KCSAP
Kenya Climate Smart Agriculture Project

KALRO
Kenya Agricultural & Livestock Research Organization

Climate Smart Agricultural Technologies, Innovations and Management Practices for Beef Value Chain

TRAINING OF TRAINERS' MANUAL








Isako T., Muthiani E., Wandera F., Nyambati E., Githui P. M., Karanja S. N., Ondabu N.. Kipronoh A., Ndirangu P., Mungube E., Mugambi J., Kimindu V., Odendo M., Muriithi G. and Okoti M.

MARCH 2020

Disclaimer

The information presented in this manual is for advisory use only. Manual users should verify site specific appropriateness with regard to the agro-climatic zone, farming system and the value chain.

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Foreword

Kenya Climate-Smart Agriculture Project (KCSAP) tasked the Kenya Agricultural and Livestock Research Organization (KALRO) with the implementation of the project's Component 2 on 'Strengthening Climate-Smart Agricultural Research and Seed Systems'. The component activities are geared towards the development, validation, adoption and delivery of context specific climate smart agriculture (CSA) technologies, innovation and management practices (TIMPS). The other responsibility was development of sustainable seed production and distribution systems for priority value chains to enhance availability and access to seed, breeds and fingerlings by target beneficiaries under Components 1 (Up scaling Climate-Smart Agricultural Practices). Against this background, KALRO and her NARS partners have developed, validated and availed CSA TIMPS for dissemination and adoption. The TIMPS have further been unpacked during the development of Training of Trainers (ToT) Manuals for use in training public and private extension service providers and lead farmers.

The ToT Manuals are instructional guides to be used for teaching and learning step-by-step procedures of implementing CSA innovations for each of the 13 value chains being addressed. The training content is drawn from the CSA TIMPS that support respective value chains. The content are arranged in progressive modules supported by extensive information from research information and background data drawn from the TIMPS. Their relevance are based on the needs teased out of the value chains and the project objectives. The ToT Manuals training design takes into consideration the delivery system, the partners and their roles, the duration of training and logical flow of the sessions. Similar content requiring similar delivery systems are grouped together while the roles of the partners are tapped in the training and planning of the training sessions.

The Manual is divided into modules, which have a uniform outline that ensures every aspect of the TIMPs are fully covered in way that the trainees can absorb and relate to. Various delivery methods are deployed and where possible demonstrations and practical work are incorporated to enable the trainees learn by participating in the actual field activities. Furthermore, to ensure that the training across various groups is standardized, trainers guidelines, detailed descriptions of the trainees, program, training methods and a training evaluation have been provided in the manual. Adhering to these guidelines, therefore, enables possibility to replicate the training in several locations without loss of details regardless of whether conducted by different trainers.

It is highly advised that the ToT Manuals should be used in conjunction with the respective value chains' TIMPs documents and facts sheets in order to provide valuable resource for both public and private extension service providers. The use of this Manual is expected to enable achievement of the envisaged 'Triple Wins' of increased productivity, enhanced resilience and reduction of greenhouse gases emissions.

I am greatly indebted to the value chain leaders and all those who participated in the preparation of the Manual, which is expected to herald a new way of delivering training content in a changing agricultural environment.

Eliud K Kireger, PhD, OGW

Director General, KALRO

Preface

The Kenya Climate-Smart Agriculture Project (KCSAP) is a Government of Kenya project with support from both the World Bank and the government. It is a five - year project implemented in 24 counties, mainly in the arid and semi-arid lands (ASALs), at a cost of Ksh. 25B. The project development objective (PDO) is *"to increase agricultural productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response."* This objective is to be achieved through the implementation of five key components, which are 1) Up scaling Climate-Smart Agricultural Practices, 2) Strengthening Climate-Smart Agricultural Research and Seed Systems, 3) Supporting Agro-weather, Market, Climate, and Advisory Services, 4) Project Coordination and Management and 5) Contingency Emergency Response.

Component 1 involves facilitating the empowering of farmers and communities to adopt technologies, innovations and management practices (TIMPs) to achieve the Climate Smart Agriculture (CSA) triple-wins of; increased productivity, enhanced resilience (adaptation), and reduced Greenhouse Gases (GHG) emissions (mitigation). Component 2 is charged with the responsibility of providing the TIMPs. Therefore, it supports the development, validation, and adoption of context specific CSA TIMPS to target beneficiaries under Components 1 and 3 as well as development of sustainable seed production and distribution systems.

To catalyze uptake of TIMPs, Kenya Agricultural & Livestock Research Organization (KALRO) in conjunction with partners in the National Agricultural Research Systems (NARS) and Consultative Group for International Agricultural Research (CGIAR) compiled inventories of TIMPs for each of the 13 prioritized value chains (cassava, green grams, sorghum, millet, pigeon peas, bananas, tomatoes, potatoes, apiculture, indigenous chicken (meat and eggs), dairy (cattle and camel), red meat (cattle, sheep and goats) and aquaculture and 3 cross cutting value chains (natural resource management, pastures & fodder and animal health). The TIMPs were categorized into those ready for upscaling, those that needed validation and gaps that required further research. Training of Trainers' (ToT) manuals focusing on TIMPs that are ready upscaling for each of the value chains were subsequently developed and form the basis of training county extension staff, service providers and lead farmers. They are in turn expected to cascade this training to beneficiaries in the targeted smallholder farming, agro-pastoral and pastoral communities in the 24 project counties of Marsabit, Isiolo, Tana River, Garissa, Wajir, Mandera, West Pokot, Baringo, Laikipia, Machakos, Nyeri, Tharaka Nithi, Lamu, Taita Taveta, Kajiado, Busia, Siaya, Nyandarua, Bomet, Kericho, Kakamega, Uasin Gishu, Elgeyo Marakwet and Kisumu.

KALRO having the mandate of implementing of activities under Component 2 has been instrumental in using its information resources and those of partners and collaborators to come up with the inventories of TIMPs and corresponding ToT Manuals. The use of

these information resources coupled with the accompanying training and the contribution of the other project components, will go a long way in enabling the KCSAP to meet its development objective.

The National Project Coordination Unit is grateful to all who participated in the development and production of this *Training of Trainers' Manual for beef value chain.* It is my hope that counties and other users will put this resource to good use as they transform and reorient their agricultural systems to make them more productive and resilient while minimizing GHG emissions under the new realities of a changing climate.

Francis Muthami

National Project Coordinator

Kenya Climate-Smart Agriculture Project

Table of Contents

Foreword.....v
Preface.....vii
List of Abbreviations.....xi
Part 1.....1
Section 1: Background.....2
1.1.The Role of Beef in The Kenyan Economy.....2
1.2. Role of Beef in Food And Nutrition Security.....2
1.3. Climate Smart Red Meat Production.....2
1.4 Objectives of The Training.....3
Section 2: Training Content.....4
2.1 Orientation of The Modules.....4
2.2 Modules Outline.....4
Section 3: The Training Design.....8
3.1 Delivery System.....8
3.2 Partners and Their Roles.....8
3.3 Training Duration.....8
3.4 Logic of Design and Flow of Session.....9
Section 4: Facilitator Guidelines.....10
4.1. Preparation of the Training Material.....10
4.2. Preparation of Training Venues And Sites.....10
4.3 The Trainees.....10
4.4. Training Program.....11
4.5. Training Methods.....11
4.6 Planning Schedule and Guidance for ToT Preparation.....11
4.7 Evaluation of Training.....12
4.8. Facilitator Reference Materials.....14
Part II.....15
Module 1. Beef Breeds and Breeding.....17
Module 2. Calf Management.....23
Module 3. Weaner Management.....28
Module 4. Beef Cattle Records.....32
Module 5. Beef Cattle Handling Structures and Equipment.....35

Module 6. Feeds and Feeding.....39
Module 7: Integrated Manure Management.....45
Module 8: Beef Health Managemen.....51
Module 9: Value Addition of Beef and Beef By-Products.....59
Module 10: Beef Production Business.....65
Module 11: Gender Mainstreaming in the Beef Value Chain.....71
Annex 1: Training Program.....78
Annex 2: General Reference Materials.....84

List of Abbreviations Acronyms

AEZs	Agro-Ecological Zones
ASALs	Arid and Semi-Arid Lands
CBPP	Contagious Bovine Pleuropneumonia
CTT	Core Team of Trainers
ECF	East Coast Fever
FMD	Foot and Mouth Disease
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GHG	Green House Gas
IMM	Integrated Manure Management
KALRO	Kenya Agricultural and Livestock Research Organization
KCSAP	Kenya Climate Smart Agriculture Project
LPs	Lead Pastoralists
LSD	Lumpy Skin Disease
MT	Metric Tonnes
PFBS	Pastoral Field and Business Schools
PFS	Pastoral Field school
TADs	Trans-boundary Animal Diseases
TIMPs	Technologies, Innovations and Management Practices
ToT	Training of Trainers
RVF	Rift Valley Fever
VMG	Vulnerable and Marginalized Groups

PART 1

This part consists of four sections including the background, module training content, training design and facilitator guidelines.

SECTION 1 BACKGROUND

1.1 The role of Beef in the Kenyan economy

Livestock in Kenya is kept by approximately 7 million households and contributes 10-13% of Kenya's GDP as well as 40% of Agricultural GDP. The Cattle population in Kenya was estimated at 18 million in 2017.

Red meat represents 80% of the domestic meat consumption and beef is the most preferred source. However, an estimated 98% of red meat (beef, mutton and chevon) is low quality lean meat. Beef contributed 74% of all meat consumption in 2014. Per capita red meat consumption per year has been increasing and was estimated at about 15 kg in 2019 up from 12.73 kg per capita in 2012. The total red meat consumption by volume was estimated at 648,252 MT in 2019 with an estimated deficit of 300,000 MT that is met by informal importation of live animals on hoof from Tanzania, Ethiopia and Somali. Recent studies indicate that the Kenya meat sector is inefficient and is characterized by high post-harvest losses due to hot meat retail chain, limited and poor value addition, with sub-optimal adherence to food safety standards.

1.2 Role of Beef in Food and Nutrition Security

The demand for food in the next 30-40 years is expected to increase with the rise in population. In 2050, the population of the country is expected to be about 96 million out of which, 41 million will live in urban areas. It has been reported that an urbanized Kenyan population will consume more high value food products of animal origin such as meat, milk and eggs. In aggregate, consumption of beef and milk is likely to increase by over 170% between 2010 and 2050 translating to about 0.81 and 8.5 million tons respectively.

Consumption of red meat has been erroneously linked to increased cases of coronary heart disease. This called for dietary change or reduction of red meat consumption to a maximum of 50 grams per capita per day. However, studies have shown that red meat provides most of the essential micronutrients including vitamin B12 required for a healthy life. Besides, consumption of lean red meat has been reported to increase satiety thus reducing the amount of carbohydrate energy food intake resulting to weight loss. Most (70%) of the red meat is produced in the Arid and Semi-Arid Lands (ASALs) of Kenya under pastoral and agro-pastoral production systems. Red meat production is the main source of livelihoods and nutritional security for over 10 million people living in the ASALs.

1.3 Climate Smart Red Meat Production

Production of red meat has been reported to contribute 14.5% of the global Green House Gases (GHG). Adoption of technologies that lead to bigger and fast maturing animals, enhanced feed quality and improved manure management will mitigate GHG production. Besides, the continuous cover provided by well managed grazing areas sequester carbon.

1.4 Objectives of the Training

The purpose of this training is to provide Master trainers with knowledge and skills on how to facilitate and support PFBS for increased productivity through adoption of GAP. Specifically, the objectives of this training are:

1. Providing pastoralists trainers with relevant attitude, knowledge and skill in beef production as a business and market assessment techniques for market led production
2. Refreshing pastoralists trainers' knowledge and skills in beef good agricultural practices (GAP) including breeding, calf and weaners husbandry practices, feeds and feeding, manure and animal health management
3. Providing pastoralists trainers with knowledge and skills in value addition of beef and beef by-products at individual or group level to increase the enterprise profitability
4. Providing pastoralists trainers with knowledge and skills in participatory techniques for effective facilitation of adult learning processes through PFBS and developing inclusive stakeholder partnerships for sustainable up scaling of PFBS.

SECTION 2: TRAINING CONTENT

2.1 Orientation of the Module

This section of the manual is about the training content or modules. It provides the orientation and outline of the 11 modules in 74 sessions (inclusive of 11 module review sessions). The 11 modules are oriented to ensure adoption and upscaling of beef value chain TIMPs that will help improve productivity, resilience and mitigation of harmful greenhouse gases. During a beef value chain analysis, the main challenges identified were inadequate knowledge of markets and market demands, inadequate availability of adapted fast-growing breeds, feeds and associated management packages, disease management, limited value addition of beef and beef by-products and low adoption Good Agricultural Practices (GAP) for increased productivity.

The purpose of these modules is to enhance the knowledge and capacities of trainers in understanding and applying the climate-smart agriculture practices in their daily activities.

2.2 Module outline

Each of the 11 modules have basically the same outline consisting of 8 parts. These parts are:

a) **Introduction to the module – c**ontext and background to training needs, knowledge and skills gaps being addressed

b) **Module learning outcomes –** what trainees are expected to learn

c) **Module target group -** trainee categories

d) **Module users –** facilitators

e) **Module duration –** minimum number of hours of exposure to training materials

f) **Module summary –** sequence of sessions, training methods, materials and duration

g) **Facilitators guideline –**detailed sessions, training methods, materials and session guides

h) **Participant's handouts –** detailed notes and reference materials for trainees

The Outline of the 11 modules is presented in Table 1.

