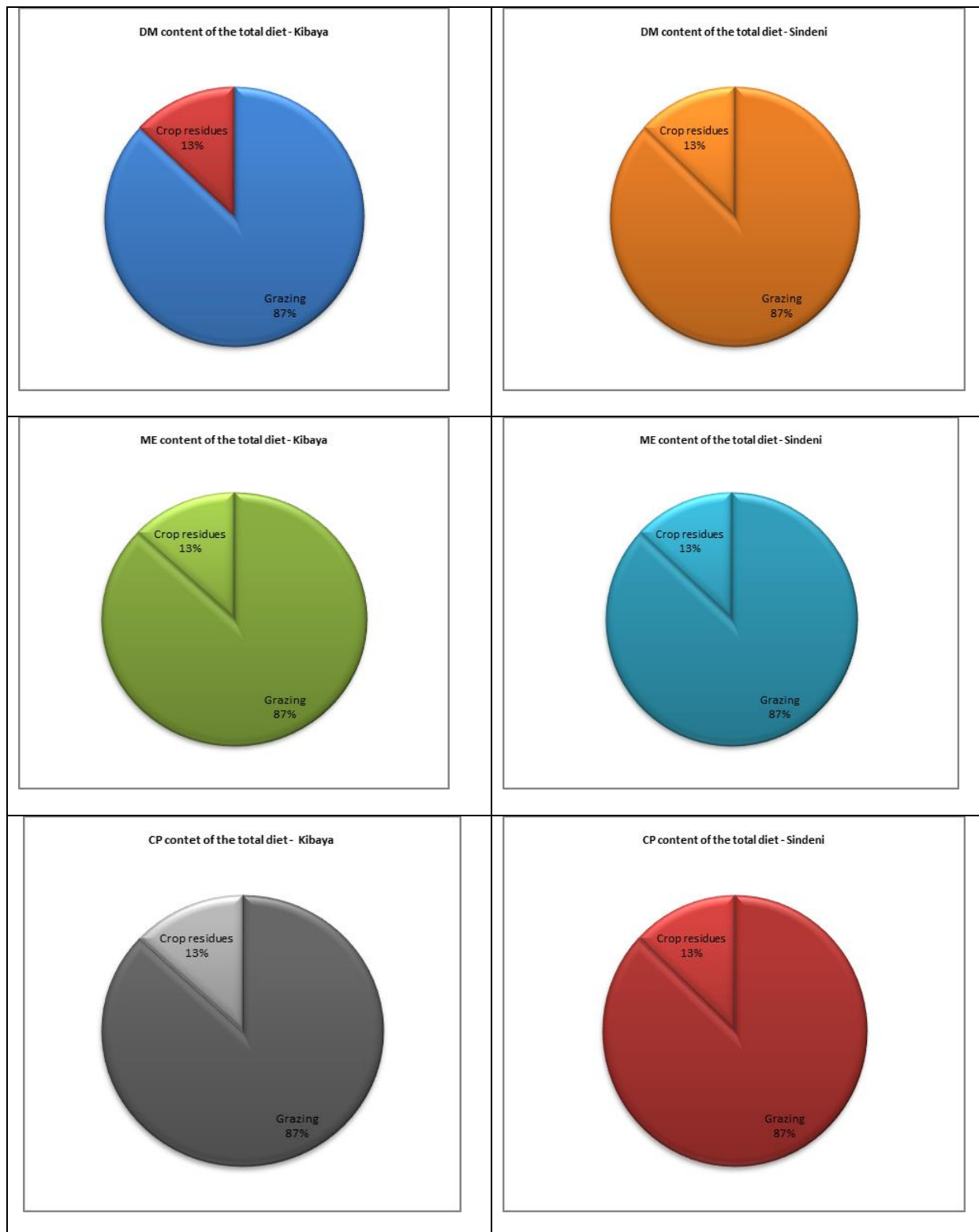


Figure 4: Available feed resources in the study area

Seasonality of feed availability has implications on feeds shortage in the area; high abundance is during long rains and less abundance during dry periods (Figure 5). Despite the fact that grazing is the main source for feed throughout the year, crop residues are important, especially in Sindeni-Misale. Feed processing and conservation is not practiced in the area, and crop residues are left in the field to be grazed by the animals later. The feed availability is always quite high after the main rainy season, except Sindeni - Seza. This might be due to high bush encroachment in the area than in other hamlets under study.

