Impact evaluation on the effectiveness of the FEAST tool in changing knowledge, attitudes and behaviour in developing livestock feed interventions

CGIAR RESEARCH PROGRAM ON Livestock

ILRI RESEARCH REPORT
53


RESEARCH
PROGRAM ON
Livestock
CGIAR


USAID
FROM THE AMERICAN PEOPLE


FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Impact evaluation on the effectiveness of the FEAST tool in changing knowledge, attitudes and behaviour in developing livestock feed interventions

Charity Kinyua and Ben Lukuyu

International Livestock Research Institute

September 2019

This work was implemented as part of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), which is carried out with support from CGIAR Fund Donors and through bilateral funding agreements. For details please visit https://ccafs.cgiar.org/donors. The views expressed in this document cannot be taken to reflect the official opinions of these organizations.

This document was made possible with support from the American people delivered through the United States Agency for International Development (USAID). The contents are the responsibility of the producing organization and do not necessarily reflect the opinion of USAID or the US Government.

ILRI thanks all donors and organizations which globally supports its work through their contributions to the CGIAR Trust Fund

Editing, design and layout—ILRI Editorial and Publishing Services, Addis Ababa, Ethiopia.

Cover photo—ILRI/Sonja Leitner

ISBN: 92-9146-586-x

Citation: Kinyua, C. and Lukuyu, B. 2019. *Impact evaluation on the effectiveness of the FEAST tool in changing knowledge, attitudes and behaviour in developing livestock feed interventions*. ILRI Research Report 53. Nairobi, Kenya: International Livestock Research Institute (ILRI).

Patron: Professor Peter C Doherty AC, FAA, FRS
Animal scientist, Nobel Prize Laureate for Physiology or Medicine–1996

Box 30709, Nairobi 00100 Kenya
Phone +254 20 422 3000
Fax+254 20 422 3001
Email ilri-kenya@cgiar.org

ilri.org
better lives through livestock

ILRI is a CGIAR research centre

Box 5689, Addis Ababa, Ethiopia
Phone +251 11 617 2000
Fax +251 11 667 6923
Email ilri-ethiopia@cgiar.org

ILRI has offices in East Africa • South Asia • Southeast and East Asia • Southern Africa • West Africa

Contents

Tables

Figures

Acknowledgement

We would like to thank the AVCD Feed the Future (ILRI) dairy and livestock value chain leaders James Rao and George Wamwere for the support provided in facilitating FEAST training and assessment in western, eastern and northeastern Kenya. We are also grateful to the Capdev unit at ILRI for their support during the training and assessment. We appreciate all the 61 training participants and farmers who took part and gave their valuable input in the training and assessment sessions.

Abstract

Livestock production is a significant source of livelihood among small scale farmers and pastoralists in Kenya. Livestock productivity is; however, challenged by inadequate quality and quantity of feed. The solutions offered by development agencies fail to integrate the opinion of farmers and address the underlying context issues of limited access to water, land, knowledge, capital, inputs and labour. The International Livestock Research Institute (ILRI) and the International Center for Tropical Agriculture (CIAT) have therefore developed the Feed Assessment Tool (FEAST) which addresses feed issues and context issues using participatory rural appraisal.

FEAST has been used widely and is currently being used in dairy and livestock value chains of the AVCD project in northeastern, eastern, coastal and western Kenya. A total of 58 of the 61 FEAST facilitators trained completed the before and after studies. The studies were used to assess impact of training on knowledge, attitude and behavior of the respondents in development of context specific feed interventions rather than limited one-fit technologies.

Significant change was achieved in knowledge with a p value of 0.001, significant at 95% confidence level and medium effect size of 0.57. There was no significant change in all the nine aspects assessed for attitude and behavior change indicating that respondents were already knowledgeable in the agricultural systems and participatory development of context specific interventions.

1 Introduction

Livestock systems occupy about 30% of terrestrial land and support the livelihoods of approximately 600 million smallholder farmers in the developing world and pastoralists who depend on common grazing land (Herrero et al. 2010). Livestock systems are generally categorized into agropastoral and pastoral, extensive mixed crop-livestock, intensive mixed crop-livestock and industrial systems based on potential in natural resources, access to markets and population density (Herrero et al. 2008). Small scale mixed livestock-crop production systems, agropastoral and pastoral systems are the main livestock production systems in sub-Saharan Africa (Ellis and Freeman 2004; McDermott et al. 2010). Indigenous, cross bred and exotic cattle are grazed on public grazing lands or confined and fed with crop residues, planted fodder and purchased concentrates.

Livestock production is an important strategy for risk reduction, nutrient provision and traction in crop production (Thornton 2010). However, the crop-livestock, agropastoral and pastoral production systems often face numerous challenges relating to resource availability which limit productivity. The constraints include limited access to land, labour, water, capital, inputs, knowledge and technologies and markets (Valbuena et al. 2012). Livestock nutrition in these systems is also characterized by poor quality basal diet with low level supplementation (Herrero et al. 2009). Furthermore, strong season effects exasperate feed supply especially in the dry season, causing a decline in milk production.

The situation has prompted innovation by development agencies to improve livestock feed supply. However, understanding feed development in livestock production systems is limited probably due to context specificity determined by the varied biophysical, socioeconomic and policy environments (Erenstein et al. 2011). On the contrary, the solutions often offered by researchers to farmers are typically a narrow range of 'one size fits all' technologies, such as supply of feed concentrates, use of crop residues and fodder treatment etc. These interventions are rarely adopted by farmers because they do not address the needs of the farmers. Failure to address context factors such as land and water availability; and access to labour, inputs/services and knowledge in use of the intervention technologies has often resulted in low adoption of interventions (Alene and Coulibaly 2009). Furthermore, farmers are often not involved in diagnosing system challenges and development of interventions, resulting in failure of ownership of interventions and commitment by farmers during implementation.

The feed assessment tool (FEAST) was developed by scientists from ILRI and CIAT to address these failures. The tool has been designed to facilitate assessment of local availability of feed, usage of feed resources and design of site-specific interventions in the context of water, land, labour, knowledge, cash and inputs availability (Duncan et al. 2012).

The FEAST tool further facilitates participatory research through a two-stage process. Focus group discussions (FGDs) are held at community level to describe the general farming system, followed by individual interviews with a sub set of farmers from the FGDs. The data from the FGDs and individual interviews is then analysed in the FEAST data application to generate graphs and figures in a report that describes the farming system in a specific community. From the analysis, we can determine if livestock feed is an issue and what type of interventions are needed in the area.

2 Study sites

The FEAST application uses context score collected from FGDs to prioritize through the technology filter tool (Techfit) and provides the top five most promising interventions for the system. The TechFit tool matches the context and technology attributes, i.e. water, credit, inputs, labour, knowledge and land availability. Examples of interventions considered include forage cultivation, conservation of forage, leguminous multi-purpose trees, crop residue, concentrates supplementation etc. Novel feeds have also been considered, including industrial byproducts rich in energy and proteins including molasses, oil seed, blood and bone meal. The tool has been used widely across Africa and Asia in developing livestock feed interventions. This study evaluates the effectiveness of the tool in changing the knowledge, attitudes and behavior of the development agents in development of site-specific interventions that address context issues as opposed to offering a limited number of one fit technologies.

2.1 North-eastern Kenya

North-eastern Kenya is located in the arid rangeland of Kenya. Five administrative counties—Marsabit, Garissa, Wajir, Isiolo and Turkana—were included in the study (Figure 1). Pastoralism is the main economic activity, supplemented by some agricultural production along the rivers (Riviere and Eregae 2003). The main types of livestock kept include cattle, sheep, goats, camels and chicken. Two of the most prevalent indigenous cattle are the small East Africa Zebu and the Boran (Okwiri et al. 2007). They are preferred because they are hardy and tolerant to drought and diseases. The cattle are mainly kept for beef and milk production, as well as for sale to generate direct cash income. However, milk production per cow is very low and most of the milk produced is used for household consumption. Agricultural and livestock extension services are limited in this region. Livestock feed scarcity is a major production constraint in the area and animals are normally fed through grazing; use of concentrates is a rare occurrence in the area (Okwiri et al. 2007). Pastoralists mitigate feed scarcity during dry seasons by migrating to areas mainly along the rivers to access pasture and water.