Table 1: Outline for the 11 modules of the beef value chain

No	Module Name	Need Addressed	Expected Training Outcomes	Duration
1.	**Beef Breeds and Breeding**	Inadequate knowledge on: • technical terminologies in beef production, characteristics and qualities of good beef cattle • available beef breeds and their attributes • principles of beef breeding and breeding systems • selection and management of breeding stock (breeding bulls and heifers) • breed registration and its benefits	Information on available beef breeds and their attributes, breeding, registration and management acquired	5 hours 35 minutes
2.	**Cow to Calf Management**	Inadequate knowledge • on managing in-calf heifers and cows • Calf and suckling management leading to 30% calf mortality	Information on management of calf, in-calf heifers and cows acquired	3 hours 50 minutes
3	**Weaner Management**	• Inadequate knowledge on managing weaners for fast growth rates to enable production of quality bulls, replacement heifers and quality beef	Information on management of weaners for fast growth rates, quality bulls, replacement heifers and quality beef acquired	2 hours 55 minutes
4	**Beef Cattle Records**	• Inadequate knowledge on importance of keeping records and type of records to keep for profitable beef enterprise	Information on type of records to keep and importance acquired	3 hours

5	**Beef Cattle Handling Structures and Equipment**	• Inadequate knowledge on appropriate beef husbandry tools, handling structures and equipment	Information on appropriate beef husbandry tools, handling structures and equipment acquired	2 hours 40 minutes
6.	**Feeds and Feeding**	• Inadequate knowledge on feeds and feeding for beef cattle	Information on feeds, feeding and ration formulation acquired	8 hours 45 minutes
7	**Integrated Manure Management**	• Limited skills on handling and disposal of manure and mitigation of GHG	Knowledge acquired on: • The role of manure in production of greenhouse gases and therefore climate change • Appropriate disposal of manure through fertilization of pastures • Use of manure to produce green energy (Biogas)	4 hours
8	**Beef Health Management**	Inadequate knowledge on • common diseases, pests and parasites and their control/ treatment in beef cattle	• Common diseases, pests and parasites of beef cattle, sheep and meat goats identified • Basic information on prevention and control measures acquired	7 hours 25 minutes
9	**Value Addition of Beef and Beef by- Products**	• Inadequate skills on value addition of beef	Information acquired on: • beef value addition • methods of value addition of hides, bones, horns and hooves	3 hours 40 minutes

10	**Beef Production Business**	• Inadequate knowledge on types of markets and their requirements • Lack of beef production for niche markets	• Knowledge on beef production business, markets and their requirements acquired	5 hours 20 minutes
11	**Gender Mainstreaming in the Beef Value Chain**	• Inadequate inclusion of gender, vulnerable and marginalized groups' (VMGs) issues in the beef value chain	• Basic concepts of gender and VMG mainstreaming and analysis in beef value chain acquired	3 hours 30 minutes

SECTION 3: TRAINING DESIGN

3.1 Delivery System

The delivery system designed for this training consists of two stages:

1. **Establishment of a team of facilitators**
   - A Core Team of Trainers (CTT) trains farmer trainers (service providers) as facilitators of a ToT course. This is done using this manual and modules contained therein.
   - Each of the Master trainers will facilitate farmers to acquire knowledge and skills in facilitating Farmer-led Pastoral and Business Schools (PFBS) through practical demonstrations.
2. **Up scaling –**This will be done by selecting Lead Pastoralists (LPs) to be trained in facilitation skills.

3.2 Partners and Their Roles

The partners envisioned in this training plan are:

a. **Core Team of Trainers –**Master trainers drawn from KALRO and Department of Agriculture facilitate initial training of Pastoralists trainers. They will also provide mentorship to farmers' trainers during the first year of LP trainings. They should also be available in the evaluation of the first round of LP trainings

b. **County Government (Department of Livestock) –** Pastoralist trainers and their supervisors who can be referred to as County Coordination Teams (CCT) to take role of LP trainers, mentors and coordinators at sub County level. They assist Pastoral Field Schools (PFS) form partnership with stakeholders for sustainability. They should also support LPs form their network

c. **3. Lead Pastoral Networks –** association of LPs in the counties to take up Pastoral and agro-pastoral trainings and up scaling in the future. The first group of LPs should visit and learn from any existing functional based Pastoral Field Schools on how they can start their own

d. **Private Sector Service Providers –** inputs suppliers, financial and business development service providers, market players and processors to partner and support growth of individual or beef producer groups, to evolve them into sustainable social and commercial entities

3.3 Training Duration

The initial ToT course for Master trainers for the 11 modules in the Beef value chain shall take a total of 53 hours and 30 minutes of the training period. This does not include health and lunch breaks.

3.4 Logic of Design and Flow of Session

The logic of design and flow of each module is that the facilitator, paying attention to the methods and sessions guidelines shall (1) Introduce the module; (2) Draw out the participants' expectations (3) Relate participants' expectations with module objectives or learning outcomes (4) Explore the concept and content, switching to different methods of delivery of the content (group exercise, brainstorming, excursions, plenary discussions, role plays) as the sessions progress; (5) Review the module at the end of the training and (6) Distribute the participants' handouts.

SECTION 4: FACILITATOR GUIDELINES

4.1 Preparation of the Training Material

The training materials suggested require adequate preparations and should be available before the actual training dates. Further:

a. The facilitators should familiarize themselves and internalize the guidelines provided by this manual prior to the training;

b. The stationery required should be available within the training institution 3 days before the training. These include name tags, writing materials, paper punch and medium size box files for participants' handouts' filing;

c. Flip charts and good quality felt pens could be used interchangeably with LCD projections. Other material, equipment and tools for demonstration should also be arranged in time before the sessions start;

d. Copies of the module notes shall be distributed at the end of each module.

4.2 Preparation of Training Venues and Sites

The training venue will include the training room, field/ demonstration sites and sites acting as markets.

1. **Training Room** – should have adequate space for 25 participants seated in a semi-circular or U shape arrangement ensuring access and unobstructed view of the front. There should be a desk for the trainer, their materials and LCD projector, a flip charts holder and white wall to act as a projector screen.

2. **Demonstration Site** –should be close to the training venue. A clear but furrowed seed bed should be also available to demonstrate planting techniques.

3. **Market Sites** – these include Livestock markets (butcheries, slabs, wholesale and aggregation points and processing sites if any. The operators should be informed in advance about the visits. These should not be very far from training venue preferably less than 10 minutes' drive.

4.3 The Trainees

The trainees who will participate are livestock extension officers with elaborate training background in livestock and extension. The facilitator should therefore act more of a facilitator than a lecturer and draw out and build on their knowledge, skills and experience that they shall bring in. As a golden rule, do not lecture them but facilitate and listen, and let them feel like equals to each other and the CTT team members.

4.4 Training Program

The training program consists of the actual training modules. Health breaks should be considered when drawing the training program. The training program should preferably be based on the outline presented in Annex 1 to allow flow of ideas and topics. However, should the situation demand, the sequence and day of coverage for whole or parts of the modules can be modified to suit emerging requirements.

4.5 Training Methods

The training methods for each session are suitable for adult learners and appropriate for addressing knowledge, skills and attitudes of the participants. The choice of the methods has been informed by the competency issues being addressed, time available and experiences of the author of this manual. Depending on time available, the facilitator can modify these training methods but as a golden rule no presentation by the facilitator should take more than 1 hour 30 minutes continuously. To avoid monotony, other participatory training methods like discussions, group exercises and brainstorming should be allowed . Table 2 presents a list of available training methods.

Table 2: Training methods

Training Method	Description of Method
Plenary presentations	Use of PowerPoint or flip charts and plenary discussions in situations where knowledge and opinion or consensus is required
Group exercises, buzz groups, visits and demonstrations	To be considered where skills are an issue requiring sharing and trying
Role plays and problem-solving exercises	Plenary discussions have been considered as training methods where attitude is an issue
On-farm practical demonstration	To be considered where hand-on practical skills are acquired through sharing and demonstration

4.6 Planning Schedule and Guidance for ToT preparation

While planning for this training, the CTT leader should ensure the following before the training as outlined in Table 3.

Table 3: Planning schedule and guidelines for ToT

Duration to Training	Activities to be Done
Two months	Recruit master trainers and compose CTT
	Identify training venue and practical demonstration sites
	Draft the training and share with CTT
One month	Send out invitation letters to participants and special guests detailing purpose, venue and program. Follow up on demonstration sites. Brief CTT members
Two weeks	Confirm names of participants; reproduce training materials for facilitators and package, confirm preparedness of the field sites to be visited. Hold briefing of CTT members to finalize training plan. Confirm special guests if any
Four days	Confirm training sites preparedness, prepare sitting arrangements, and brief assistants
One day	Arrange training room furniture, place materials, equipment and stationery on the tables. Arrange for reception of trainees at the residence.
On first day	Arrange for reception of trainees at the training venue. Ensure climate setting is done before the course is officially opened. This includes: • Registration • Welcome to venue by host • Elaborate introduction of CTT and participants • Ground rules • Group formation

4.7 Evaluation of Training

At the end of each module, participants will evaluate it through a questionnaire (Table 4) while a final training evaluation will be carried out on the last day using questions in Table 5. Individual trainees will fill the evaluation forms without discussing with each other. The evaluation forms are then collected and analyzed by the CTT members. Time should also be allocated on the last day for each County to discuss and present their way forward.

Table 4: Individual sample evaluation form

MODULE:_____COUNTY_____

What new things did you learn from the topic?
What important aspects/topics were omitted?
Any other comments?

NB: Expand the form into one page to give enough room for comments

Table 5. Final evaluation of KCSAP beef training of trainers

Venue: _____Dates_____

Thank you for participating in the _____ value chain ToT Training Workshop which has just ended. Kindly take a few minutes to complete this Evaluation Form and return it to the Training Coordinator. The information you provide will be used to improve on the planning, organization, and management of future workshops and training.

1.0 I rate the training venue in terms of food and workshop facilities as:

☐ V. Good ☐ Good ☐ Average ☐ Poor

2.0 How would rate the ToT in attainment of your expectations:

☐ V. Good ☐ Good ☐ Average ☐ Poor

3.0 Please indicate two things that you liked about this ToT:

3.1
3.2

4.0 Please indicate two things that you did not like about this ToT:

4.1
4.2

5.0 Suggest two things about the course you would like done differently in future

5.1
5.2

NB: Please provide adequate space in the rows for participants to comment

4.8 Facilitator Reference Materials

4.8.1 Key references

Two key references should be provided for each module plus a list of other relevant publications for reference as shown in Annex 2.

4.8.2 Guide on the use of the information

The trainers will be advised to issue to farmers at most two publications for each of the training sessions. This is because if they get many publications, they might not read each properly. The publications should be stored and availed as electronic copies in PDFs. The service providers are strongly advised to keep these electronic copies on a memory stick, CD or portable hard drive – so that farmers can easily access and if necessary, print any of them out at a local internet café at their convenience.

The trainers will be advised to issue a General Beef Cattle Farming Manual to be accompanied by 2 other publications during the training.

PART II

This part consists of 11 modules namely: i) Beef breeds and breeding; ii) Cow– calf Management; iii)Weaner Management; iv) Beef Cattle Records; v) Cattle Handling Structures and Equipment; vi) Feeds and Feeding; vii) Integrated Manure Management; viii) Beef Health Management; ix) Value Addition of Beef and Beef by- Products x) Beef Production Business; and xi) Gender Mainstreaming in the Beef Value Chain. Each module will be divided into the following:

1.1. Introduction to the Module

1.2. Module Learning Outcomes

1.3. Module Target Group and Categories

1.4. Module Users

1.5. Module Duration

1.6. Module Summary

1.7. Facilitator Guidelines

1.8. Participant's Handouts



MODULE 1

BEEF BREEDS AND BREEDING

1.1 Introduction to the Module

This module is designed for training facilitators on terminologies used in beef production, types of beef breeds in a changing climate, characteristics and quality of good beef cattle, principles of beef cattle breeding and breeding systems, selection and management of breeding stock and breeds registration. Beef production requires information on breeds suitable for the different agro-ecological zones (AEZs) and parentage of the breeding herd through proper recording system. Quality breeding stock can be maintained and improved through rigorous selection and long-term breeding programs.

Pastoralists and agro-pastoralists have over the years produced beef for subsistence purposes without targeting any market, quality of the beef produced and consumer demands. Quality beef production begins with having quality beef breeding stock which grow fast and attain market weights within the desired time. Thus, the need for beef producers to understand which breeds are desired by different markets and their carcass quality. A sound breeding program is key in attaining carcass quality and finishing weights within specified time as demanded by different markets. Thus, need for pastoralists and agro-pastoralists to understand the principles of breeding beef cattle, suitable beef breeds for different AEZs and the importance of breeds registration.

1.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

1. Terminologies used in beef production discussed and understood
2. Characteristics and qualities of good beef cattle explained and understood
3. Types of beef breeds described and understood
4. Principles of beef breeding and breeding systems explained and understood
5. Selection and management of breeding stock: breeding bulls and heifers explained and understood
6. Importance and methods of breed registration discussed and understood

1.3 Module Target Group and Categories

This module targets service providers who include County extension staff, private service providers and lead farmers.

1.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in red meat value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

1.5 Module Duration

The module is estimated to take 5 hours and 35 minutes.