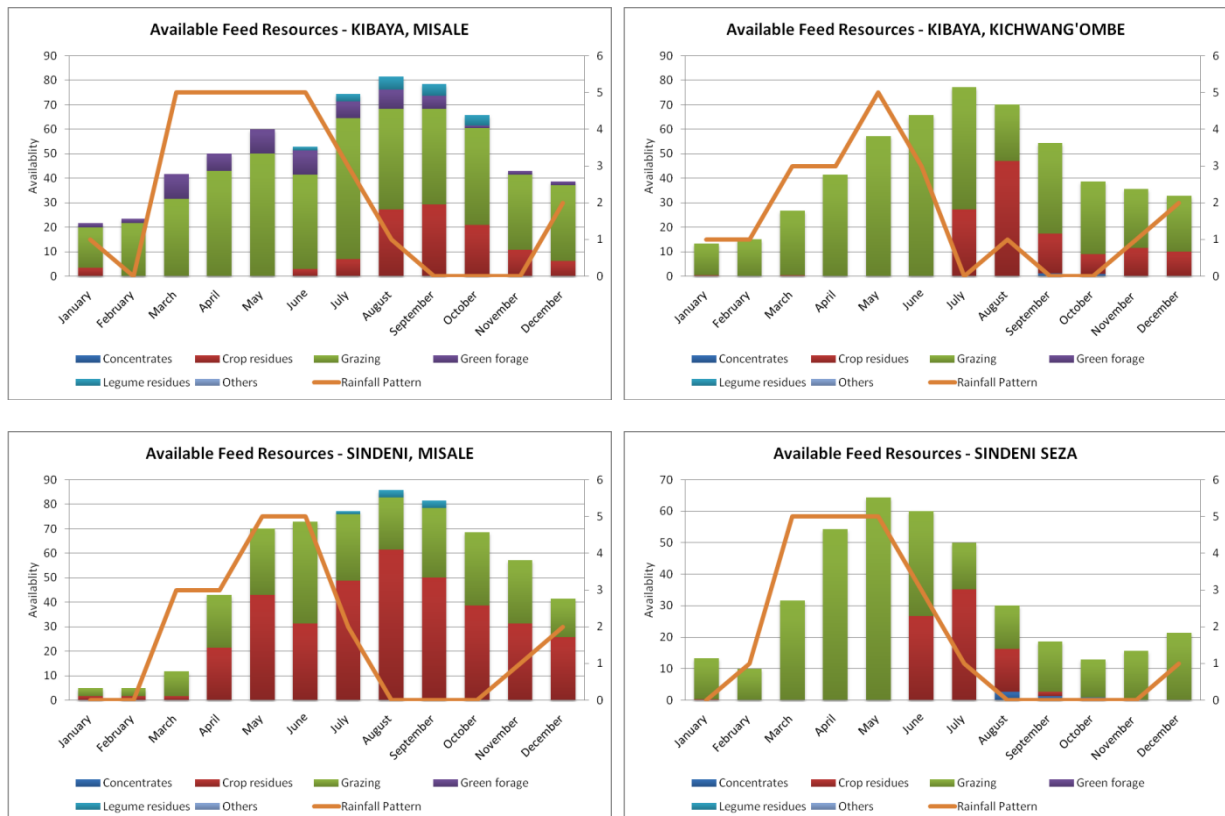


Figure 4: Available feed sources utilised by farmers throughout the year

3.7 Agricultural and livestock inputs and services

There is no any cash/credit providers in the area and agro-vet inputs are available from local sellers at a distant area (about 10 km) away from the villages. However, the inputs are claimed to be very expensive. Extension staffs are available in the area and they are responsible for provision of advices in livestock production including prevention/control of livestock diseases.

3.8 Constraints and opportunities

3.8.1 Constraints/problems

The major five problems in their descending order of importance as identified by farmers and their proposed solutions are given in table 6.