2.2 Eastern and coastal Kenya

Regions of FEAST implementation in eastern and coastal Kenya included in the study are Kitui, Makueni and Taita Taveta (Figure 1). Dairy production is the third most important agricultural activity in eastern Kenya (Itabari et al. 2006). Lack of livestock feed of adequate quality and quantity is a major limiting factor in the dairy sector (Kenya Arid and Semi-Arid Land Program 2009).

Over 80% of the dairy farmers in eastern Kenya are smallholders who practice mixed crop-livestock production (Kenya Arid and Semi-Arid Land Program 2009). The production systems are further classified as intensive and semi-intensive. In intensive systems, the animals are reared in sheds and feed is brought in while in the semi intensive system the animal is sometimes let out of the holding unit to graze outside. Farmers often feed their livestock from their own resources and the majority of land is allocated to food and cash crops leaving about 10% of the land for fodder production. The amount of feed generated is often grossly inadequate since the land allocated for fodder production is usually the most infertile portion of the land and poor rainfall accelerates low productivity (Njarui et al. 2011).

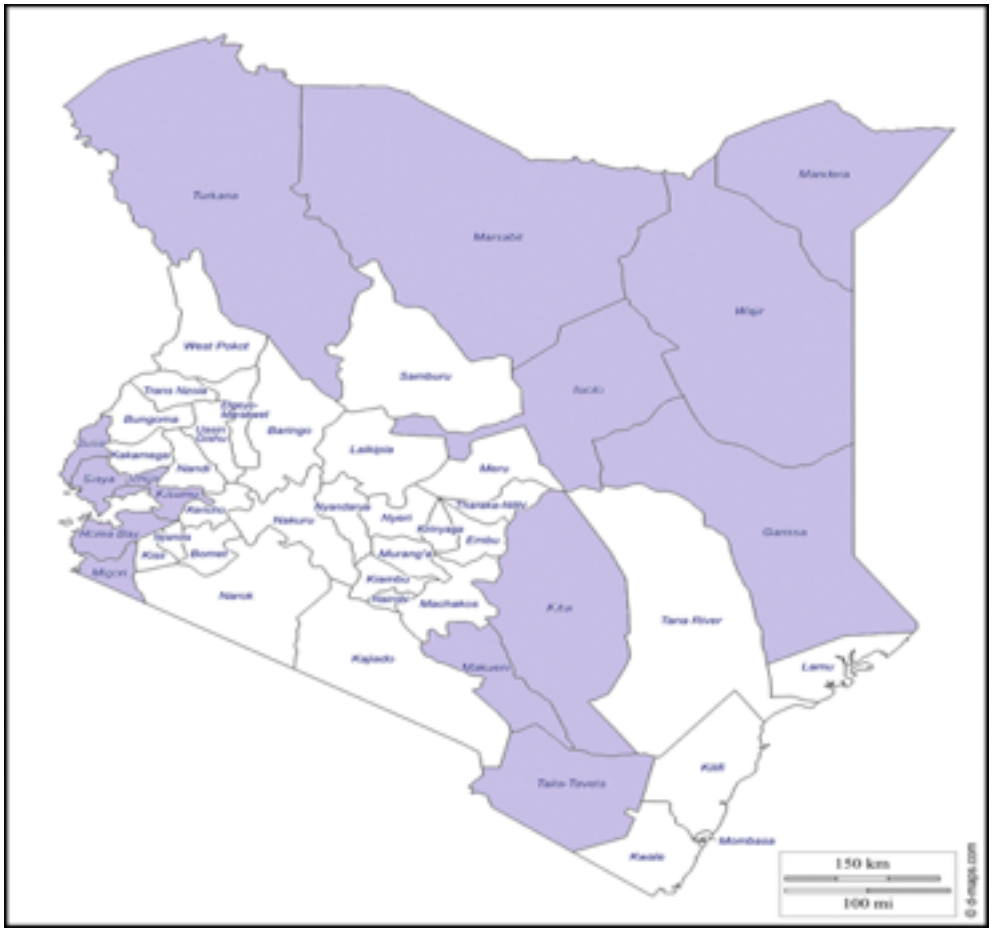
A large percentage (98%) of smallholder dairy farmers in the coastal lowlands feed their livestock on pastures all year (Njarui et al. 2016). Maize stover contributes significantly to livestock feeding in the months of August and September. There is very low contribution of Napier and other cultivated fodder (25–40%) to overall livestock feed (Njunie and Ogora 1990; Mwatate et al. 1998; Ramadhan et al. 2001).

2.3 Western Kenya

Districts where FEAST was implemented in western and Nyanza regions Kenya include Kisumu, Migori, Busia, Homabay, Siaya and Vihiga (Figure 1). Dairy production in the region is dominated by the Zebu and cross breeds with only a small proportion of pure improved breeds (Department for International Development 2011). The high number of Zebu are associated with cultural practices where ownership of a high number of livestock is prestigious and used in payment of dowry where the Zebu cattle is highly valued. Local cattle are also resistance to tick borne diseases.

The cattle are reared under confined, tethering/grazing, semi zero grazing and zero grazing feeding regimes. The main sources of feed include natural pastures, forage, fodder and agricultural byproducts. However, the natural pastures do not provide adequate nutrition to the animals; their crude protein levels are low, especially during the dry season (Lukuyu et al 2009). Maize stover is a rich source of roughage but an inadequate source of crude protein, vitamins, energy and minerals (Adudna et al 1998).

Figure 1: Map of FEAST implementation locations in the north-eastern, eastern, coast and western Kenya



Source: IEBC 2016

3 FEAST training and impact evaluation

In order to ensure optimal implementation of FEAST to develop appropriate feed interventions, local livestock officers were trained by FEAST experts from ILRI on how to use the tool. The livestock officers who were required to be facilitators in the implementation of FEAST are expected to be competent in principles of FGD and the general technical knowledge of livestock production. They were also expected to have a shift in behavior and attitude from dictating a narrow range of one fit technology to facilitating participatory development of site-specific interventions that are suitable for local context in terms of water, land, knowledge, cash, inputs and labour. Impact evaluation in the three study regions was conducted to assess change in technical knowledge, attitudes and behavior of the facilitators after training.

Classroom training and e-learning were employed simultaneously in all three regions for course content delivery. The e-learning materials were provided prior to the classroom training followed by 5-day classroom training sessions in each of the three regions. Impact evaluation in knowledge, attitude and behavior was designed for the two study platforms (Annex 1).

3.1 Study objectives

i. To evaluate the change in level of knowledge of livestock officers on FEAST before and after the training

11. To evaluate the change in behavior and attitudes of participants before and after training with regard to principles of FGDs and general farming systems for facilitation of participatory and site-specific interventions as opposed to a limited one fit technology.

3.2 Research strategy

Uncontrolled before and after studies were conducted among 21 participants in Western Kenya, 24 in North Eastern Kenya and 13 in Eastern and Coastal Kenya. The studies were used to determine change in technical knowledge in FEAST, attitude and behavior using paired t tests effect size (glass delta).

Sampling frame

Twenty-two livestock officers were randomly nominated from the six counties of FEAST implementation in western Kenya. Stratification was done at sub county level based on dairy production potential and a total of 22 sub counties were effectively represented. A total of 21 participants completed before and after assessments.

Twenty-six livestock officers were randomly selected from five counties in north-eastern Kenya to participate in the FEAST training. Stratification was done at sub county level based on livestock production potential. A total of 24 participants completed the before and after assessments.

Thirteen livestock officers were randomly selected from two counties in eastern Kenya and one county in coastal Kenya. Stratification was done at sub county level based on dairy production potential; 12 sub counties were subsequently represented. All 13 participants completed the before and after assessments.

Statistical analysis

Paired t-tests were computed in GenStat for the before and after studies and effect size was calculated using glass delta because the standard deviations for the tests varied. Descriptive statistics, including means, were generated in excel for quantitative data in profiling the participants. NVIVO was used to analyse qualitative data for attitude and behavior change.