1.6 Module Summary

Beef Breeds and Breeding			
Sessions	**Training Methods**	**Training Materials**	**Time**
1.6.1 Introduction and Levelling of Expectations	• Self-introduction • Buzz	• Program • Projector • Felt pens • Sticky leaf pads • Handouts	15 minutes
1.6.2 Terminologies Used in Beef Production	• Plenary discussion • Plenary presentation	• Projector • Posters • Handouts	45 minutes
1.6.3 Characteristics and Qualities of Good Beef Cattle	• Plenary discussion • Plenary presentation	• Projector • Posters	30 minutes
1.6.4 Types of Beef Breeds and their Attributes	• Plenary discussion • Plenary presentation	• Projector • Posters • Documentaries	1 hours
1.6.5 Principles of Beef Breeding and Breeding Systems	• Plenary presentation • Plenary discussion	• Projector • Posters	1 hour
1.6.6 Selection and Management of Breeding Stock: Breeding Bulls and Heifers	• Plenary presentation • Plenary discussion	• Projector	1 hour
1.6.7 Breeds Registration	• Plenary presentation • Plenary discussion	• Projector • Posters	45 minutes
1.6.8 Module Review	Plenary discussion	Questionnaire	20 minutes
Total Duration			**5 hours 35 minutes**

1.7 Facilitator Guidelines

Beef Breeds and Breeding	
1.7.1 Introduction and Levelling Expectations (15 minutes)	**Session Guide**
(The facilitator welcomes participants to the module of beef breeds and breeding by stating his profile and experience of working in pastoral production system and with beef cattle). The facilitator invites the participants to state their expectations **Module Objectives** (The facilitator presents module objectives) By the end of the module, participants should be able to: 1. Define terminologies used in beef production 2. Characterise the qualities of good beef cattle 3. Describe beef breeds and their attributes 4. Explain the principles of beef breeding and breeding systems 5. Explain selection and management of breeding stock: breeding bulls and heifers 6. Explain the importance and methods of breeds registration	Each participant should share their expectations Summarize participant expectations on a flip chart
1.7.2 Terminologies Used in Beef Production (45 Minutes)	**Session Guide**
(Introduce the common terms used in the beef industry and relate them to beef production). **Plenary Presentation** • Randomly, go through the list quickly to see how many terms the participants know- even in local languages **Plenary Presentation** Present PowerPoint slides on the definition of the common terms used in the beef industry • Explain the common terms used in beef production • Make it as participatory as possible	List the answers on flip charts

1.7.3 Characteristics and Qualities of Good Beef Cattle (30 minutes)	Session Guide
(The facilitator should be able to articulate characteristics and qualities of a good beef animal). **Plenary Discussion** Ask these questions • How does a good beef animal look like? Both male and female? • Which qualities do you look for in different beef breeds you own? • Which beef breeds do you know? Ask participants to list the beef breeds that are kept in their respective areas considering the above characteristics and qualities in reference and those which they think can do well in their area but are absent. • Ask participants why the breeds that can do well in their area are absent. Plenary PowerPoint Presentation on: Characteristics and qualities of good beef cattle	List the answers on a flip chart Distribute handout on characteristics and qualities of good beef breeds
1.7.4 Types of Beef Breeds and Their Attributes (1 hour)	**Session Guide**
Facilitator to introduce the subject **Plenary discussion** Let the participants list Kenyan, regional and exotic beef breeds known to them Let the participants discuss the attributes of the listed breeds Discuss the salient features for each breed Plenary Presentation and Discussion PowerPoint presentation and documentary on types of beef breeds and their attributes	- List the characteristics of each of the breeds known by the participant - PowerPoint presentation - Share handouts on characteristics of different beef breeds

1.7.5 Principles of Beef Breeding and Breeding Systems (1 hour)	Session Guide
Facilitator to introduce the subject **Plenary Presentation and Discussion** • What is beef breeding? • What is the importance of beef breeding? • How do you breed your beef animals? • What challenges do you have in beef breeding? • Power point presentation on beef breeding and breeding systems	PowerPoint presentation Share participants' handouts
1.7.6 Selection and Management of Breeding Stock: Breeding Bulls and Heifers (1 hour)	**Session Guide**
Facilitator to introduce the subject **Presentation and Discussion** • What is selection? • How do you select breeding bulls and heifers? • How do you manage breeding bulls and heifers? PowerPoint Presentation on selection and management of breeding stock	**PowerPoint presentations** **Share Participants handout**
1.7.8 Breeds Registration (45 minutes)	
Facilitator to introduce the subject **Plenary discussion** The facilitator should ask the questions; • Do participating pastoralists register their cattle? If not, why? • Importance of breeds registration? • What is the process involved in breeds registration? • How many beef breeding associations do you know in Kenya? **Plenary presentation** Present PowerPoint slides on breeds registration	**PowerPoint presentations** **Share Participants handout**

1.7.9 Module Review (20 minutes)	
(The facilitator should lead the participants in reviewing the module). **Individual Exercises** Review the main points about principles of breeds and breeding by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute Module review questionnaire

1.6 Participant's handouts

1. Beef Production Extension Manual
2. Tura I. 2020. Selection and Management of Breeding Heifers and Bulls (Poster)

MODULE 2

COW TO CALF MANAGEMENT

2.1 Introduction to the Module

This module is designed for training facilitators on calf management which starts from management of the cow. Maintaining a sustainable beef production enterprise depends on production of healthy replacement heifers and maintaining healthy reproductive cows. Continuous production of calves is the basis of a sustainable beef production enterprise. One calf per cow per year is an indicator of a fertile and well managed herd. Growth of beef herds is often slowed by high mortality rates of calves which is a typical in pastoral livestock production systems in the ASALs. Pre-weaning calf mortality ranges between 10 and 20% in traditional beef and dairy production systems in Kenya. Poor feeding and helminth infections have been reported to increase calf mortality by almost 50%. Therefore, appropriate, calf, heifer and cow management are key to sustain beef production.

2.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

- Management of heifers and cows explained and understood
- Management of in-calf heifers and cows explained and understood
- Birth management: signs of parturition, safe delivery and colostrum feeding discussed and understood
- Milk suckling management explained and understood
- Calf husbandry practices explained and understood

2.3 Module Target Group

This module targets service providers who include County extension staff, private service providers and lead farmers.

2.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in beef value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

2.5 Module Duration

The module is expected to take 3 hours 50 minutes

2.6 Module Summary

Cow to Calf Management			
Sessions	**Training Methods**	**Training Materials**	**Time**
2.6.1 Introduction and Levelling of Expectations	• Self-introduction • Buzz	• Program • Felt pens • Sticky leaf pads • Projector	20 minutes
2.6.2 Management of in-Calf Heifers and Cows	• Plenary discussion • Plenary presentation	• Flip chart • Projector • Participants' handouts	1 hour
2.6.3 Birth Management -Signs of Parturition, Safe Delivery and Colostrum Feeding	• Plenary discussion • Plenary presentation	• Flip chart • Projector • Participants' handouts	40 minutes
2.6.4 Calf Husbandry Practices	• Plenary discussion • Plenary presentation	• Flip chart • Projector • Participants' handouts	1 hour 30 minutes
2.6.5 Module Review	Discussion	Review questionnaire	20 minutes
Total Duration			**3 hours 50 minutes**

2.7 Facilitator Guidelines

Cow-Calf Management	Session Guide
2.7.1. Introduction and Levelling Expectations (20 minutes)	
(Facilitator welcomes participants to the module Cow-Calf management and introduces trainers by stating their profile and experience of working with farmers). The facilitator invites the participants to state their expectations. **Module Objectives** The facilitator presents module objectives By the end of the module, participants should be able to explain: • Proper management of in-calf heifers and cows • Birth management-signs of parturition, safe delivery, colostrum feeding • Milk suckling management • Appropriate calf management to reduce pre-weaning mortalities	List expectations in flip chart. Display chart pages to wall Distribute Participants' handouts on Module Objectives.
2.7.2 Management of In-Calf Heifers and Cows (1 hour)	**Session guide**
Plenary discussion on management of in-calf cows Plenary Presentation on in-calf heifers and cow management	PowerPoint Presentation Give session handout
2.7.3 Birth Management (40 minutes)	**Session guide**
Plenary discussion on participant's practices on 'how to know a cow or heifer is about to calve and what to do in preparation for the calving' Plenary Presentation on birth management and signs of parturition Plenary presentation and discussion on how to deal with 'retained placenta, dystocia and mal-presentation' presentation on placenta detachment and handling of retained placenta, description of prolapse, causes and treatment, maternity management	Write on flip chart PowerPoint Presentations and distribution of participants' handouts

2.7.4 Calf Husbandry Practices(1 hour 30 minutes)	Session guide
Plenary discussion on colostrum feeding, calf refusal and feeding of calves The following questions can be used to guide the discussion: • How do pastoralists deal with calf refusal and calves born to dams without milk (with agalactia)? • How do pastoralists achieve a balance between milking for household milk intake and calf suckling to ensure calf growth is not compromised? **Plenary Presentation** Present PowerPoint Slides on: • Colostrum – what is is • Colostrum feeding, importance and procedure • Calf suckling and calf refusal and how to deal with it • Methods of feeding calves • Suckling regimes in beef cattle - include the 50:50 milking suckling regime • Calf replacers Plenary Discussion to elicit pastoral practices on calf husbandry The facilitator can use these questions: • Do pastoralists weight their calves? If yes, what do they use? • Which methods do pastoralists use to identify their calves? • Do pastoralists disbud their calves and if yes, what do they use? **Plenary Presentation** Present PowerPoint slides to bring out the appropriate calf husbandry practice on: • Weighing the calf, importance and methods • Identification of calves • Disbudding (Description/definition)	Flip Charts PowerPoint presentations Distribute Participants' handouts Write on a flip chart answer given Write on a flip chart answers to the question Distribute participants handouts

Presentation on: • Calf feeding and watering Plenary discussion on pastoralists and agro-pastoralists practices Plenary presentation on: • Calf feeding and watering regimes • Calf supplementation • Hoof trimming (Done if an animal is injured or has foot rot- done using a paring knife) **Plenary Discussion** • Calf housing, hygiene and health Facilitator to ask this question: Do pastoralists and agro-pastoralists house their calves? Plenary Presentation Present PowerPoint slides on the importance of calf housing, hygiene and qualities of calf housing structures	
2.7.5 Module Review (20 minutes)	
(The facilitator should lead the participants in reviewing the module). **Individual Exercises** Review the main points about principles of calf management by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute Module review questionnaire

2.8 Participant's handouts

1. Beef Production Extension Manual
2. Calf Management

MODULE 3

WEANER MANAGEMENT

3.1 Introduction to the Module

This module is designed for training facilitators on weaner and steer management for a profitable beef enterprise in a changing climate. Production of weaners with high weaning weights is desirable for subsequent growth of replacement heifers, bulls and steers.

Pastoralists scout and buy 'good' bulls but do not consider crucial indicators of productivity such as weaning weight, years to first calving and years to market weight for steers. This results in low herd productivity, low quality beef and low profitability. The pastoralists therefore keep large herds to increase their profit margins.

There is therefore need to address the challenges that lead to low growth rates of weaners and steers to improve herd productivity, besides reducing pressure on the environment.

3.2 Module Learning Outcomes

By the end of the training, the following shall be achieved:

- Appropriate management strategies of weaners and steers for fast growth rates explained and understood
- Replacement heifers and bull selection explained and understood
- Methods of finishing steers for the target markets discussed and understood

3.3 Module Target Group

This module targets service providers who include County extension staff, private service providers and lead farmers.

3.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in beef value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

3.5 Module Duration

The module is estimated to take **3 hours and 25 minutes**

3.6 Module Summary

Weaner Management			
Sessions	**Training Methods**	**Training Materials**	**Time**
3.6.1 Introduction and Levelling of Expectations	• Self introduction • Buzz	• Participants' handouts • Felt pens and flip charts • Sticky leaf pads • Masking tape • Projector	20 minutes
3.6.2 Weaner Feeding and Watering	• Plenary discussion • Plenary presentation	• Participants' handouts • Felt pens and flip charts • Projector	30 minutes
3.6.3 Weaner Husbandry Practice	• Plenary discussion • Plenary presentation • Demonstration	• Participants' handout • Felt pens and flip charts • Projector	45 minutes
3.6.4 Selection of Breeding Heifers and Bulls	• Plenary discussion • Plenary presentation	• Participants' handouts • Felt pens, Flip charts • Projector	I hour
3.6.5 Module Review	Individual exercise	Review questionnaire	20 minutes
Total Duration			**2 hours 55 minutes**

3.7. Facilitator Guidelines

Weaners Management	Session Guide
3.7.1 Introduction and Levelling Expectations (20 minutes)	
(The facilitator welcomes participants to the weaner and steer management module and introduces trainers by stating their profile and experience of working with farmers). The facilitator invites the participants to state their expectations). **Module Objectives** (The facilitator presents module objectives) By the end of the training, the participants should be able to explain: • Appropriate management strategies of weaners for fast growth rates • Selection of replacement heifers and breeding bulls • Methods of finishing steers for the target markets Try to meet the expectations	Summarise participants' "expectations" on a flipchart and make displays Distribute participants' handouts on module objectives