Table 6: Identified problems and proposed solution by farmers during PRA

Site	Problem	Solution
Kibaya - Misale	Insufficient fodder/pasture for animals	Introduction of improved pasture, destocking, paddocking
	No livestock routes	Group formation and harmonization to have proper ways for animals to get water and pasture without any crops interference
	Water scarcity	Construction of wells/charcoal dams
	Low price of animal during the sale	Fattening of animals to attain market weight
	Low milk production	Training on general animal husbandry, provision improved bulls
Kibaya – Kichwang’ombe	Insufficient fodder/pasture for animals	Introduction of improved pasture, destocking, paddocking
	Feeder ways for water and pasture searching	Group formation and harmonization to have proper ways for animals to get water and pasture without any crops interference
	Water scarcity	Construction of wells/charcoal dams
	Low price of animal during the sale	Fattening of animals to attain market weight.
	Low milk production	Availability of feeds and minerals.
Sindeni - Misale	Water scarcity	Construction of wells/charcoal dams
	Low price of animal during the sale	Fattening of animals to attain market weight.
	Low milk production	Availability of feeds and minerals
	No livestock routes	Group formation and harmonization to have identified routes for livestock.
	No specific identified/reserved area for grazing animals.	Implementation of existing land policy (Government to assist)
Sindeni - Seza	Insufficient fodder/pasture for animals	Introduction of improved pasture (Government and stakeholders to assist)
	Livestock diseases.	Proper ways for drugs availability near farmers place and extensionists.
	Land dispute among farmers and livestock keepers.	Implementation of existing land policy for land use act among the two.
	Feeder ways for water and pasture searching.	Group formation and harmonization to have proper ways for animals to get water and pasture without any crops interference.
	Lack of reserved land for grazing animals.	Implementation of existing land policy

3.8.2 Opportunities

Although some problem in livestock production exists in the area, the opportunities that might contribute toward improving livestock production include;

- Enough land for grazing which can also be used for forage cultivation
- Availability of extension Staff to provide livestock services to farmers i.e. prevention/control and treatment of diseases and advisory services on farmers' group formation.
- Availability of milk processing industry in Tanga

3.9 Conclusion and Recommendations

The exercise revealed that livestock keeping contributes much to the income of the farmers in the study area, therefore the following was concluded:

- Grazing contributes to the largest proportion of the feed, and although there are long periods of feed shortage, feed conservation is not a common practice.
- Long distance movement of farmers and their animal for searching feeds and water calls for immediate intervention overcome the situation.
- Low productivity potential of the animals is an implication of lack of knowledge/skills on general animal husbandry and/or feed shortage mainly due to seasonality.

The following were recommended

- There is a need for immediate interventions on feeds and feeding aspects.
- Farmers need to be trained on general animal husbandry. Government and other stakeholders are required to take an integrated approach to improve livestock extension services and provision of education to farmers through short courses, seminars, workshops.
- Collaborative efforts by government, farmers and other stakeholders to be done to overcome the problem of water i.e. by constructing dams within the area.

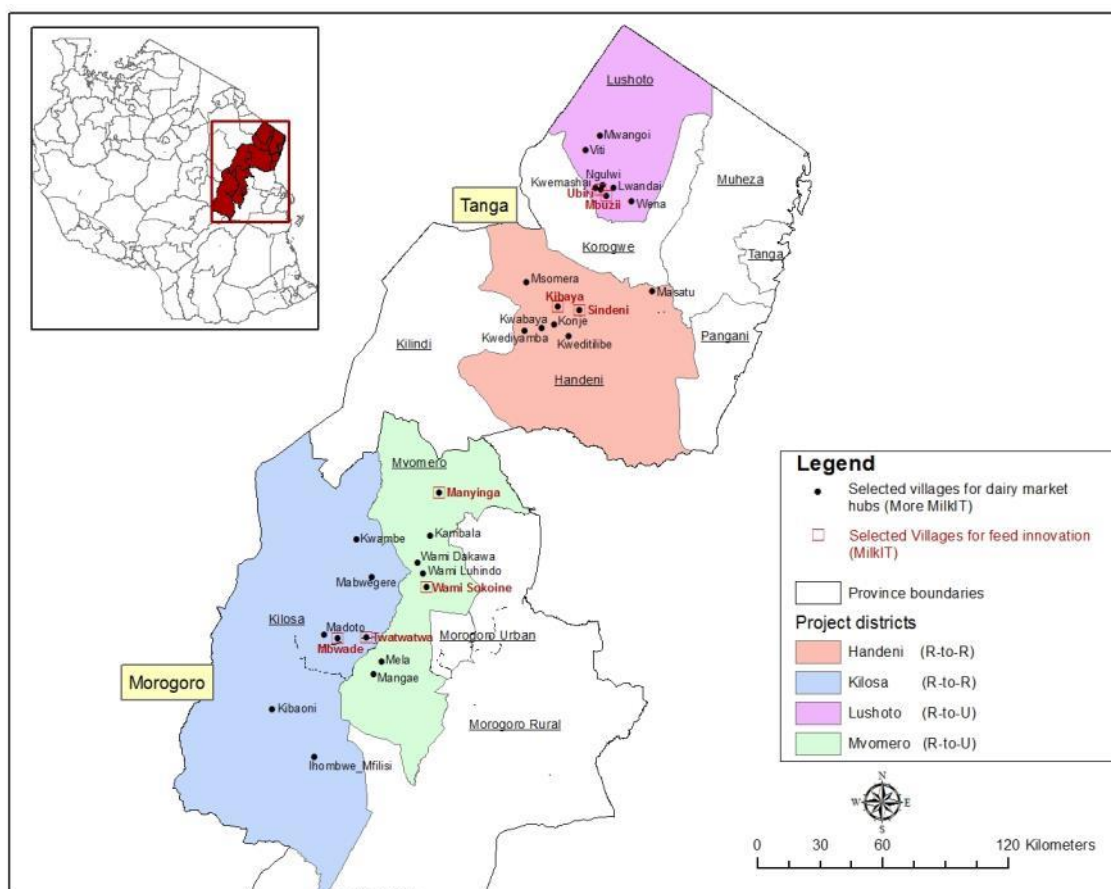
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Appendices