3.3 Study limitations

Challenges with the research design

Randomized controlled studies were designed for impact evaluation in knowledge and attitude for the e-learning treatment. However, this was not achieved as more than 90% of the treatment group in each of the three study regions failed to complete the e-learning course. Poor internet connectivity was cited as the main reason for not completing the course, but even where the offline player was provided, there was still very low completion. Respondents cited time limitation as the main setback because the course was taken alongside routine office duties. The fact that 90% of the respondents had no previous experience with e-learning may also have contributed significantly to the low response rate. It was also evidently very challenging to implement an experimental design in a setting where a development project is being implemented as the focus mainly lies in achieving project milestones and the number of training participants was too small to support feasible randomized controlled studies.

Addressing design limitations in the study

We shifted our focus to evaluating the classroom training sessions. The study was successful because the participants were released from routine job activities by their employers and they delivered activity reports as an output from the training and implementation of FEAST. Pre- and post-tests on the technical knowledge of FEAST and behavior and attitude were conducted to evaluate the effectiveness of the training in preparing the facilitators in implementing FEAST in their areas of operation effectively (Annexes 2, 3 and 4).

Way forward

Collaborations will be formed with other institutions including universities, livestock departments in government institutions and feed processing firms who will offer technical support in delivery of e-learning course. An agreement could also be reached with the employers of participants to allocate time for course completion to ensure participants have adequate time to complete the course without being overloaded by daily job activities.

4 Results and discussion

The results are categorized into personal profiles, change in knowledge and change in attitudes and behaviour.

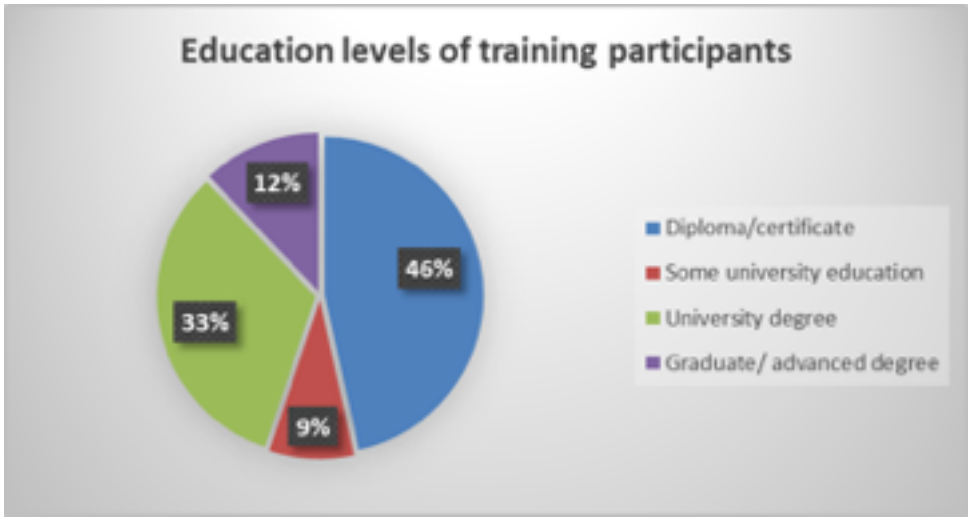
4.1 Personal profiles

These are descriptions of the initial level of skills relevant for FEAST implementation and previous experiences with FEAST to determine capacity development needs among the training participants.

Education levels

The training participants had high levels of education ranging from diploma to advanced degrees (Figure 2) which guaranteed capacity to work with the FEAST tool.

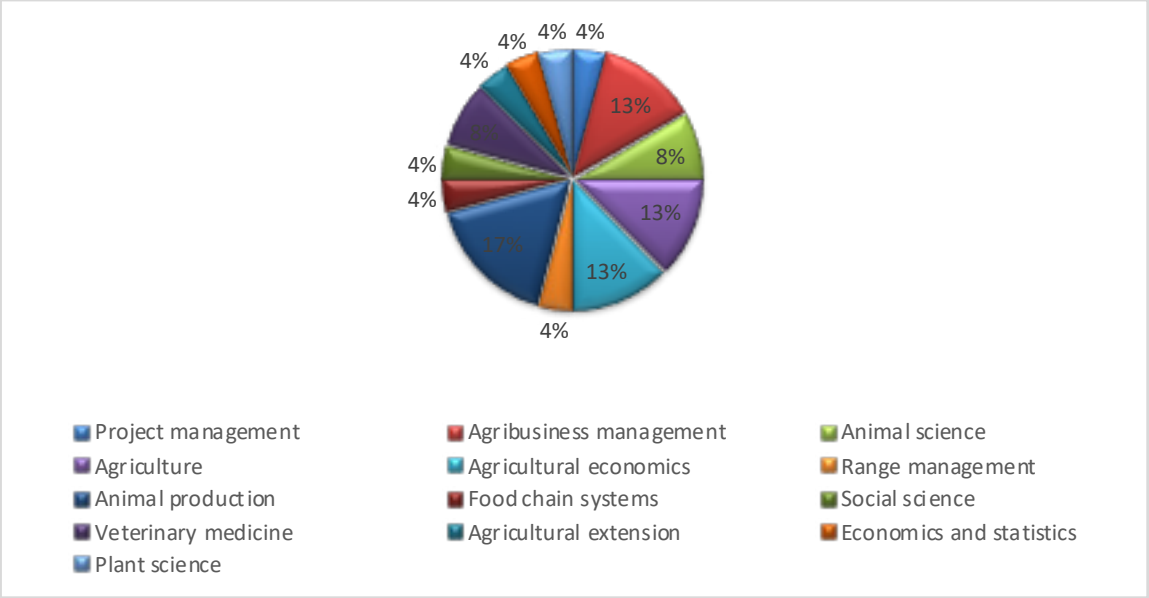
Figure 2: Education levels of training participants



Source: Authors' data

The degrees studied by the training participants are very relevant in informing livestock feed interventions and project management in the FEAST implementation process (Figure 3).

Figure 3: Degree types held by training participants

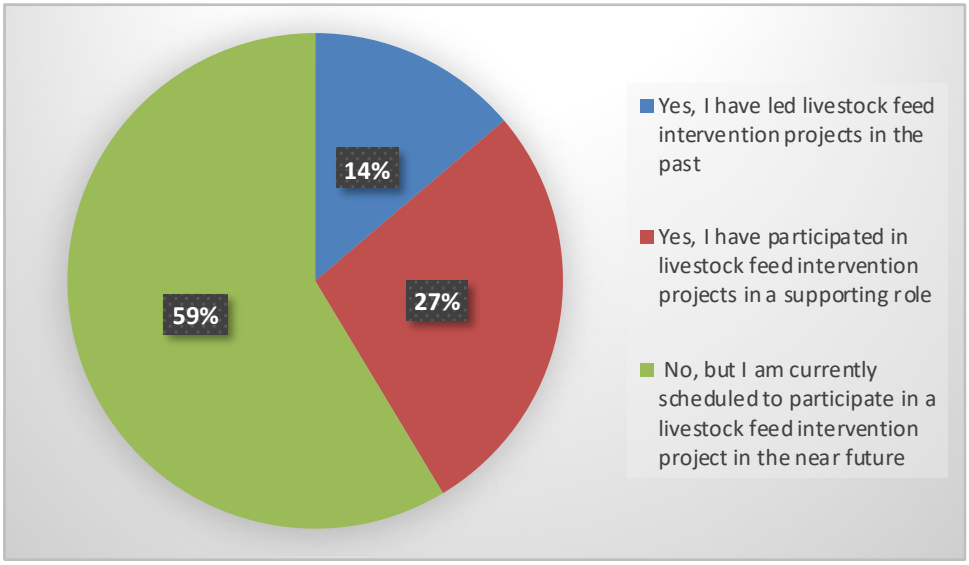


Source: Authors' data

Previous experience leading livestock interventions

A total of 59 % of the training participants had not previously led any livestock feed interventions, while 27% had participated in a supporting role. Only 14% had led livestock interventions in the past (Figure 4). The FEAST training was; therefore, important in preparing the livestock officers in best practice for farmer centred diagnosis and use of participatory approach to achieve best outcomes in FEAST implementation.

Figure 4: Previous experience in leading feed interventions



Source: Authors' data

Activities in FEAST implementation

The respondents indicated that the activities they considered important in implementing FEAST included conducting research, interviews and focus group discussions; reporting research findings; suggesting interventions to farmers; preparing a work plan with the community; and following up on progress (Figure 5). While all these activities are important in the implementation of FEAST, the outcome indicated that there's a need to train the participants on other activities equally important in the implementation of FEAST.