3.7.2 Weaner Feeding and Watering (30 minutes)	Session Guide
Facilitator to define weaner and weaning. **Plenary discussion** Ask these questions: 1. At what age do pastoralists in the respective Counties wean their calves? 2. What challenges do pastoralists face when it comes to weaning claves? **Plenary Presentation** Present PowerPoint slides on weaner feeding and watering.	List the various answers on a flip chart Share participants' handouts
3.7.3 Weaner Husbandry Practices (45)	**Session Guide**
Husbandry practices are a set of activities that are done to ensure that the potential growth of the weaner is attained. **1. Feeding of Weaners** **Plenary discussion** • Let the facilitator ask this question: At what age are calves weaned in your respective areas? **Branding** **Plenary Discussion** Let the facilitator ask this question; Do pastoralists brand their cattle? **Plenary Presentation** Present PowerPoint slides on weaning, management and feeding of weaners. **Castration** Plenary Discussion on castration Ask participants if pastoralists castrate their male weaners and which methods they use. **Plenary Presentation** Present PowerPoint on methods of castration. Present on emerging markets and changing consumer preferences that require entire animals.	Share participants' handouts Write on a flip chart the reasons given by those who do not castrate

3.7.4 Selection of Breeding Heifers and Bulls (1 hour)	Session Guide
Facilitator introduces the subject of selection of bulls and replacement heifers • **Selection of replacement heifers** Share with participants the factors to be considered when selecting breeding heifers • **Selection of Bulls** Share with participants the factors to be considered when selecting breeding bulls	Share handout on key features for heifer and bull selection
3.7.5 Module Review (20 minutes)	
(The facilitator should lead the participants in reviewing the module). **Individual Exercises** Review the main points about principles of weaner management by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute Module review questionnaire

3.8 Participant's handouts

1. Beef Production Extension Manual
2. Mwangi, P. M. 2020. Weaner Management

MODULE 4

BEEF CATTLE RECORDS

4.1 Introduction to the Module

This module is designed for use in training facilitators of PFS on record keeping. This is necessary to improve their knowledge, skills and attitude towards record keeping and livestock identification to enable beef producers become market oriented, profitable and competitive. Records are essential to any business activity for reference and decision making. For business ventures, records help in ascertaining whether the business is profitable. In the beef production enterprises, records help in decision making during selection of replacement heifers, bulls, cull animals and sales. They are also used for monitoring performance and productivity of the entire herd. Further, records such as stud records are used to conserve and improve breed traits.

There is therefore need for beef producers to understand the importance of maintaining records especially under the changing market demands and consumer requirements. Further, there is need for beef producers to add value to their animals by registering them.

4.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

- Livestock identification methods and importance discussed and understood
- The importance of keeping records discussed and understood
- Type of records to keep and their importance explained and understood

4.3 Module Target Group

This module targets service providers who include County extension staff, private service providers and lead farmers.

4.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in beef value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

4.5 Module Duration

The module is estimated to take 3 hours.

4.6 Module Summary

Beef Cattle Records			
Sessions	**Training Methods**	**Training Materials**	**Time**
4.6.1 Introduction and Levelling Expectations	• Self-introduction • Presentation	• Participants' handouts • Projector • Felt pens, flip charts and masking tape	20 minutes
4.6.2 Livestock Identification and Importance	• Plenary presentation • Plenary discussion	• Projector • Flip charts, felt pens	50 minutes
4.6.3 Types of Records, Their Importance and Management	• Plenary presentation • Plenary discussion	• Projector • Flip charts, felt pens	1 hour 20 minutes
4.6.4 Module Review	Individual exercise	Questionnaire	30 minutes
Total Duration			**3 hours**

4.7 Facilitator Guidelines

Beef cattle records	Session guidelines
4.7.1 Introduction and Levelling Expectations (20 minutes)	
(*The facilitator welcomes participants to the module on Beef Cattle Records and introduces trainers by stating their profile and experience of working with farmers. The facilitator invites the participants to state their expectations).* **Module Objectives** *(The facilitator presents module objectives).* By the end of the module participants should be able to explain: • Livestock identification methods and importance • The importance of keeping records • Type of records to keep and their importance	Summarise participants' "expectations" and display them. Distribute participants' handouts on module objectives.

4.7.2 Livestock Identification and Importance (50 minutes)	Session Guide
Plenary discussion on records. Ask the participants: How do pastoralists identify their cattle? **Plenary presentation** Present PowerPoint slides on methods of livestock identification **Plenary discussion** Ask the participants the following question 1) What is the importance of identification? **Plenary presentation** PowerPoint Presentation on importance of animal identification	
4.7.3 Types of Records , their Importance and Management (1 hour 20 minutes)	**Session Guide**
The facilitator recaps on the need for records and leads discussion of what records should be kept **Plenary discussion** Ask the participant the question: Do pastoralists keep records and if yes, which ones and for what reason? **Plenary presentation** Present PowerPoint slides on the types of records that need to be kept and the purpose	
4.7.4 Module Review (20 minutes)	
(The facilitator should lead the participants in reviewing the module). **Individual Exercises** Review the main points on beef cattle records by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute Module review questionnaire

4.8 Participant's Handouts

1. Beef Production Extension Manual
2. Tarus, P. 2020. Beef Cattle Identification
3. Tarus ,P. 2020. Beef Cattle Records

MODULE 5

BEEF CATTLE HANDLING STRUCTURES AND EQUIPMENT

5.1 Introduction to the Module

This module is designed for use in training facilitators on animal handling structures, tools and equipment in beef production enterprises. Most beef in the country is produced in the pastoral and agro-pastoral areas where traditional animal handling structures, equipment and practices are used.

Though the present handling practices may be fit for the purpose, the product can hardly access premium markets as it does not meet market requirements. Appropriate beef cattle handling structures and equipment are essential in beef producing farms to enable producers have a wide array of markets for their produce that may increase profitability. Further, high (10-20%) calf mortality in the pastoral systems is associated with poor hygiene and housing. In addition, some zoonotic diseases have been reported in pastoral systems due to poor handling of livestock especially where calves share the same houses with people.

5.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

- The importance of proper beef cattle handling structures, tools and equipment discussed and understood
- Appropriate farm structures and tools for handling beef cattle to minimize losses and increase productivity explained and understood

5.3 Module Target Group

This module targets service providers who include County extension staff, private service providers and lead farmers.

5.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in beef value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

5.5 Module Duration

The module is estimated to take **2 hours and 40 minutes.**

5.6 Module Summary

Beef Cattle Handling Structures and Equipment			
Sessions	**Training Methods**	**Training Materials**	**Time**
5.6.1 Introduction and Levelling of Expectations	• Self-introduction • Brainstorming	• Module objectives • Projector • Participants' handouts • Flip chart, felt pens	20 minutes
5.6.2 Types of Beef Cattle Management Tools and Equipment	• Plenary discussion • Plenary Presentation	• Projector • Portable equipment • Flip chart, felt pens • Photos	1 hour
5.6.3 Beef Cattle Handling Structures	• Plenary discussion • Plenary Presentation	• Projector • Portable structure • Flip chart, felt pens • Photos	1 hour
5.6.4 Module Review	Individual exercise	Questionnaire	20 minutes
Module Duration			**2 hours 40 minutes**

5.7 Facilitator Guidelines

5.7.1 Introduction and Levelling Expectations (20 minutes)	**Session guide**
(The Facilitator Invites the Participants to State their Expectations). **Module Objectives** (The Facilitator Presents Modules Objectives) By the end of the module participants should be able to explain: • Appropriate beef cattle handling structures for effective husbandry practices • Appropriate beef cattle equipment for efficient beef production	Summarize participants' "expectations" and display them. Distribute participants' handouts on module objectives

5.7.2 Types of Beef Cattle Management Tools and Equipment (1 Hour)	Session Guide
Plenary discussion *(Facilitator to introduce the topic by mentioning the various activities like castration, disbudding and deworming that may require certain equipment).* • List the activities that require tools and equipment and ask the participants to indicate what pastoralists use. **Plenary Presentation** Present PowerPoint slides to explain what each equipment is used for.	Summarize pastoralists' innovations on equipment and tools for carrying out routine beef animals rearing activities Distribute participants' handouts on farm tools and equipment
5.7.3 Beef Cattle Handling Structures (1 hour)	**Session Guide**
The facilitator should be able to define the term farm structures. **Plenary discussion** *Facilitator to introduce the topic by mentioning the various activities that may require structures such as dipping, feed storage etc.* • List the activities that require structures and ask the participants whether pastoralists and agro-pastoralists have them and if not why? • Ask participants to discuss in groups innovative ways used by pastoralists and agro-pastoralists to replace critical farm structures. **Plenary Presentation** Present PowerPoint slides on structures and their designs and features that should be considered when constructing them.	Summarize pastoralists' innovations on farm structures for carrying out routine beef animals rearing activities Distribute participants' handouts on farm tools and equipment
5.7.4 Module Review (20 minutes)	**Session Guide**
(The facilitator should lead the participants in reviewing the module). **Individual Exercises** Review the main points about beef cattle handling structures and equipment by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute Module review questionnaire

5.8 Participant's Handouts

1. Beef Production Extension Manual
2. Njenga , S.K. 2020. Commonly Used Livestock Tools and Equipment
3. Njenga S.K. 2020. Routine Management Practices of a Plunge Dip.

MODULE 6

FEEDS AND FEEDING

6.1 Introduction to the Module

This module is designed for training facilitators/trainers in addressing the perennial challenge of feed in most livestock production systems. Feed is the major input in livestock as it constitutes about 60 – 70% of the production cost. Feed availability determines the quality and quantity of beef and beef products. However, feeds in beef producing areas are characterized by high variability in quantity and quality. A large percentage of forage produced during the wet season is also used uneconomically leading to wastage and scarcity during dry seasons. Droughts, whose frequency has increased with climate change are characterized by massive livestock losses as pastoral and agro-pastoral communities hardly grow or store feed to last more than a year. Attempts at growing forage is done on small portions of land, inadequate to support livestock during prolonged droughts. Storage/preservation of forages is mainly left as standing hay resulting in losses of quantity and quality. Interventions that ensure continuous availability of quality feed are necessary not only to increase productivity but to reduce GHG production.

6.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

- Beef cattle production systems explained and understood
- Climate smart forage varieties for beef production explained and understood
- Forage conservation discussed, demonstrated and understood
- Beef nutrition explained and understood
- Beef finishing explained and understood

6.3 Module Target Group

This module targets service providers who include County extension staff, private service providers and lead farmers.

6.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in beef value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

6.5 Module Duration

The module is estimated to take 8 hours and 45 minutes

6.6 Module Summary

Feeds and feeding			
Session	Training Method	Training Material	Time
6.6.1 Introduction and Levelling of Expectations	• Self-introduction • Brainstorming	• Module objectives Flip chart, felt pens	20 minutes
6.6.2 Beef Cattle Production Systems	• Plenary discussion • Plenary presentation • Demonstration	• Projector • Flip chart, felt pens • Demonstration site	1 hour 20 minutes
6.6.3 Climate Smart Forage Varieties for Beef Production	• Plenary discussion • Projector • Demonstration	• Projector • Flip chart, felt pens • Demonstration material	2 hours
6.6.4 Forage Conservation	• Plenary discussion • Plenary presentation • Demonstration	• Projector • Flip chart, felt pens • Demonstration site	1 hour 20 minutes
6.6.5 Beef Cattle Nutrition	• Plenary discussion • Plenary presentation	• Projector • Flip chart, felt pens • Demonstration site	2 hours 25 minutes
6.6.6 Beef Finishing	• Plenary discussion • Plenary presentation	• Projector • Flip chart, felt pens	1 hour 20 minutes
6.6.7 Module Review	Individual exercise	Questionnaire	20 minutes
Module Duration			**9 hours 5 minutes**

6.7 Facilitator Guidelines

6.7.1 Introduction and Levelling Expectations (20 minutes)	Session Guide
(The facilitator welcomes participants to the module on feeds and feeding and introduces trainers by stating their profile and experience of working with farmers). The facilitator invites the participants to state their expectations). **Module Objectives** (The facilitator presents module objectives) By the end of the module participants should be able to: • Explain beef cattle production systems • Describe climate smart forage varieties for beef production • Demonstrate forage conservation • Explain beef nutrition • Explain beef finishing	Summarise participants' "expectations" and display. Distribute module objectives.
6.7.2 Beef Cattle Production Systems (1 hour 20 minutes)	**Session Guide**
Plenary discussion on Pastoral - extensive systems **Ask the Participants to form groups by County** Discuss the grazing management systems in their respective counties 1. Effects of the grazing system on the feed resource base 2. Possible strategies for ensuring sustainability of pastoral beef production **Plenary presentation** Present PowerPoint slides on the grazing management systems • Rotational, • Continuous grazing • Holistic grazing management, • Ranching, • Integrated beef/wildlife	

6.7.3 Climate Smart Forage Varieties for Beef Production (2 hours)	Session Guide
3.1 Types of feeds **Plenary Presentation** Present PowerPoint slides on types of feeds (grasses, fodder trees, concentrates) **3.2 Grasses and sorghums** **Plenary discussion** Ask the participants to form groups as per the Counties they come from. Ask the participants in their groups to: 1. List the grasses and sorghums that pastoralists and agro-pastoralists plant 'in your counties for livestock feeding 2. List challenges that pastoralists and agro pastoralists face in pasture and fodder establishment **Plenary presentation** Present PowerPoint slides of climate smart grasses and sorghums giving the nutrition qualities of each **3.3 Fodder shrubs and trees** Ask the participants in their groups to: 1. List the fodder shrubs and trees that pastoralists and agro-pastoralists plant or utilize in their counties 2. List challenges that pastoralists and agro pastoralists face in establishment of fodder shrubs and trees Plenary PowerPoint presentation on climate smart fodder trees and shrubs **3.4 Forage Establishment** Major farm operations in pasture production • Seed acquisition, Land preparation, Planting, Crop management, Harvesting, Storage, Species selection - Factors to consider when selecting grass species to plant • Land and seed bed preparation • Through discussions let the participants list the benefits of these activities as you explain the details. Share with participants the key steps in land and seed bed preparation that will result in a fine tilth • Planting the seed • Increasing grazing area productivity	Group presentation Handout on grass and legumes forages adapted to the arid and semi-arid areas