Appendix 1 Map: MilkIT project sites in Morogoro and Tanga Regions of Tanzania; map produced by ILRI

Appendix 2: Local units reported for Handeni district

Local weight unit measurements	Local weight units / 1 kg		Explanations
	Kibaya	Sinden	
Gunia mahindi (bag)	0.01053	0.01053	Bag of maize
Gunia maharage (bag)	0.01053	0.01053	Bag of beans
Kiroba (Cassava)	0.01667	0.01667	Bag of cassava
Debe (Sweet potatoes)	0.025	0.025	Tin of sweet potatoes
Mzigo wa majani	0.03333	0.03333	Luggage of green leaves
Kiroba (vegetables)	0.03333	0.03333	Bag of vegetables
Debe Mahindi (tin)	0.05	0.05	Tin of maize
Bunch of banana	0.05	0.05	
Debe Pumba (tin)	0.10	0.10	Tin of maize bran
Sadolin (plastic container)	0.25	0.25	Plastic container
Debe (Leucaena leaf meal)	0.33333	0.33333	Tin of Leucaena leaf meal
Piece (Pumpkin)	0.33333	0.33333	

Appendix 3: Acronyms and abbreviations

AI	Artificial insemination
CBPP	Contagious Bovine Pleuropneumonia
CP	Crude protein
CIAT	International Center for Tropical Agriculture
DM	Dry matter
ECF	East Coast Fever
FEAST	Feed assessment tool, see http://www.ilri.org/feast
IFAD	International Funds for Agricultural Development of the United Nations
ILRI	International Livestock Research Institute
ME	Metabolizable energy
MilkIT	A research project funded by IFAD (Title: <i>Enhancing Dairy-based Livelihoods in India and the United Republic of Tanzania through Feed Innovation and Value Chain Development Approaches</i>)
NBS	National Bureau of Statistics
PRA	Participatory Rural Appraisal
SUA	Sokoine University of Agriculture, Morogoro, Tanzania
TALIRI	Tanzania Livestock Research Institute
Tsh.	Tanzanian Shilling; about 1600 Tsh. = 1 USD at the time of the survey

Annex 1: Research team

SN	Name	Institution, Function	Gender
1	Elia Masasi	Handeni District Livestock Office, Extension officer	Male
2	Jelly Chang'a	TALIRI, Veterinary Research Officer	Female
3	John Diyu	TALIRI, Livestock Research Officer	Male
4	Rose Loina	TALIRI, Livestock Research Officer	Female
5	Samwel Mngulu	TALIRI, Livestock Research Officer	Male
6	Valentino Urassa	TALIRI, Livestock Research Officer	Male
7	Walter Mangesho	TALIRI, Livestock Research Officer	Male
8	Zuberi Mkodo	Handeni District Livestock Office, Extension officer	Male