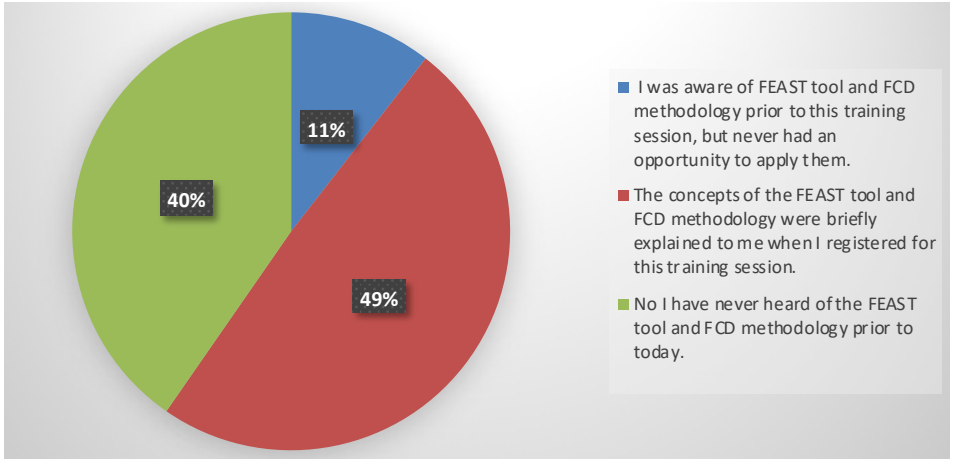
Figure 5: Activities perceived as important in FEAST implementation

Source: Authors' data

Prior interaction with FEAST

Only 11% of the training participants had prior knowledge of FEAST before the training but had not had the opportunity to apply it. About 49% had the concept explained to them when they registered for the training, while 40% have never heard about FEAST and farmer centred diagnostics (FCD) prior to the training (Figure 6). The training was therefore critical to familiarize the participants with FEAST concepts and ensure smooth implementation of the livestock feed interventions by the livestock officers.

Figure 6: Previous experience with FEAST and FCD

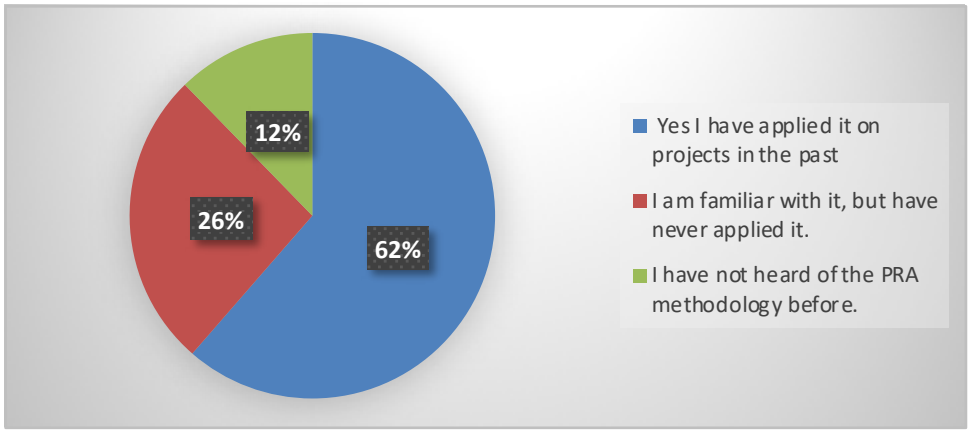


Source: Authors' data

Participants prior experience with participatory rural appraisal

Only 12% of the livestock officers had not heard of participatory rural appraisal (PRA) before the training and 26% had not applied it although it is an important approach in ensuring inclusive development (Figure 7). It was therefore imperative to train on participatory rural appraisal to ensure a participatory approach in development of intervention strategies and secure greater buy in and longevity of the interventions within the AVCD project.

Figure 7: Previous experience with PRA

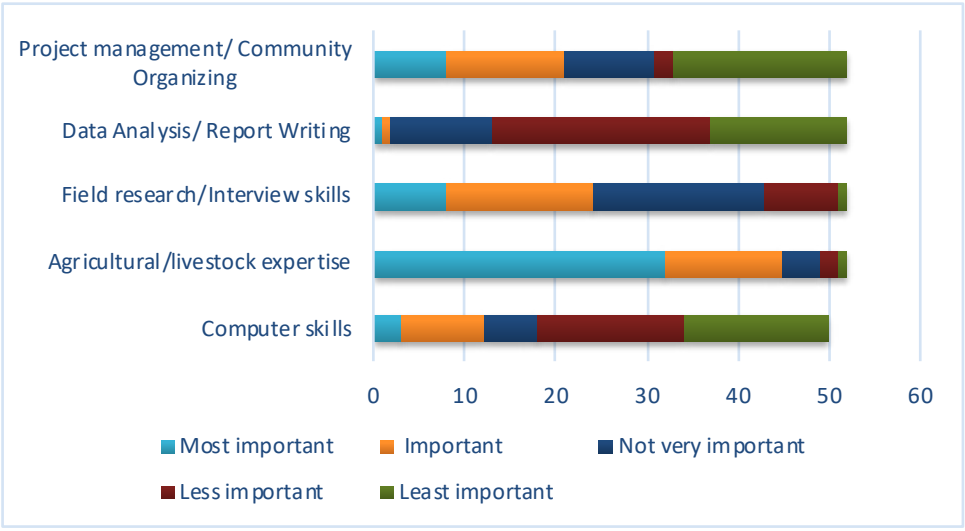


Source: Authors' data

Ranking and level of proficiency of participants in important skills for FEAST implementation

The respondents considered agricultural/livestock expertise as the most important skill in implementation of FEAST. Project management was rated the least important by the majority of the respondents (Figure 8). It was critical for the respondents to be trained and made aware that all five skills are equally important in implementing FEAST.

Figure 8: Rating on importance of key skills by training participants

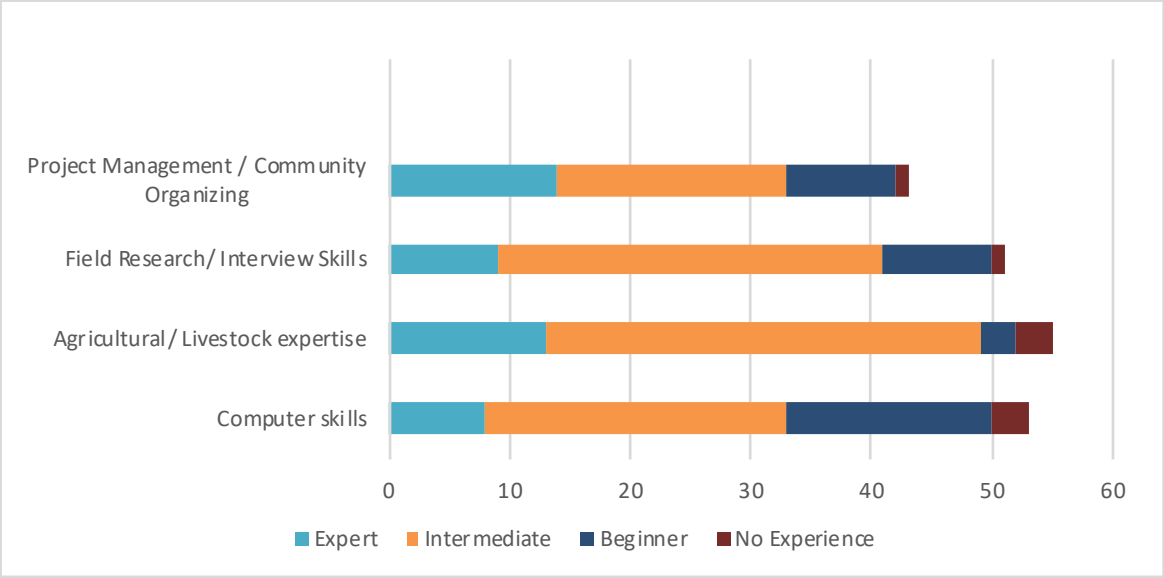


Source: Authors' data

Proficiency levels in key skills for FEAST implementation

The majority of the participants had intermediate levels of proficiency for the five skills considered critical for FEAST implementation (Figure 9). This revelation justifies the need for training to improve the skills of the participants to a level where they can handle the FEAST tool comfortably.