6.7.4 Forage Conservation (1 hour 20 minutes)	Session Guide
4.1 Plenary discussion of feed conservation techniques Ask participant randomly to mention types of fed conservation techniques Plenary PowerPoint presentation on types of feed conservation techniques: Silage, Hay, UMMBs, Pellets **Exercise** Demonstrate each of the feed conservation techniques Plenary presentation on the benefits of each conservation technique	Demonstration of conservation techniques
6.7.5 Beef Nutrition (2 hours 25 minutes)	**Session Guide**
5.1 Principles of feeding **Plenary discussion** The facilitator to ask 'how much feed (kgs) is adequate for an animal unit Plenary presentation on principles of feeding **5.2. Feed formulation** **Plenary discussion** Facilitator to ask participant 'why is it necessary to formulate feed and whether there is on-going feed formulation for beef cattle like is common for poultry. **Plenary presentation** Present PowerPoint slides on feed formulation • Full rations and their formulation • Supplements (Feed blocks, urea mineral molasses blocks) and their formulations • Pellets • Mash Use the Pearson square with different materials	

6.7.6. Beef Finishing (1 hour 20 minutes)	Session guide
Plenary discussion Ask the participants: Do you finish your steers/bulls when you are about to sell them and if so, how do you feed/finish them to attain the right market weights? **Plenary presentation** Present PowerPoint slides on reasons for beef finishing and systems and pros and cons of each system **Plenary Presentation** Present PowerPoint slides on beef finishing methods and factors to consider while finishing steers Finishing methods: feedlot, semi-intensive, pasture based	Write answers on a flip chart
6.7.7 Module Review (20 minutes)	**Session Guide**
Review the main points about feeds and feeding by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute module review questionnaire

6.8 Participant's handouts

1. Beef Production Extension Manual
2. Natural Pasture Improvement Manual
3. Highland forage and dual-purpose sorghum for livestock feed and human food (leaflet)

MODULE 7

INTEGRATED MANURE MANAGEMENT

7.1 Introduction to the Module

This module is designed for training facilitators/trainers on production and management of manure from beef production systems. Manure is a major by-product in beef production systems but it is hardly managed. Whereas manure is a highly valuable product in high potential areas, it is considered a menace in pastoral and most agro pastoral areas where it is often disposed by burning. Burning and decomposition of manure heaps release Methane (CH_4) and Carbon dioxide (CO_2), which are both greenhouse gases (GHG). Livestock production has been reported to contribute more GHG globally than the global transport sector which is estimated at 14.5% of the anthropogenic GHG with enteric fermentation being the largest contributor at 39.1%. Manure is the second largest GHG contributor from the livestock sectors at 25.9%. GHG emissions can however be reduced by 25% through improvement of animal and herd efficiency. In livestock producing areas, organic manure is required for rehabilitation of degraded soils. However, despite the high tonnage of manure produced in the ASALs, the soils are low in organic matter, nitrogen and phosphorus and most are acidic. Efficient management of manure to address the poor-quality soils is therefore necessary besides reducing GHGs. Further, manure and slaughterhouse sludge are sources of green energy, biogas. Opportunities to change manure management practices at farm level through training of the service providers has been identified as key in all the 24 KCSAP focus counties.

7.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

1. Integrated manure management and its benefits discussed and understood
2. Steps of the manure chain (animal excretion/forms, collection and handling, storage practices and structures, treatment, and application) discussed and understood
3. Basics of nutrient management planning explained and understood
4. Basics of manure regulations explained and understood
5. Manure and relevant environmental issues discussed and understood

7.3 Module Target Group

This module targets service providers who include County extension staff, private service providers and lead farmers.

7.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in beef value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

7.5 Module Duration

The module is estimated to take **4 hours**

7. 6 Module Summary

Manure Management			
Session	**Training Method**	**Training Material**	**Time**
7.6.1 Introduction and Levelling of Expectations	• Buzz • Self-introduction	Stickers and flip charts	20 minutes
7.6.2 An Overview of Integrated Manure Management	• Buzz • Presentations	Projector, stickers and flip charts	20 minutes
7.6.3 Manure Management: Housing, Storage, Treatment and Handling	• Plenary presentation • Discussions	Flip charts, handouts Projector Training handouts	30 minutes
7.6.4 Agronomic Issues: Field Application and utilization of Manures	• Presentation • Field visit	Flip charts, handouts Training handouts Projector	25 minutes 1 hour
7.6.5 Environmental, Social & Regulatory Issues	• Plenary presentation • Group discussions	• Flip charts, handouts • Training handouts • Projector	30 minutes
7.6.6 Module Review	Questions and answers	Questionnaire on module review	30 minutes
Module Duration			4 hours

7.7 Facilitator Guidelines

7.7.1 Introduction, Objectives and Expectations (20 minutes)	Session Guide
(The facilitator welcomes participants to the module and introduces him/herself by stating own profile and experience. The facilitator invites the participants to state and write down their expectations). **The facilitator presents the module objectives** By the end of the module participants should be able to explain: • Integrated manure management, its importance and principles • Forms of manure, housing, collection, handling, storage, and treatment and application • Application of manure in crops and aquaculture • Manure components and how to minimize them • Environmental, social and regulatory issues in the manure chain	Summarize participants' "expectations" and display. Distribute handouts Module objectives, and session program to participants
7.7.2 An Overview of Integrated Manure Management (20 minutes)	**Session Guide**
(The facilitator should discuss integrated manure management). **Address the following areas in the presentation;** a) What is integrated manure management (IMM)? "The optimal site-specific handling of livestock manure from collection, through treatment and storage up to application to crops and/or aquaculture" • Why is IMM important? • What are the guiding principles of IMM? • What are the challenges of IMM? • Describe the manure chain (from collection to application) • What is contained in animal manure? • Give the benefits of IMM • What are the costs of IMM? Allow the participants recall what they learned and discuss any issue that may arise. Note that some of the issues the participants may raise will be covered under a different topic.	Distribute handouts to participants Use flip chart to highlight the key points for dicussion

7.7.3 Manure Management: Housing, Storage, Treatment and Handling (30 minutes)	Session Guide
(The facilitator should be able to discuss manure management in the areas of housing, storage, processing and handling). Plenary Presentation The facilitator addresses the following areas in the presentation/discussion; • Importance of housing structure • What is the relationship between the housing system and manure form/type and quality? • Principles of manure storage • Show pictorial/video of acceptable and unacceptable housing for good manures. • Give examples for different livestock/value chains including the deep litter system • Discuss manure treatment (including composting) and handling • Discuss how farmers can easily assess manure quality on their own. At the end, let the participants recall what they learned and discuss any issue that may arise.	Distribute handouts on manure housing, storage, treatment & handling to participants Brochures/leaflets

7.7.4 Agronomic Issues: Field Application and Utilization of Manures (1 hour 25 minutes)	Session Guide
(The facilitator should be able to discuss agronomic issues of manures in relation to the application to crops and aquaculture). Plenary presentation (25 minutes) The facilitator addresses the following areas in the discussion; • Role of manures as substitutes to often expensive inorganic fertilizers • Importance of nutrients to crops • The basic principles of fertilization, e.g. manure supply vs crop nutrient demand • Show chemical composition of different fertilizers • Ways of sampling and handling manures for analysis • Application techniques Farm visit and viewing/inspection for learning process (1 hour) (Ensure that the field layout is done for all the components). Visit the farm with the participants and demonstrate how the farm adopts the IMM practice. Get to hear from the farmer/ researcher how the different forms of manures are sourced or composted and applied. After the farm visit, allow participants to raise any issues and discuss them.	Distribute handouts to participants Take participants to the farm/ demonstration plots
7.7.5 Environmental, Social & Regulatory Issues (30 minutes)	
(The facilitator should be able to discuss environmental, social and current regulatory issues in the manure chain). Based on the knowledge acquired during the last three sessions, the facilitator introduces the following topics that are important in understanding IMM at the plenary (5 minutes); • Environmental concerns in manure production and utilization • Social issues in manure chain • Current regulatory issues affecting use of manures • Biohazard risks associated with manure The facilitator divides the participants into groups for each of the groups to tackle one topic. After 15 minutes allow the groups to present in the plenary. At the end, allow discussion on issues/concerns that they may have (10 minutes)	The groups to present their discussion points using flip charts and then review them together. Distribute handouts on environmental, social and regulatory concerns in the manure chain

7.7.6. Module Review (30 minutes)	
Review the main points about Integrated manure management by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute module review questionnaire

7.8 Participant's handouts

1. Okoti , O. M 2020 Integrated Manure Management

2. E. Teenstra1, F. De Buisonjé, A. Ndambi, D. Pelster 2015. Manure Management in the (Sub-)Tropics; Training Manual for Extension Workers. Wageningen, Wageningen UR (University & Research centre) Livestock Research, Livestock Research Report 919.

MODULE 8

BEEF HEALTH MANAGEMENT

8.1 Introduction to the Module

This module is designed for training facilitators/trainers on beef animal health and disease management under the changing climate and increasing consumer awareness. It is designed to train on economically important climate related diseases and pests/ parasites which affect beef cattle productivity. Beef cattle are mainly found in the ASALs which are vulnerable to climate shocks. They are affected by outbreaks of diseases including trade sensitive Trans-boundary Animal Diseases (TADs) such as Food and Mouth Disease (FMD), Contagious Bovine Pleuropneumonia (CBPP), Rift Valley fever (RVF) and Lumpy Skin Disease (LSD).

8.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

- Basic principles of animal health management discussed and understood
- Differentiating diseased and healthy animals in the herd/flock explained and understood
- Recognizing animals infested with parasites and pests in the farm explained and understood
- The benefits of keeping healthy animals in the farm discussed and understood
- Important diseases of beef cattle and their causes, signs, and economic importance explained and understood
- Important pests and parasites of beef cattle and their economic importance explained and understood
- Appropriate disease and pest/parasite management practices for increased productivity explained and understood
- Safe use and handling practices of animal drugs and pesticides explained and understood

8.3 Module Target

This module targets Service providers who include County extension staff, private service providers and lead farmers.

8.4 Module Users

This module is intended for use by master trainers who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

8.5 Module Duration

The module is estimated to take **7 hours and 15 minutes**

8.6 Module Summary

Beef Health Management			
Sessions	**Training Methods**	**Training Materials**	**Time**
8.6.1 Introduction and Levelling of Expectations	• Buzz groups • Group Exercises	• Handout of Module Objectives • Felt pens, masking tape or sticker glue, notebooks and pens • Projector	15 minutes
8.6.2 Concept of health and disease in farm animals	• Plenary presentation • Group exercises	• Flip charts, felt pens, participants' handouts • Projector	1 hour
8.6.3 Causes of disease in farm animals	• Plenary presentation • Group exercises	• Flip charts felt pens, participants' handouts • Projector	1 hour 25 minutes
8.6.4 Requirements for keeping healthy farm animals	• Plenary presentation • Group exercises	• Projectors • Handouts • Flip charts	1 hour
8.6.5 Safe and effective use of veterinary drugs, vaccines and pesticides	• Plenary Presentation • Brainstorming sessions	• Sample drugs and pesticides and containers • Notebooks, handouts • Flip charts and projector	40 minutes
8.6.6 Farm biosecurity	• Group exercises • Plenary Presentation	• Flip charts, flash cards, felt pens • Projector, coloured pictures, handouts	35 minutes
8.6.7 Overview on climate variability and occurrence of diseases and pests/ parasites in beef cattle	• Brainstorming • Plenary Presentation	• Flip charts and felt pens • Projector presentations • Participants' handouts	1 hour

8.6.8 Climate related beef cattle diseases and pests/ parasites	• Brainstorming • Plenary Presentation	• Flip charts, flash cards, felt pens • Projector, coloured pictures • Participants' handouts	1 hour
8.6.9 Module review	Individual exercise	Module review questionnaire	20 minutes
Total Duration			**7 hours 15 minutes**

8.7 Facilitator Guidelines

8.7.1 Introduction and Levelling Expectations (15 minutes)	**Session Guide**
(The facilitator welcomes participants to the module on beef health management and introduces him/herself by stating his/her profile and experience of working with farmers). **Introduction** The facilitator invites the participants to state their expectations for the module. (The facilitator introduces the module objectives) **Module Objectives** By the end of the module trainees should be able to: • Explain the basic principles of animal health management • Explain and differentiate between diseased and healthy animals in the herd/flock • Explain and recognize animals infested with parasites/ pests in the farm • Explain the benefits of keeping healthy animals in the farm • Explain the effect of climate variability on occurrence of diseases and pests/parasites in beef cattle • Different climate related diseases and pests/parasites affecting productivity of beef cattle • Recommend appropriate management practices for controlling diseases and pests/parasites for increased beef cattle productivity • Recommend safe use and handling practices of drugs, vaccines and pesticides in beef cattle.	List the participants' expectations on a flip chart and pin at a strategic place for reference during module review session