Figure 9: Level of skills in training participants



Source: Authors' data

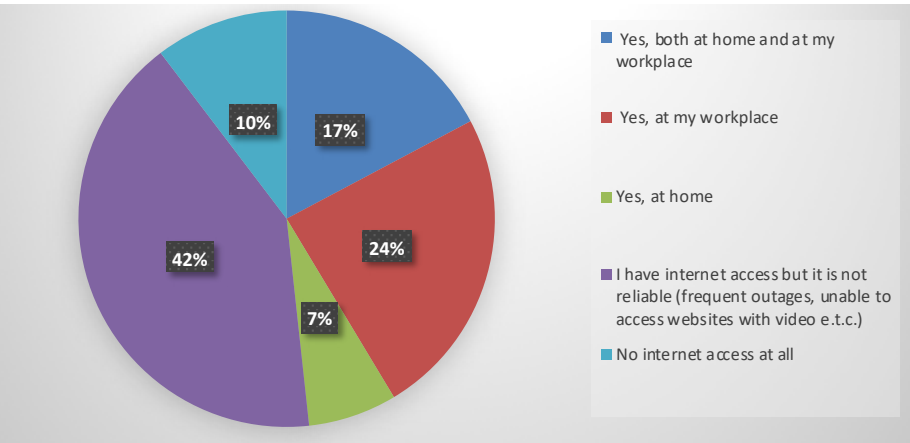
Participants' previous experience with FEAST

None of the training participants were previously trained in FEAST, which could be addressed by sensitization of training participants on the e-learning materials to bridge the knowledge gap.

Internet access and experience of participants with remote learning

The majority of the participants (42%) had unreliable internet connection while a significant proportion (10%) had no internet connection at all; and 24% had internet access only at work (Figure 10). The poor internet connectivity limited the ability of participants to access the e-learning course and made class room training sessions the most viable option.

Figure 10: Internet access by training participants

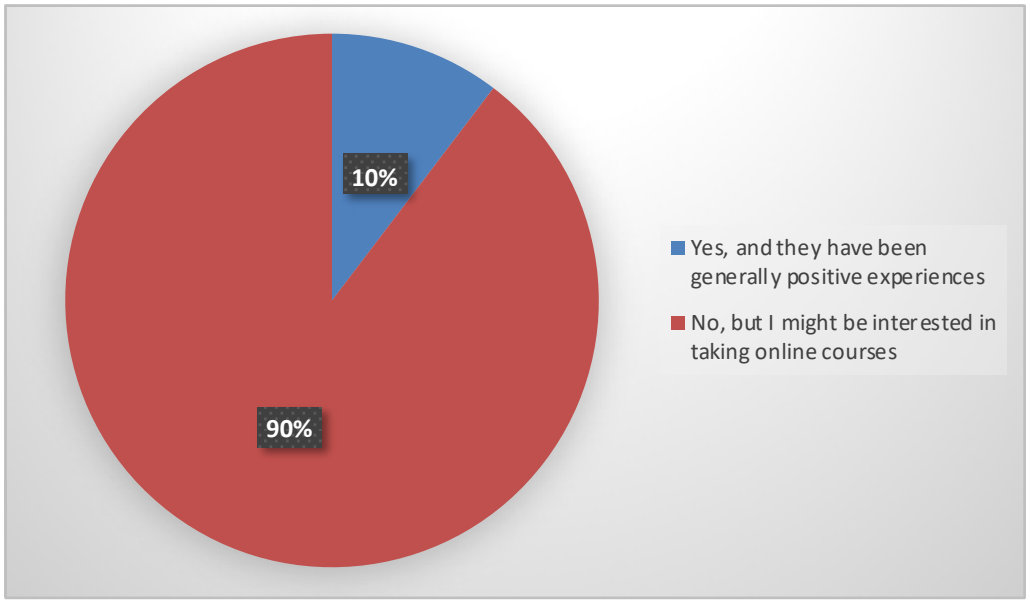


Source: Authors' data

Previous experience with online courses

A total 90% of the training participants had no previous experience with e-learning but indicated they would be interested in using it, while the 10% who had previously taken online courses said they had positive experience (Figure 11). This could explain the poor interaction with the e-learning course in the treatment group for randomized controlled trials. It could be deduced from this experience that there is a need to actively support intended users of the e-learning course, probably through collaboration with universities, government livestock offices and feed formulation companies who can provide technical support for the FEAST users to navigate through the e-learning course.

Figure 11: Previous experience with online courses



4.2 Knowledge change

After the training, there was significant change in knowledge among the 58 participants in the three study regions in eastern, western and north-eastern Kenya at 95% confidence level with a p-value <0.001 (Table 1). A medium size effect 0.57 was achieved (Table 2), which indicates that the training sessions significantly improved the understanding of the participants in technical competence in using the FEAST application. The participants who had no previous experience in using the FEAST application had improved competencies in computer use, conflict resolution, data analysis and project management at the end of the training session. This is expected to help them execute implementation of FEAST under the AVCD project with a lot of proficiency.

Table 1: Influence of training on technical knowledge in FEAST among FEAST facilitators

Sample	Sample size	Mean	Variance	Standard deviation	Standard error of mean	T value	Probability	Significance
Posttest/pre-test	58	1.13	3.962	1.991	0.2614	4.32	<0.001	***

Source: Authors' data

Table 2: Effect size in knowledge change

Sample	Pre-test mean	Post-test mean	Pre-test SD	Post-test SD	Effect size
Pretest / post test	12.508	13.638	1.938	1.922	0.573

Effect size: 0.2=small; 0.5=medium; 0.8=0.8 (Cohen 1968).
Source: Authors' data

4.3 Attitude change

There was no significant change at 95% confidence level in quantitative scores for all 9 aspects of attitude assessed among the training participants (Table 3). The effect size achieved with the training was insignificant for eight attitude aspects and small for one aspect (Table 3).

Table 3: Influence of FEAST training on 9 attitude and behavior aspects of FEAST facilitators

Sample	Sample size	Mean	Variance	Standard deviation	Standard error of mean	T value	Effect size	Probability	Significance
Posttest/ Pretest (1)	57	-17.19	17278	131.4	17.41	-0.99	-0.161	0.328	ns
Posttest/ Pretest (2)	57	-17.04	17497	132.3	17.52	-0.97	-0.179	0.335	ns
Posttest/ Pretest (3)	57	0.1754	35154	187.5	24.83	0.01	-0.088	0.994	ns
Posttest/ Pretest (4)	57	35.04	34256	185.1	24.52	1.43	-0.032	0.159	ns
Posttest/ Pretest (5)	57	17.42	17272	131.4	17.41	1.00	0.011	0.321	ns
Posttest/ Pretest (6)	57	52.53	50520	224.8	29.77	1.76	-0.015	0.083	ns
Posttest/ Pretest (7)	57	18.21	17241	131.3	17.39	1.05	-0.315	0.300	ns
Posttest/ Pretest (8)	57	0.50	35401	188.2	24.92	0.02	-0.226	0.984	ns
Posttest/ Pretest (9)	57	35.04	69155	263.0	34.83	1.01	-0.061	0.319	ns