8.7.2 Concept of Health and Disease in Farm Animals (1 hour)	Session Guide
(The facilitator should introduce the concept of health and disease in farm animals by outlining the signs associated with health and disease). **Buzz Groups** Start a discussion about the concept of health and disease in farm animals by asking participants: What is your understanding of the concept of health and disease in farm animals? **Plenary Presentation** Summarize the definition by stating that health is the state of being free from illness or injury while disease is an abnormal condition that negatively affects the structure or function of part or whole of an organism (animal). **Signs of good health** Highlight signs of good health which include: Alertness, mobility, smooth hair coat, life parameters (e.g. feeding, breathing, excretion, temperature, production/performance) **Signs of disease (poor health)** Dullness/depression, general weakness, rough hair coat, life parameters (e.g. loss of appetite, impaired breathing, watery or hard faeces, abnormal temperature, reduced production/ performance)	List the responses on flip chart Distribute participants' hand out on: signs of health and disease in farm animals
8.7.3 Causes of Disease in Animals (1 hour 25 minutes)	**Session Guide**
(The facilitator should be able to help the participants to understand the causes of disease/poor health in farm animals). **Group Exercises** The facilitator initiates a discussion on the causes of disease in animals **Plenary Presentation** After the discussion, the facilitator gives a presentation to describe the different causes of disease (The facilitator should then let the participants to share experiences on the above causes of disease/poor health in their farms).	Distribute participants' handouts on: Causes of disease (poor health) in farm animals

8.7.4 Requirements for Keeping Healthy Farm Animals (1 hour)	Session Guide
(The facilitator should be able to explain to the participants the essential requirements for keeping healthy farm animals). **Group Exercises** After outlining the signs of health and disease in farm animals, a discussion on essential requirements for keeping healthy animals will be initiated by the facilitator. **Plenary Presentation** After the discussion, the facilitator will give a presentation on the essential requirements which include; feeding and nutrition, breeding, housing, hygiene (cleanliness, farm bio-security, waste management, de-contamination), disease diagnostics (e.g. mastitis), disease, pests/parasite prevention and control (vaccination, movement control, tick control, deworming), information on estimation of age of animals using teeth/ dentition method will be shared during this session to enable proper management of farm animals. (The facilitator should then let the participants share experiences on the application and benefits of the above requirements in their farms)	Distribute participants' handouts on: requirements for keeping healthy farm animals
8.7.5 Safe and Effective Use of Veterinary Drugs, Vaccines and Pesticides (40 minutes)	**Session Guide**
(*The facilitator should seek opinion from participants on safe use of veterinary drugs and pesticides and outline key issues on safety and impacts on the environment).* **Plenary Discussion (20 minutes)** (The facilitator should lead in a candid and honest evaluation of current use of veterinary drugs and pesticides and how safe and effective use of drugs and pesticides can be taken up by beef farmers). Start with a discussion since most of the staff have some knowledge on safe and effective use of veterinary drugs and pesticides. **Ask the participants:** **1.** What do pastoralists know about safe use of veterinary drugs and pesticides, do they practice and if no, why? **2.** What opportunities exist in ensuring practice of safe use of veterinary drugs and pesticides?	Distribute handout on: Safe and effective use of veterinary drugs, vaccines and pesticides

Ask the participants to mention types of veterinary drugs and pesticides commonly used in beef animals. They should also mention examples of respective brands. 1. Veterinary drugs used in cattle include antimicrobials, de-wormers, trypanocides, anti-protozoals, anaesthetics, metabolic stimulants 2. Pesticides include acaricides and insecticides 3. Vaccines include live vaccines, live attenuated/inactivated vaccines, killed vaccines and sub-unit vaccines. Blood vaccines can also be mentioned. **Plenary Presentation (20 minutes)** Present in PowerPoint an overview of safe and effective use of veterinary drugs, vaccines and pesticides. (In plenary discussion ask them to list the precautions for safe and effective use of drugs, vaccines and pesticides in animals)	
8.7.6 Farm Biosecurity (35 minutes)	**Session Guide**
(The facilitator will guide the participants in identifying farm biosecurity measures for preventing introduction and spread of infectious agents within and between farms and apiaries). **Plenary Presentation** Present in PowerPoint notes on farm biosecurity measures necessary for keeping healthy animals. Inform participants that the following issues will be covered in this session, housing, clear demarcation of clean and dirty areas within the farm, disinfection points at farm gates, waste disposal, security fencing, signage for restricted areas within the farm, disinfectants (In plenary discussion ask them to share their experiences on farmer practices on-farm biosecurity)	Distribute hand out on: Farm biosecurity List on flip chart

8.7.7 Overview on Climate Variability and Occurrence of Diseases and Pests/Parasites in Beef Cattle (1 hour)	Session Guide
(The facilitator will guide the participants in relating climate variability and occurrence of diseases and pests/parasites in beef cattle). Participants will share their experiences on disease incidences and abundance of pests/parasites in different seasons of the year. **Plenary Presentation** Present in PowerPoint evidence about climate variability (floods and drought periods) and its relationship with disease incidences and pests/parasites abundance. (In plenary discussion ask the participants to relate climate variability and animal disease and pest/ parasites patterns based on real experiences)	List the names of diseases and pests/ parasites as they are mentioned and their occurrence in relation to seasons
8.7.8 Climate Related Beef Cattle Diseases and Pests/ Parasites (1 hour)	**Session Guide**
Brainstorming *(The facilitator will guide the participants in identifying climate related beef cattle diseases and pests/parasites affecting and their management options)*. **Plenary Presentation** Present in PowerPoint notes and images to describe and explain the diseases, pests/parasites and their management options. Introduce the issues to be covered in this session: 1. Description of the economically important climate related beef cattle diseases and pests/parasites which include: a) Diseases (CBPP, ECF, RVF, FMD, LSD) b) Pests/external parasites (ticks, mosquitoes/cullicoides, biting flies, mites, lice,) c) Gastro-intestinal parasites 2. Recognition of the diseases (based on symptoms) and pests/parasites 3. Treatment, prevention and control options for the diseases and pests/parasites described. In plenary discussion ask them to share the farmers' experience in managing these diseases and pests/parasites	List the names of diseases and pests/ parasites and how to treat, prevent and control them Distribute participants' handouts: (notes and images of disease signs) and images of pests)

8.7.9 Module Review (20 minutes)	Session Guide
(The facilitator should lead the participants in reviewing the module). **Individual Exercises** Review the main points about principles of animal health and management by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute Module review questionnaire

8.8 Participant's Handouts

1. Bain R. K. (1999). Integrated Helminth Control: KARI Technical Note No. 2. Produced by KARI/DFID NARP II Project.
2. Wamae L. W. and H. K. Cheruiyot. Beef Tapeworm (Tegu): A brochure produced by KARI – Muguga.
3. Effective Tick Control for Improved Livestock Productivity: A brochure By Department of Veterinary Services with support from EAAPP.
4. Quality Vaccines for Guaranteed Livestock Health: A brochure by KEVEVAPI

MODULE 9

VALUE ADDITION OF BEEF AND BEEF BY-PRODUCTS

9.1 Introduction to the Module

This module is designed for use in training facilitators on value addition of beef and by-products. This is necessary to refresh their awareness on skills and the available approaches, technologies and infrastructural resources that can be adapted to make beef production more market oriented, competitive and profitable along the entire value chain. Various value-addition activities have been brought to light, using a value chain approach, from production, slaughter, processing and marketing. Similarly, value addition strategies on beef, hides and skins and bones and horns have been described.

9.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

- Value addition activities along the beef value chain explained and understood
- Value addition approaches, technologies and innovations of beef and edible by-products explained and understood
- Types of processed beef products discussed and understood
- Value addition strategies for traditionally processed meat products discussed and understood
- Red meat consumption and health explained and understood
- Value addition approaches, technologies and innovations of hides explained and understood
- Value addition approaches, technologies and innovations of bones, horns and hooves explained and understood

9.3 Module Target Group

This module targets service providers who include County extension staff, private service providers and lead farmers.

9.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in beef value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

9.5 Module Duration

The module is estimated to tak**e 3 hours 40 minutes.**

9.6 Module Summary

Value Addition of Beef and Beef By-Products			
Session	**Training Method**	**Training Material**	**Time**
9.6.1 Introduction and Levelling of Expectations	• Self-introduction • Buzz	• Handout of Module Objectives • Felt pens, masking tape or glue stick, notebooks and pens	20 minutes
9.6.2 Value addition Strategies Used in the Beef Value Chain	• Plenary presentation • Group exercise • Summary presentation	• Flip charts, felt pens • Participants' handouts	30 minutes
9.6.3 Value Addition Activities Along the Beef Value Chain	• Plenary presentation • Group exercise • Presentation	• Flip charts, Felt pens • Participants' handouts	30 minutes
9.6.4 Types of Processed Beef Products	• Plenary presentation • Group exercise • Presentation	• Projector • Flip charts felt pens • Participants' handouts	20 minutes
9.6.5 Value addition Strategies for Traditionally Processed Meat Products	• Plenary presentation • Group exercise • Presentation	• Projector • Gross margin analysis chart, Flip charts	20 minutes
9.6.6 Red Meat Consumption and Health	• Plenary presentation • Group exercise • Presentation	• Projector • Sample business plan • Flip charts	20 minutes
9.6.7 Value Addition of Hides	• Plenary presentation • Group exercise • Presentation	• Projector • Sample business plan • Flip charts	30 minutes
9.6.8 Value Addition of Bones, Horns and Hooves	• Plenary presentation • Group exercise • Presentation	• Projector • Sample business plan Flip charts	30 minutes
9.6.9 Module Review	Individual exercise	Review questionnaire	20 minutes
Module Duration			**3 hours 40 minutes**

9.7 Facilitator Guidelines

9.7.1 Introduction and Levelling Expectations (20 minutes)	Session Guide
(The facilitator should welcome participants to the module on value addition of beef and beef by-products and introduce trainers by stating their profiles and experience of working with farmers). The facilitator invites the participants to state their expectations **Module Objectives** *(The facilitator presents module objectives)* By the end of the module, participants should be able to: • Describe the value addition activities along the beef value chain • Describe the value addition approaches, technologies and innovations of beef and edible by-products • Explain types of processed beef products • Discuss the value addition strategies for traditionally processed meat products • Explain the relationship between meat consumption and health • Discuss value addition approaches, technologies and innovations of hides • Discuss value addition approaches, technologies and innovations of bones, horns and hooves	Each participant should share their expectations Summarize participants' expectations on a flip chart
9.7.2 Value Addition Strategies Used in the Beef Value Chain (30 minutes)	**Session Guide**
(Introduce the current strategies used in the beef industry both locally and globally). **Plenary Presentation and Discussion** • Randomly, go through the list quickly to see the strategies the participants know • Explain the strategies used locally and in other regions **Plenary Presentation** Present PowerPoint slides on value addition strategies used in the beef value chain.	List the answers on flip charts

9.7.3 Value Addition Activities Along the Beef Value Chain (30 minutes)	Session Guide
Plenary Discussion **Ask these questions** • What value addition activities are carried out in your counties? • What activities do you think can be disseminated and sustainably adopted? **Plenary Presentation** Present PowerPoint slides on the value addition activities along the beef value chain	List the answers on flip charts Distribute participants' handouts
9.7.4 Types of Processed Beef Products (20 minutes)	**Session Guide**
Plenary Discussion **Ask these questions** • What processed beef products are locally available in the markets in your counties? • Do you consume these products regularly? • Which products have interested you? **Plenary Presentation** Present PowerPoint slides on processed beef products	List the beef products available in the market Distribute handout on beef products
9.7.5 Value Addition Strategies for Traditionally Processed Meat Products (20 minutes)	**Session Guide**
Facilitator to introduce the subject **Plenary Discussion** • Ask whether these strategies are economically, socially and environmentally sustainable **Plenary Presentation** Present PowerPoint slides on traditionally processed meat products	Share participants' handouts
9.7.6 Red Meat Consumption and Health (20 minutes)	**Session Guide**
Facilitator to introduce the subject **Plenary Discussion** • What health concerns associated with consumption of red meat are there in your home, county and nationally? **Plenary Presentation** Present PowerPoint slides on red meat consumption and health	Share participants' handouts

9.7.7 Value Addition of Hides (30 minutes)	Session Guide
Introduction of subject **Plenary Discussion:** **Ask these questions** • What is the current use of hides? • What is the price of hides and payment scheme? (eg by piece, weight) • How is the market for hides in your county? • Does the county have a leather tannery? What tanning methods are used? **Plenary Presentation:** Present PowerPoint slides on value addition of hides that include: • Preparation of hides and skins for tanning and the tanning process as well as the tanning methods • Leather products, • Constraints in hide production and processing, best management practices of hides, opportunities in the hides industry	List responses on flip chart Share participants' handouts
9.7.8 Value Addition of Bones, Horns and Hooves (30 minutes)	**Session Guide**
The facilitator introduces the subject **Plenary Discussion:** **The facilitator to ask these questions** • What are the traditional uses of bones, horns and hooves? • What are the modern uses of bones, horns and hooves? • What utilization and value addition technologies and innovations do you feel can be sustainably adopted in your counties? **Plenary Presentation** Present PowerPoint slides on value addition of bones, horns and hooves to include: • Production of edible products (soup, bone paste, bone meal, gelatine) • Production of non- edible products (cow bone ash (CBA) as replacement for cement, glue and adhesive production, production and handicrafts)	List on flip chart Share participants' handouts

9.7.9 Module Review (20 minutes)	
(The facilitator should lead the participants in reviewing the module). **Individual Exercises** Review the main points on value addition of beef and beef products by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute Module review questionnaire

9. 8 Participant's Handouts

1. Beef Production Extension Manual
2. Kimindu V. 2020 Value Addition of Bones, Horns and Hooves
3. Kimindu V. 2020 Value Addition of Beef By-products
4. Kimindu V. 2020 Value Addition of Hides

MODULE 10

BEEF PRODUCTION BUSINESS

10.1 Introduction to the Module

This module is designed for use in training facilitators on quality beef production business. This is necessary to improve their knowledge, skills and attitudes on livestock business management to enable beef producers become market oriented, profit making and competitive.

Beef production in Kenya is mainly carried out in the ASALs by pastoralists and agro pastoralists, mostly at a subsistence level and without a target market. The beef market is stratified into different segments all of which have different requirements. Lack of market-oriented focus makes it impossible for majority of producers to access certain markets. Knowledge of the principles of operating any business may enable market-oriented production with impact on the profitability hence livelihoods.

10.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

- Beef business explained and understood
- Concept of commercial farming explained and understood
- Key requirements for enterprise management discussed and understood
- Analysis of the beef production enterprise discussed and understood
- Business planning explained and understood
- Business financing explained and understood

10.3 Module Target Group

This module targets service providers who include County extension staff, private service providers and lead farmers.

10.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in beef value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

10.5 Module Duration

The module is estimated to take **5 hours 40 minutes.**

10.6 Module Summary

Beef Production Business			
Session	**Training Method**	**Training Material**	**Time**
10.6.1 Introduction and Levelling of Expectations	• Self-introduction • Buzz	• Felt pens, masking tape or glue stick, notebooks and pens	20 minutes
10.6.2 Introduction to Farm Business Management	• Plenary presentation • Group exercise • Summary presentation	• Flip charts, felt pens • Participants' handouts	40 minutes
10.6.3 Concept of Commercial Farming	• Group Exercise • Plenary discussions	• Flip charts, Felt pens • Participants' handouts	1 hour
10.6.4 Key Requirements for Enterprise Management	• Plenary discussion • Plenary presentation	• Projector • Flip charts felt pens • Participants' handouts	1 hour
10.6.5 Analysis of the Beef Production Enterprise	• •Plenary exercise	• Projector • Gross margin analysis chart, Flip charts	40 minutes
10.6.6 Beef Business Planning	• Plenary presentation	• Projector • Sample business plan • Flip charts	1 hour
10.6.7 Beef Business Financing	• Business brainstorming • Presentation	• Projector flip charts	40 minutes
10.6.8 Module Review	Individual exercise	Module review questionnaire	20 minutes
Module Duration			**5 hours 40 minutes**

10.7 Facilitator Guidelines

10.7.1 Introduction to The Module and Levelling of Expectations (20 Minutes)	**Session guide**
(*The facilitator welcomes participants to the module on beef production business and introduces trainers by stating their profile and experience of working with farmers).* The facilitator invites the participants to state their expectations). **Module Objectives** (The facilitator presents modules objectives) By the end of the module participants should be able to : • Explain beef production business • Explain markets and their requirements • Analyse the beef production business • Explain beef business planning • Explain enterprise development	Summarise participants' "expectations" and display them on a flip chart. Distribute participants' handouts on module objectives
10.7.2 Introduction to Beef Business Management (40 minutes)	**Session Guide**
(The facilitator should be able to define the term business, facilitate comparison between farming and a common business in the area as well as explain common terms used in business). **Discussion on Agri-Business** Ask these questions to initiate discussion about the session 1 What is a business? 2 What businesses are we familiar with? 3 What is agri-business? **Group Exercise** Ask them in their groups to compare a common retail enterprise (shop) with an agri-business on aspect of inputs, operations, financing, marketing costs and record keeping. **Presentation** on common terms used in business (Introduce the common terms used in business and relate them to beef production. Also, explain the characteristics of a good business) **Discussion** on characteristics of a good business (most people think a big enterprise started big) Lead the participants into a discussion to find meaning to the characteristics	List the answers on flip charts Participants' handouts on agribusiness Record answers on a flip chart

10.7.3 Concept of Commercial Farming (1 hour)	Session Guide
(The facilitator conducts an exercise on comparison between subsistence and commercial farming. Discuss the principles of management in relation to farming business). **Introduce the terms commercial and subsistence farming.** **Group Exercise** (comparison between commercial and subsistence beef undertakings). Ask them in their groups to make a comparison between subsistence and commercial farming by following the table provided. This is in relation to input requirements, operational as well as marketing activities as follows: 1. What are the inputs involved in each system? 2. What are the operational activities involved in each of the two? Ask one of the groups to present as others chip in and discuss. Summarise the key points **Presentation** on principles of business management *(Referring to handouts on definition and comparison of businesses, present and discuss the principles of management)..*	Make a summary of the points raised by the groups and share the results List the answers on a flip chart Distribute participants' handout on comparison between commercial farming and traditional subsistence farming
10.7.4 Key Requirements for Enterprise Management (1 hour)	**Session Guide**
(The facilitator should guide a discussion on gross margin analysis and net income calculations). Principles of business management are also known as principles of management: In plenary let participant mention what these principles stand for. **Presentation and Discussion** For a farmer to engage in beef production it is important to understand how it performs. Questions: • What does the farmer need to know in order to decide on beef production? • What are the products for the business? • What types of beef markets are you aware of? **Plenary presentation** Present PowerPoint Slides on the type and requirement of markets **Group exercise** From the consideration identified above, work out the profitability of beef production from selling at farm level, including marketing. Do a gross margin analysis that will help to understand the business. **Present** the gross margin analysis	List answers on flip chart. Distribute Participants' Handouts on Beef production gross margin analysis PowerPoint presentation

10.7.5 Analysis of the Beef Production Enterprise (40 minutes)	Session Guide
(The facilitator should guide a discussion on gross margin analysis and net income calculations) **Presentation and Discussion** Group exercise: in your groups carry out gross margin analysis for your value chains by filling in the chart provided after group exercise one Group member presents and others chips in	List answers on flip chart. Distribute participants' handouts on farming gross margin analysis Distribute handout on group exercise
10.7.6 Business Planning (1 hour)	**Session Guide**
(The facilitator should be able to define the business plan, give its importance as well as explain the keys parts of it). **Discussion** Initiate discussion by asking what a business plan is, then present in the plenary **Presentation** • Business plan and its benefits • Parts of a business plan • Business records	Distribute Participants' handouts on components of a business plan
10.7.7 Business Financing (40 minutes)	**Session Guide**
(The facilitator should be able to define business financing, explain the types, sources and costs of acquiring the finance). Every business requires financing for inputs and operations. **Discussion questions** What is business financing? What are the types of finances available to the farmers in your area? What are the sources of finances for farming? **Group Exercise:** on business planning (The facilitator to conduct a group exercise and have the groups identify the internal and external sources of finances and state their advantages and their disadvantages). In plenary discuss how to carry out a business plan for beef production	Participants' handouts on sources of business finances, cost and advantages Distribute handouts on steps in business planning

10.7.8 Module Review (20 minutes)	
(The facilitator should lead the participants in reviewing the module). Review the main points about principles Beef production business by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute module review questionnaire

10.8 Participant's handouts

1. Beef Production Manual

MODULE 11

GENDER MAINSTREAMING IN THE BEEF VALUE CHAIN

11.1 Introduction to the module

This module is designed for use in training facilitators on gender mainstreaming in the beef value chain. Gender is the social construction of roles, responsibilities and behaviour patterns assigned to men, women and youth in a society. Through the process of socialization, the society provides gender identity to males and females. It differs between cultures and changes with time. The UN states that most societies show "differences and in-equalities between women and men in responsibilities assigned, activities undertaken, access to and control over resources, as well as decision-making opportunities".

Gender inequalities in division of labour, access to and control of resources and decision making within the household limit especially women and youth access to and benefit from technologies at different nodes of the value chain. Gender analysis examines the productive and reproductive roles of men and women; access, control and ownership of resources; beneficiaries; levels of power relations; differential needs, constraints and opportunities; and impact of these differences (positive/ negative) on lives of men, women and youth.

Agricultural value chain interventions, when designed and implemented with gender equitable principles, can foster adoption of technologies and hence enhance productivity. For instance, women are highly involved in key activities in beef, but sometimes not integrated in training activities. Moreover, they may not have control and ownership of animals or revenue from sale of produce.

11.2 Module Learning Outcomes

By the end of the module, the following shall be achieved:

- Basic concepts of gender explained and understood
- Different gender roles and responsibilities at various levels of the beef value chain discussed and understood
- Gender awareness, lobbying and advocacy explained and understood
- Mainstreaming gender approaches explained and understood
- Social inclusion in all levels of beef value chain discussed and understood
- Group formation/cohesion and leadership discussed and understood

11.3 Target Group

This module targets service providers who include County extension staff, private service providers and lead farmers.

11.4 Module Users

This module is intended for use by Master trainers/trainer of trainers (ToT) in beef value chain who are members of the Core Team of Trainers (CTT). The trainers using this module should familiarize themselves with participants' handouts/training materials.

11.5 Module Duration

The module duration is **3 hours 55 minutes**

11.6 Module Summary

Gender Mainstreaming in the Beef Value Chain			
Sessions	**Training Methods**	**Training Materials**	**Time**
11.6.1 Introduction and Levelling of Expectations	• Self-introduction • Brainstorming	• Flip chart/flipchart stand • Plain papers, marker pens, masking tape, meta cards	20 minutes
11.6.2 Introduction to Gender	• Brainstorming • Presentation • Question and answer	• Flip chart/flipchart stand • Plain papers, marker pens, masking tape, Meta cards, • Projector, computer	30 minutes
11.6.3 Different Gender Roles and Responsibilities at Various Levels of the Beef Value Chain	• Question and answer • Discussion • Group exercise	• Flip chart/flipchart stand • Plain papers, Marker pens, Masking tape, Meta cards, • Projector, Computer	1 hour
11.6.4 Gender Awareness, Lobbying and Advocacy	• Group discussions • Group exercises • Questions and answers • Case study	• Flip chart/flipchart stand • Projector, computer • Plain papers, marker pens, masking tape, Meta cards	25 minutes

11.6.5 Mainstreaming Gender Along Beef Value Chain	• Question and answer • Discussion • Group exercise	• Flip chart/flipchart stand • Plain papers, marker pens, masking tape, meta cards, • Projector, computer	20 minutes
11.6.6 Social Inclusion in All Levels of Beef Value Chain	• Group discussions • Group exercises • Questions and answers • Case study	• Flip chart/flipchart stand • Plain papers, marker pens, masking tape, meta cards, • Projector, computer	30 minutes
11.6.7 Group Formation/Cohesion and Leadership	• Group discussions • Group exercises • Questions and answers • Case study	• Flip chart/flipchart stand • Plain papers, marker pens, masking tape, meta cards, • Projector, computer	30 minutes
11.6.8 Module Review	Individual review	Review questionnaire	20 minutes
Module Duration			**3 hours 55 minutes**

11.7 Facilitator guidelines

11.7.1 Introduction and Levelling of Expectations (20 minutes)	**Session Guide**
(The facilitator welcomes participants to the module and introduces trainers). The facilitator asks the participants to state their expectations **Module Objectives** By the end of the module participants should be able to: • Explain basic concepts of gender • Discuss different gender roles and responsibilities at various levels of the beef value chain • Explain gender awareness, lobbying and advocacy • Discuss gender mainstreaming approaches and implement gender mainstreaming	Write participants expectations on a flip chart Follow up with a PowerPoint presentation on module objectives Refer to participants' handout

11.7.2 Introduction to Gender (30 minutes)	Session Guide
(Facilitator introduces gender by asking the participants what they understand by the term gender and to differentiate between sex and gender). Follow up by presentation on the definition of gender and related terms. Differentiate between gender and sex and give examples.	Ask the participants to define gender and write down responses on a flip chart. Make presentation on gender and related terms Refer to participants' handout
11.7.3 Different Gender Roles and Responsibilities at Various Levels of the Beef Value Chain (1 hour)	**Session Guide**
Objectives • Explain the term 'gender roles' • Explain different gender roles and responsibilities at various levels of the beef value chain *(Facilitator makes a presentation followed by a group exercise on gender roles and responsibilities at various levels of the beef value chain).* Ask participants to identify gender roles and responsibilities at various levels of the beef value chain).	The facilitator will make a PowerPoint presentation on this topic List answers on flip chart

11.7.4 Gender Awareness, Lobbying and Advocacy (25 minutes)	Session guide
Objectives **Explain the concepts of gender awareness, lobbying and advocacy** • Concepts of gender awareness, lobbying and advocacy • The facilitator introduces the topic by asking the participants to go through exercise one on "what is advocacy"? • Let the participants share and discuss their responses in plenary • The trainer concludes by summarizing the key points **Step 2:** Gender concerns that need advocacy • Through a brainstorming session, ask participants to identify gender concerns which need advocacy and awareness e.g. access, control and ownership of resources, (land, finances, access to credit, education, equipment, information, crops, livestock, extension services etc.) leadership • Discuss these issues in plenary **Step 3:** Approaches and methods in creating gender awareness and advocacy • Ask participants to share, in plenary, their experiences of creating gender awareness, lobbying and advocacy • Let them discuss the challenges encountered and lessons learnt. • Discuss and agree on the best methods of carrying out gender awareness, lobbying and advocacy. **Step 4:** Gender advocacy and awareness strategy • In plenary, discuss the main steps of developing a gender awareness and advocacy strategy • In groups, assign a task for participants to practice developing an advocacy strategy • Let them present, discuss and agree on best practices	The facilitator will make a PowerPoint presentation on this topic Participants will go into group work and make presentation using flip charts