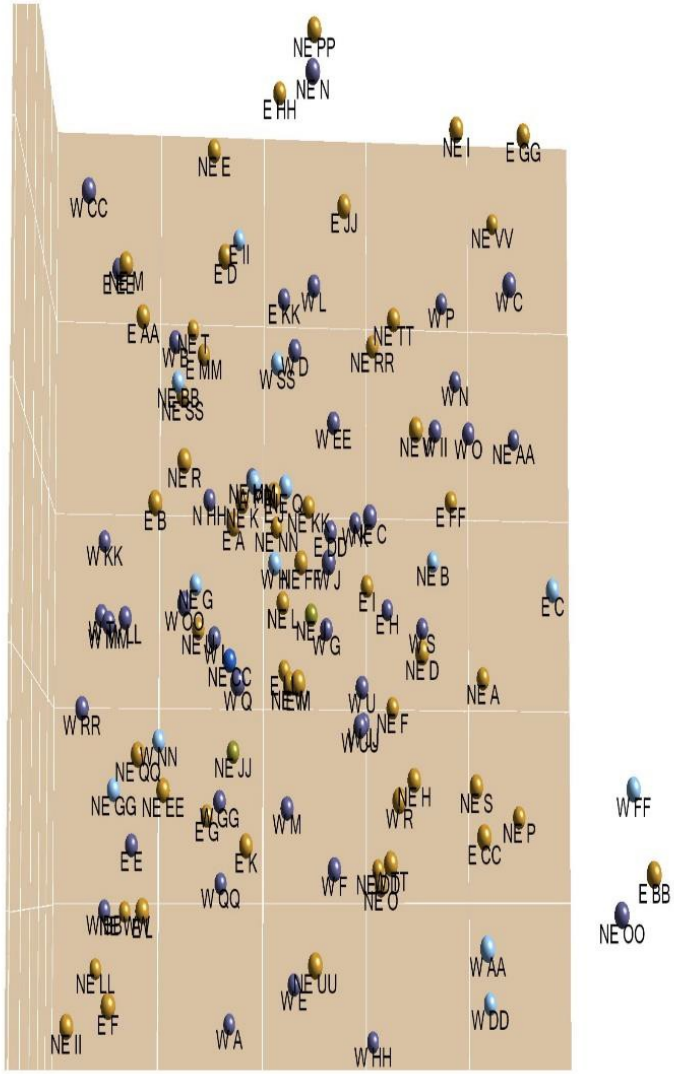
Effect size: 0.2= small; 0.5=medium; 0.8=0.8 (Cohen 1968).
Significance: *** probability <0.01, ** probability <0.05, *probability <0.1, ns – not significant
Source: Authors' data

There was also similarity in the qualitative statements for all nine aspects assessed for attitude and behavior in the before and after studies among the respondents in the three study areas (Figures 12, 13, 14 and 15).

Coding of respondents is alphabetical for the three regions with the pre-test response coded with a single alphabet and the post-test coded with double alphabet. Western region is coded W; eastern, E; and north-eastern, NE. The pre- and post-test responses for the first respondent are therefore coded as NEA and NEAA (north-eastern) WA and WAA (western) and EA and EAA (eastern). The rest of the respondents follow that sequence.

The responses in the study were generally consistent with other research findings, which indicates that the respondents were aware of the current state of the agricultural systems, participatory agricultural research practices and need to develop site-specific interventions. The training did not depart from these facts; therefore, achieving consistency in responses before and after training.

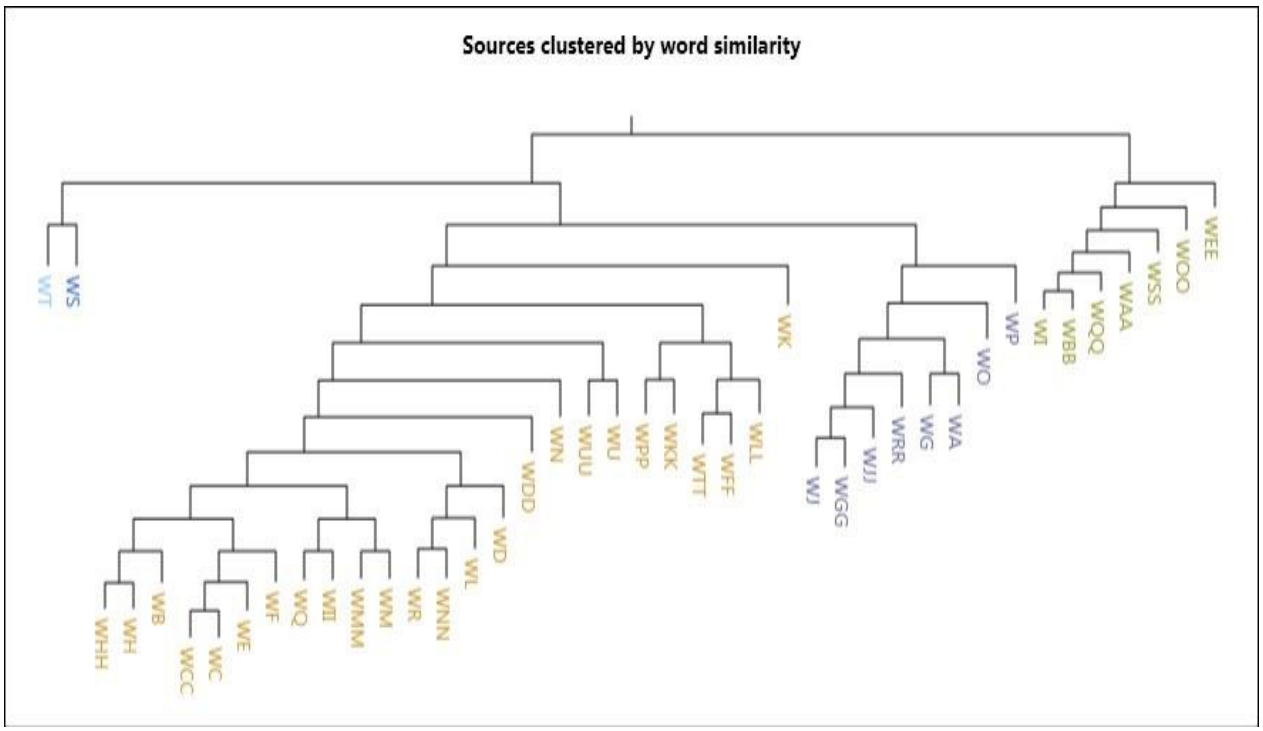
Figure 12: Combined cluster analysis for attitude change in north-eastern, eastern and western Kenya



Source: Authors' data

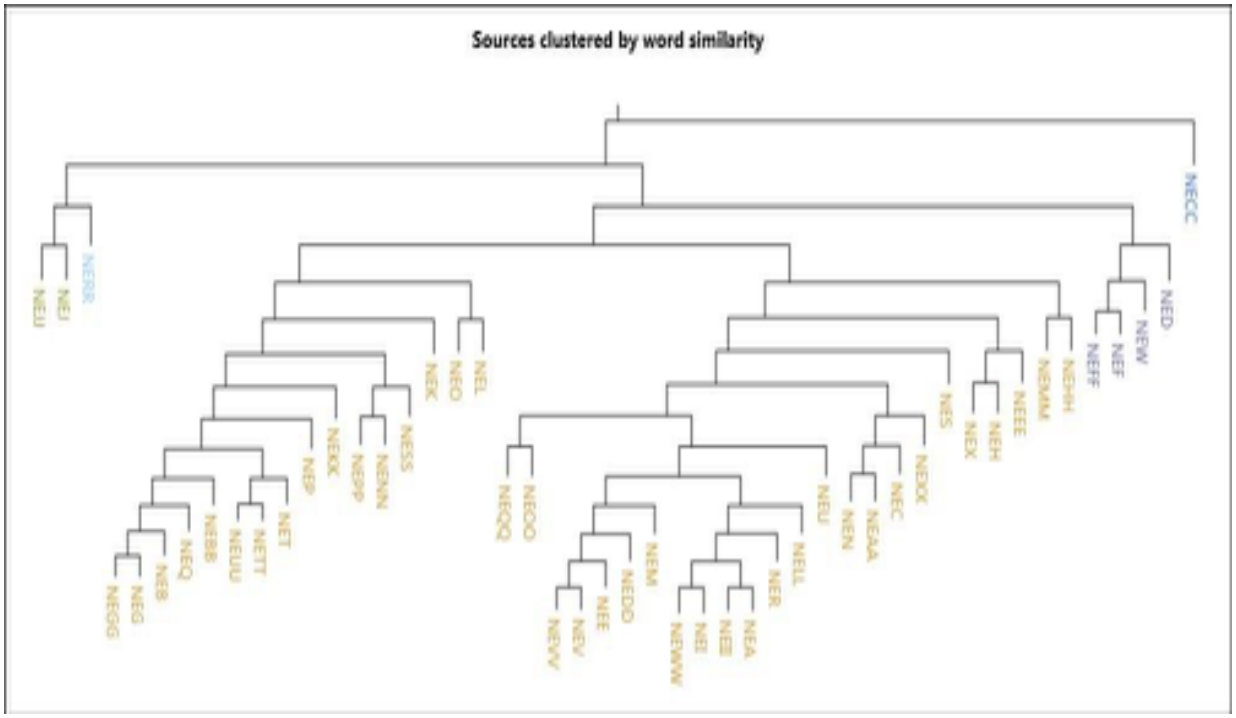
Please note: In figure 12, the dots that are clustered close to each other represent responses that have high similarity in words; in figures 13, 14 and 15, responses that are on the same branch have high similarity in words.