11.7.5 Mainstreaming Gender Along Beef Value Chain (20 minutes)	Session Guide
Objectives **Concepts of gender mainstreaming** • Ask the participants to explain their understanding of the concepts of gender mainstreaming • In plenary, let the participants discuss gender mainstreaming **Approaches to gender mainstreaming** • Through a brainstorming session, let the participants explain approaches which can be used in gender mainstreaming • Let them provide reasons for appropriateness of each **Provisions of the current policies on gender** • Ask participants to list any policies on gender known to them • Lead the participants to identify key policies relating to gender mainstreaming **Institutional frameworks for gender mainstreaming** • Ask participants to identify key institutions they know of which deal with gender mainstreaming • Lead the participants in summarizing the key institutions in gender mainstreaming	Facilitator will make a presentation on PowerPoint and then facilitate a plenary discussion
11.7.6 Social Inclusion in All Levels of Beef Value Chain (30 minutes)	**Session Guide**
Objectives **Concepts in social inclusion** **Ask** the participants to explain their understanding of the concepts of social inclusion • In plenary, let the participants discuss the social inclusion in beef value chain **Why social Inclusion** • Ask leaners why there should be social inclusion programmes in development initiatives • Lead the participants in summarizing the key institutions in social inclusion.	Facilitator will make a presentation on PowerPoint and then facilitate a plenary discussion

11.7.7 Group Formation/Cohesion and Leadership (30 minutes)	Session Guide
Objectives **Concepts in group formation/cohesion and leadership** • Ask participants to list the types of groups they are familiar with in communities • Let the participants explain importance of group formation **Group formation stages** • Ask participants to list the group formation stages • Lead the participants in summarizing the group formation stages and their characteristics **Cohesion and leadership** • Ask the participants the relationship between the leadership of a group and cohesiveness of the group • Let them provide reasons for appropriateness of each • The facilitators to lead the participants in listing and discussing the factors that increase group cohesion	Facilitator will make a presentation on PowerPoint and then facilitate a plenary discussion
11.7.8 Module Review (20 minutes)	**Session Guide**
(The facilitator should lead the participants in reviewing the module). Review the main points on gender mainstreaming in beef value chain by answering the following: 1. What new things did you learn from this topic? 2. What important aspects/topics were omitted? 3. Any other comments	Distribute module review questionnaire

11.8 Participant's handouts

1. Beef Production Manual

ANNEX 1: TRAINING PROGRAM

Time	Day 0 (Sunday)	Remarks/ Facilitator
Late Evening	Arrival of participants and registration	**ALL**
Time	**Day 1 Monday**	**Remarks/ Facilitator**
Climate setting		
8.30- 9.00 am	Registration	KALRO Secretariat
9.00-9.20 am	Welcome and introductions	KCSAP Secretariat
9.30-10.00 am	Workshop objectives and expectations	Beef VC Leader
9.20 – 9.30 am	Overview of KCSAP	KALRO Secretariat
10.00-10.30 am	Red meat (Beef) in Kenya and role in GDP	Beef VC Leader
10.30-11.00 AM	**HEALTH BREAK (GROUP PHOTO)**	**ALL**
11.00 – 11.30 am	Understanding climate change	
11.30 – 12.00 pm	Climate change impacts on agriculture and food security	
12.00 – 12.30 pm	Climate smart agriculture and context specific practices	
12.30 – 1.00 pm	Formation of groups and setting norms	
1.00 -2 .00 pm	**LUNCH BREAK**	**ALL**
Module 1: Beef Breeds and Breeding		
2.00-3.00pm	Terminologies used in beef production	
3.00-4.00pm	Characteristics and qualities of good beef cattle	
4.00-4.30 pm	**HEALTH BREAK**	**ALL**
4.30- 5.30 pm	Types of beef breeds and their attributes	
Close of Day 1		
Time	**Day 2 Tuesday**	**Remarks/Facilitator**
8.00 – 8.30 am	**Registration**	KALRO Secretariat
8.30 – 9.30 am	Principles of beef breeding and breeding systems	
9.30 – 10.30 am	Selection and management of breeding stock: breeding bulls and heifers	
10.30-11.00 am	**HEALTH BREAK**	**ALL**
11.00 – 11.35 am	Breeds registration	
11.35 – 11.55pm	**End Module 1 Review**	

Module 2: Cow-Calf Management		
11.55 – 1.00 pm –	Breeding management	
12.30 –1.00 pm	Management of in-calf heifers and cows	
1.00-2.00 pm	**LUNCH BREAK**	**ALL**
2.00 – 2.40 pm	Birth management -signs of parturition, safe delivery and colostrum feeding	
2.40 – 4.10 pm	Calf husbandry practices	
4.10 – 4.40pm	**HEALTH BREAK**	
4.40 – 500 pm	**End Module 2 Review**	
	Close of day 2	**ALL**
Time	**Day 3 Wednesday**	**Remarks/ Facilitator**
8.00 – 8.30 am	Registration	KALRO Secretariat
Module 3: Weaner Management		
8.30 – 9.20am	Weaner feeding and watering	
9.20 – 10.05am	Routine weaner husbandry practices	
10.30-11.00 am	**HEALTH BREAK**	**ALL**
11.00 – 12.00 pm	Selection of breeding heifers and bulls	
12.00- 12.20pm	**End Module 3 Review**	
Module 4: Beef Cattle Records		
12.20 – 1.00 pm	Livestock identification and importance	
1.00-2.00 pm	**LUNCH BREAK**	**ALL**
2.00 – 3.20 pm	Types of Records, Their Importance and Management	
3.20 – 3.50pm	**End Module 4 Review**	
4.00 - 4.30pm	**HEALTH BREAK**	**ALL**
4.30 – 5.00 pm	**Group Discussion**	
	Close of Day 3	
Time	**Day 4 (Thursday)**	**Remarks/ Facilitator**
8.00 - 8.30 am	Registration	KALRO Secretariat
Module 5: Beef Handling Structures and Equipment		
8.30 – 9.50 am	Types of beef cattle management tools and equipment	
9.50 – 10.30 am	Types of cattle handling structures	
10.30-11.00 am	**HEALTH BREAK**	**ALL**
11.00 am11.30pm	Beef Cattle handling structures	
11.30 – 11.50pm	**End module 5 Review**	

Module 6: Feeds and Feeding		
11.50 – 1.00 pm	Beef Cattle Production systems	
1.00 – 2.00pm	**LUNCH BREAK**	**ALL**
2.00– 3.00pm	Beef Cattle Production systems	
3.00 – 4.00 pm	Climate smart forage varieties for beef production	
4.00 – 4.30 PM	**HEALTH BREAK**	
4.30 – 5.00 pm	Climate smart forage varieties for beef production	
	Close of Day 4	
Time	**Day 5 (Friday)**	**Remarks/Facilitator**
8.00 – 8.30 am	**Registration**	
8.30 – 9.00 am	Climate smart forage varieties for beef production	
9.00- 10.30 am	Forage Conservation	
10.30-11.00 am	**HEALTH BREAK**	**ALL**
11.00 am - 1.00 pm	Beef cattle nutrition	
1.00-2.00 pm	**LUNCH BREAK**	**ALL**
2.00- 2.25 pm	Beef cattle nutrition	
2.25 – 3.45 pm	Feed ration formulation	
3.45 – 4.05pm	End Module 6 Review	
4.05-4.30 pm	**HEALTH BREAK**	**ALL**
4.30-5.00 pm	Visit the feed factory	
	Close of day 5	
Time	**Day 6 (Saturday)**	**Remarks/ Facilitator**
Module 7: Manure Management		
8.00 – 8.30 am	**Registration**	
8.30 – 9.20	An overview of integrated manure management	
9.30 -10.00 am	Manure management: housing, storage, treatment and handling	
10.00 – 10.30am	Agronomic Issues: Field Application and Utilization of Manures	
10.30 -11.00 am	**HEALTH BREAK**	**ALL**
11.00 -12.00 pm	Agronomic issues: field application and utilization of manures	

12.00- 1.00 pm	Environmental, social and regulatory issues	
1.00-2.00 pm	**LUNCH BREAK**	**ALL**
2.00 – 4.00 pm	Farm visit	
2.30 – 4.00 pm	End of Module 7 Review	**ALL**
4.00 -4.30 pm	**HEALTH BREAK**	**ALL**
4.30-5.15 pm	Group Discussion	
	Close of Day 6	
Time	**Day 7 (Sunday)**	**Remarks/Facilitator**
8.30 am – 5.00 pm	**VISIT TO Lanet beef research centre**	**ALL**
TIME	**Day 8 (Monday)**	**Remarks/Facilitator**
Module 8: Beef Health and Diseases		
8.0- 8.30 am	Registration	
8.30 – 9.45 am	Concept of health and disease in farm animals	
9.45 – 10.30am	Causes of Disease in Farm animals	
10.30-11.00 am	**HEALTH BREAK**	**ALL**
11.00 am -11.40 am	Causes of disease in farm animals	
11.40 – 12.40 pm	Requirements for keeping healthy farm animals	
12.40 – 1.00pm	Safe and effective use of veterinary drugs, vaccines and pesticides	
12.00-1.00 pm	**LUNCH BREAK**	
2.00 – 2.20 pm	Safe and effective use of veterinary drugs, vaccines and pesticides	
2.20 – 2.55 pm	Farm biosecurity	
2.55 – 3.55pm	Overview on climate variability and occurrence of diseases and pests/ parasites in beef cattle	
4.00 pm –4.30pm	**HEALTH BREAK**	
4.30 pm -5.00pm	Climate related beef cattle diseases and pests/parasites	
	Close of day 8	

Time	Day 9 (Tuesday)	Remarks/Facilitator
8.00 – 8.30 am	Registration	
8.30 – 9.00 am	Climate related beef cattle diseases and pests/parasites	
9.00 – 9. 20am	**End Module 8 Review**	
Module 9: Value Addition of Beef and Beef by-Products		
9.20 – 10.00am	Value addition strategies used in the beef value chain	
10.00 – 10.30 am	Value Addition Activities Along the Beef Value Chain	
10.30 – 11.00 am	**HEALTH BREAK**	**ALL**
11.00 – 11.20 am	Types of processed beef products	
11.20 – 11.40 pm	Value addition strategies for traditionally processed meat products	
11.40 – 12.00 pm	Red meat consumption and health	
12.00 – 12.30pm	Value addition of hides	
12.30 – 1.00pm	Value addition of bones, horns and hooves	
1.00-2.00 pm	**LUNCH BREAK**	**ALL**
2.00 – 2.20pm	**End Module 9 Review**	
Module 10: Beef Production Business		
2.20 -3.20 pm	Introduction to farm business management	
3.20- 4.00 pm	Concept of commercial farming	
4.00-4.30 pm	**HEALTH BREAK**	**ALL**
4.30-5.00 pm	Concept of commercial farming	
Close of Day 9		
TIME	**Day 10 (Wednesday)**	**Remarks/Facilitator**
8.00-8.30 am	Registration	**ALL**
8.30- 9.30 am	Key requirements for enterprise management	
9.30- 10.10 am	Analysis of the beef production enterprise	
10.10 – 10.30am	Group discussion	
10.30-11.00 am	**HEALTH BREAK**	**ALL**

11.00- 12.00pm	Beef business planning	
12.00-12.40 pm	Beef business financing	
12.40-1.00 pm	**End Module 10 Review**	**ALL**
1.00-2.00 pm	**LUNCH BREAK**	**ALL**
Module 11 Gender Mainstreaming in Beef Value Chain		
2.00 – 2.50pm	Introduction to gender	
2.50 – 3.50 pm	Different gender roles and responsibilities at various levels of the beef value chain	
4.00 – 4.30 pm	**HEALTH BREAK**	**ALL**
4.30- 5.00 pm	Group Discussion	
Close of Day 10		
TIME	**Day 11 (Thursday)**	**Remarks/Facilitator**
8.30 – 9.00 am	**Registration**	
9.00 - .9.25 am	Gender awareness, lobbying and advocacy	
9.25 - 9.45am	Mainstreaming gender along beef value chain	
9.45 – 10.30 am	Social inclusion in all levels of beef value chain	
10.30 – 11.00 am	**HEALTH BREAK**	**ALL**
11.00 – 11.30 am	Group formation/cohesion and leadership	
11.30 – 11.50 am	**End of Module 11 Review**	
11.50. – 1.30 pm	• Overall training review and way forward • Official closing remarks	
1.30 – 2.30 pm	**Lunch Break**	ALL
2.30 – 4.00 pm	**Logistic**	
Close of day 10: End of Pilot training		
Departure		

ANNEX 2: GENERAL REFERENCE MATERIALS

Category / Modules	Publication title	Reference types	No Pages	Farmer Category A= New entrant/ Beef farmer B= Established Beef farmer
Beef Breeds and Breeding	Beef production Manual*	Manual		B
	Selection and management of breeding heifer and bulls	Poster	1	A/B
Calf Management	A cross-sectional study of the welfare of calves raised in smallholder dairy farms in Meru	Journal paper	8	B
	Calf Management	Poster	1	A/B
Weaner Management	Beef production Manual	Manual		B
	Weaner Management	Poster	1	A/B
Beef Cattle Records	i. Beef production Manual	Manual		A/B
	Beef Cattle Records	Poster	1	A/B
	Beef Cattle Identification	Poster	1	A/B

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