Figure 13: Cluster analysis for attitude change in western Kenya



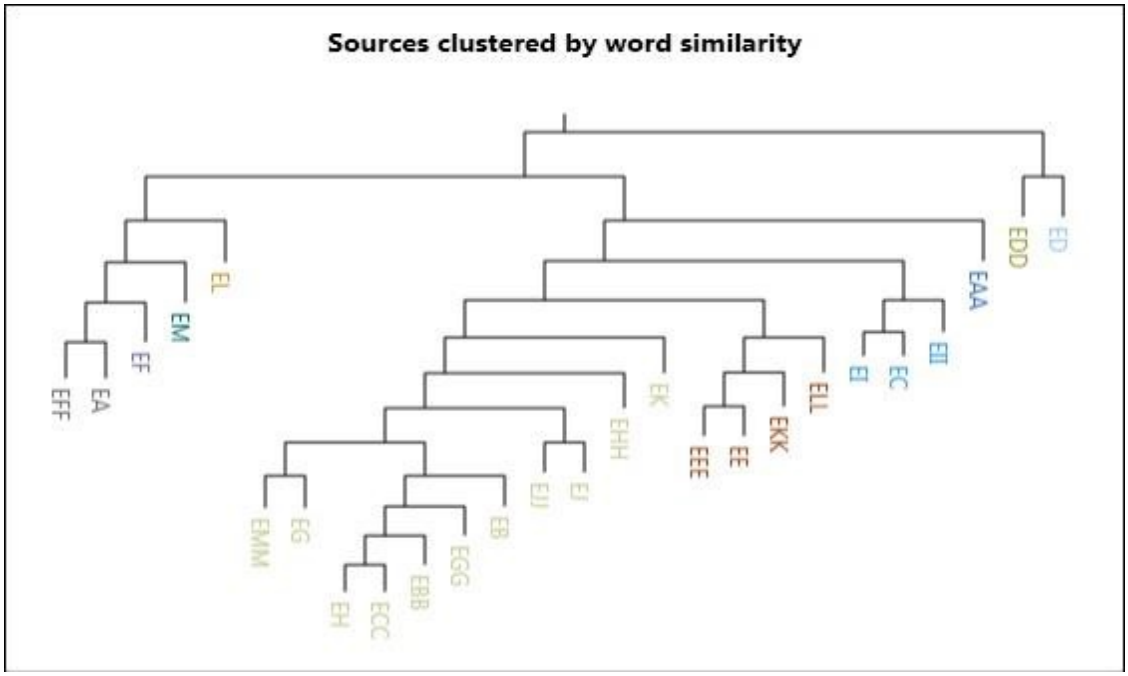
Source: Authors' data

Figure 14: Cluster analysis for attitude change in north-eastern Kenya



Source: Authors' data

Figure 15: Cluster analysis for attitude change in eastern Kenya



Source: Authors' data

Aspects assessed for attitude and behavior change include general knowledge on crop and livestock production systems, importance of participatory research and importance of development of context specific interventions.

Previous experience with online courses

The focus of the assessment was on the purposes of livestock production among small scale farmers, suitability of exotic breeds in small scale systems and factors that influence choice of crops grown by small scale farmers.

Purpose of livestock production among small scale farmers

At both the pre- and post-test stage, respondents maintained the view that livestock was produced by farmers for provision of milk and meat for household consumption and for income generation. They also cited other reasons such as draught power, manure, prestige and dowry. The consistency in the views of the training participants is indicated by a p value of 0.328 which denotes no significant change at 95% confidence level and the insignificant effect size of 0.16 (Table 3).

The findings were consistent with existing literature which argues that livestock production in developing countries focuses on production of milk and meat for household consumption and sale, production of manure to support crop production, acquire and maintain social status and as insurance in case of cash shortage (Udo and Cornelissen 1998).

Suitability of exotic breeds in small scale systems

Small holder farmers in Kenya own about 80% of exotic dairy cattle comprising Friesian, Jersey, Guernsey, Ayrshire and Bis Indicus cattle, and the local Zebu, Boran and Sahiwal (Bebe et al. 2003). There was a divide among the respondents in both the pre- and post-tests on the suitability of keeping exotic cattle breeds for small scale farmers in all three regions. The consistency in the views of the respondents was reflected by a p value of 0.335, which is insignificant at 95% confidence level and insignificant effect size of 0.17 (Table 3).

Those who disapproved of the idea argued that small scale farmers lack adequate knowledge in the high-level management required for the exotic breeds. Another reason cited was that farmers are resource poor and may not meet the feeding

requirements of the animals. It was further argued that rearing the animals would be strenuous for the farmers because the animals are prone to disease. The suitability of exotic breeds was explained on the basis of ecological factors as argued by a respondent from north-eastern Kenya who stated, 'this [ownership of exotic breeds] is practical to agropastoralists who have land along the river; it is not practical for the nomads in the hinterland (the case of Garissa)'. Those who agreed said that the exotic breeds are suitable for small holder farmers because of their high productivity. The divide in response was consistent with other findings which indicate differences in recommendations for rearing of smaller breeds such as Jersey and Guernsey and actual practice by farmers who breed their herds with the larger frame breeds, especially Friesian, although they have lower milk yield and poor adaptability under small scale conditions (Kahi et al. 2000).

Factors that influence types of crops grown by small scale farmers

Small scale farmers are often subsistent or semi-commercial and target profit maximization while ensuring that their subsistence needs are met (Ellis, 1991). This was consistent with research findings where respondents argued that choice of crops grown by farmers in eastern and western regions was determined by the potential of the crop to contribute to food for household consumption. Crop production in these regions is the main source of food supply and it is given priority over livestock production. However, a few farmers grow cash crops including sugarcane and tobacco for income generation in western Kenya. In north-eastern Kenya, where livestock keeping is the main source of livelihood and crop production is driven by market availability, one respondent said, 'for Garissa farmers, their focus is the market; they plant fruit trees and vegetables that have demand in the market'. The perception of respondents regarding determining factors on the choice of crops grown remained unchanged in both the pre- and post-tests. This is indicated by the p value of 0.994 which is insignificant at 95% confidence level and effect size of 0.088 (Table 3).

General knowledge in context specific and participatory research

Assessment was done on knowledge of importance of engaging farmers in research, factors influencing adoption of interventions recommended by researchers, importance of developing context specific interventions and farmer understanding of cost benefit analysis.

Importance of engaging farmers in research

Research in the past has not delivered optimum benefits to farmers in Africa mainly due to a top-down approach rather than participatory research. Hence, it has failed to address the needs of farmers and context issues of water, land, labour, inputs, cash and knowledge availability (Sumberg 2005). In recent times, there has been a paradigm shift towards participatory agricultural research to enhance benefits of research in development. The respondents in the study were aware of the need to include farmers in designing feed interventions. During the training, people acknowledged that the participatory approach enhances stakeholder buy in and; therefore, sustainability and longevity of interventions. There was no significant change in the scoring of this aspect as indicated by the p value of 0.159, which is insignificant at 95% confidence level and the effect size of 0.032 (Table 3).

Factors influencing adoption of interventions recommended by researchers

Rodriguez et al. (2008) state that, while conventional agricultural practices lead to problems of environmental degradation, economic challenges and social conflict, the adoption of sustainable agricultural practices is not popular among famers. Researchers often fail to support the needs of farmers, especially those specific to farming situations which leave farmers struggling to find information on the benefits of sustainable agricultural practices. Government institutions fail to promote adoption due to lack of funds, improper design and ineffective intervention targeting.

Farmers are often blamed for being reluctant to adopt improved practices, but several barriers actually hinder adoption. These include land tenure, cultural issues, poor infrastructure and unsuitability of solutions offered to solve their problems (Rodriguez et al. 2008).

This was consistent with the views of respondents in the pre- and post-tests that farmers fail to adopt new feeding technologies due to poor access to information about the availability of new technologies and their benefits. The factors cited as contributing to the poor awareness included poor extension services and failure to access other sources of information including meetings organized by local leaders, newspapers and other media. Lack of resources to implement modern feeding technologies was also cited as a challenge faced by farmers in the implementation of modern technologies. The consistency in the views is reflected by the p value of 0.321 which is insignificant at 95% confidence interval and the insignificant effect size of 0.01 (Table 3).

Lack of resources was cited by respondents as the main reason why farmers fail to take up advice on modern feeding technologies provided by extension farmers. It was further argued that the advice provided by the extension officers is sometimes not appropriate in certain contexts. There was no significant change in perception before and after the training as indicated by the p value of 0.08 which is insignificant at 95% confidence level and the insignificant effect size of 0.015 (Table 3).

Importance of developing context specific interventions

There was a shift in opinion by respondents who initially argued that feed intervention could work anywhere. In the post-tests conducted after training, there is greater consensus among respondents that interventions need to be context specific and issues of water and climate, which vary in different locations, need to be addressed. The change is reflected by the small effect size of 0.3, although the p value of 0.3 is not significant at 95% confidence level (Table 3).

Training participants said that, although feed technologies can work for both poor and rich farmers, the level of adoption varies. They felt that rich farmers are better endowed with resources, which makes it easier for them to implement interventions. However, there was variation in the perceived attitudes of rich farmers where some stated that they may adopt interventions that target poor farmers. Others stated that rich farmers disregard interventions suggested to them. There was no significant change in the attitude of the respondents regarding this issue as indicated by the p value of 0.984 which is insignificant at 95% confidence level and the insignificant effect size of 0.22 (Table 3).

Farmer understanding of cost-benefit analysis

Cost-benefit analysis requires consideration of economic criteria, risks and other relevant factors. However, information on prices of inputs, outputs and new feed technologies is inadequate and inaccessible to farmers, which compromises their capacity in decision making on the choice of feed intervention strategies (Chilonda and Van Huylenbroek 2001). This was consistent with the response of participants in the study which stated that farmers lack an understanding in cost-benefit analysis because information needed is often unavailable to them. It was further suggested that a lot of capacity building is needed to enhance the knowledge levels of cost-benefit analysis among farmers for informed decision making in implementing feed intervention strategies. There was consistency in this perception before and after training as indicated by the p value of 0.319 which is insignificant at 95% confidence level and the insignificant effect size of 0.06 (Table 3).

5 Attitude change

The personal profiles of the respondents confirmed that the individuals were well suited to facilitate the implementation of FEAST. The level of skills in computer usage, data analysis, report writing, project management and field research were intermediate for majority of the respondents. There was significant change in technical knowledge in FEAST after the training.

Lack of previous experience with remote learning and poor internet connectivity made it hard for the respondents to rely on the e-learning course, leaving the option of class room training as the viable mode of content delivery. It was difficult to effect the randomized controlled trials experiment design within the AVCD project given the time and resource limitations.

Results from the before and after studies indicated significant change in knowledge of livestock production, data analysis, report writing and field research after the classroom training. This was indicated by the p value of 0.001 which is significant at 95% confidence level and the medium effect size of 0.57.

There was no significant change in attitude in all nine aspects assessed for attitude change in the before and after studies. The aspects assessed were on general knowledge of crop and livestock production, importance of participatory research and development of context specific interventions. The responses given concurred with existing literature which indicated that the respondents had adequate knowledge on agricultural systems, participatory agricultural research practices and importance for development of context specific interventions. The group trained was; therefore, well matched for the implementation of FEAST and good outcomes are expected in participatory development of context specific interventions.

6 Recommendations

- Impact evaluation for knowledge, attitude and behavior change with the FEAST e-learning platform should be conducted for facilitators who would be purposively selected on the criteria of computer literacy. The participants should also have access to computers and stable internet connection in the typical 5-day training sessions with a certificate of completion being offered upon completion to ensure high success rate of course completion.
- The indication from the impact evaluation on the effectiveness of FEAST training was that there was significant change in level of knowledge on FEAST technical skills and small effect in changing the mindset of developing site-specific interventions. The participants were already aware of the importance of participatory research. Therefore, there should be greater emphasis in imparting knowledge on the need for site-specific interventions in future training sessions.

7 References

Adugna, T., Frik, S., and Abdullah, N. S. 1998. The effect of stage of maturity on yield and quality of maize grain and stover. *Animal Feed Science and Technology* 75(2): 157–168

Alene, A. and Coulibaly, O. 2009. The impact of agricultural research on productivity and poverty in sub-Saharan Africa. *Food Policy* 34(2):198–209. http://dx.doi.org/10.1016/j.foodpol.2008.10.014

Bebe, B., Udo, H., Rowlands, G., and Thorpe, W. 2003. Smallholder dairy systems in the Kenya highlands: breed preferences and breeding practices. *Livestock Production Science* 82(2–3):117–127. http://dx.doi.org/10.1016/s0301-6226(03)00029-0

Chilonda, P. and Van Huylenbroek, G. 2001. A conceptual framework for the economic analysis of factors influencing decision-making of small-scale farmers in animal health management. *Revue Scientifique et Technique De L'oie* 20(3):687–700. http://dx.doi.org/10.20506/rst.20.3.1302

Cohen, J. 1968. Multiple regression as a general data-analytic system. *Psychological Bulletin* 70(6, Pt.1):426–443. http://dx.doi.org/10.1037/h0026714

Department for International Development. 2011. *Smallholder dairy production and marketing in Western Kenya: A review of literature*. Nairobi, Kenya: Department for International Development.

Duncan, A., York, L., Lukuyu, B., Samaddar, A. and Stür, W. 2012. Feed Assessment Tool (FEAST): *A systematic method for assessing local feed resource availability and use with a view to design intervention strategies aimed at optimizing feed utilization. Questionnaire for Facilitators.* Version 5.3, updated 15 June 2012. Addis Ababa, Ethiopia: ILRI. (Available from http://www.ilri.org/feast) (Accessed on 6 September 2018)

Frank, E. 1991. *Peasant economics: Farm households and agrarian development*. Norwich, UK: School of Development Studies, University of East Anglia.

Frank, E. and Freeman, H. 2004. Rural livelihoods and poverty reduction strategies in four African countries. *Journal of Development Studies* 40(4): 1–30. http://dx.doi.org/10.1080/00220380410001673175

Erenstein, O., Samaddar, A., Teufel, N. and Blümmel, M. 2011. The paradox of limited maize stover use in India's smallholder crop-livestock systems. *Experimental Agriculture* 47(04): 677–704. http://dx.doi.org/10.1017/s0014479711000433

Herrero, M., Thornton, P., Gerber, P. and Reid, R. 2009. Livestock, livelihoods and the environment: understanding the trade-offs. *Current Opinion in Environmental Sustainability* 1(2):111–120. http://dx.doi.org/10.1016/j.cosust.2009.10.003

Herrero, M., Thornton, P., Notenbaert, A., Wood, S., Msangi, S. et al. 2010. Smart investments in sustainable food production: revisiting mixed crop-livestock systems. *Science* 327 (5967):822–825. http://dx.doi.org/10.1126/science.1183725

Herrero, P., Thorntorn, A., Notenbaert, S., Msangi, S., Kruska, J. et al. 2008. *Drivers of change in crop-livestock systems and their potential impacts on agroecosystems services and human well-being to 2030*. CGIAR System wide Livestock Program. International Livestock Research Institute.

Itabari, J., Bett, C., Bauni, S., Githunguri, C., Kariuki, C. et al. 2006. *Research priorities for KARI-Katumani mandate area*. Katumani Research Centre.

Kahi, A., Thorpe, W., Nitter, G., Van Arendonk, J. and Gall, C. 2000. Economic evaluation of crossbreeding for dairy production in a pasture-based production system in Kenya. *Livestock Production Science* 65(1–2):167–184. http://dx.doi.org/10.1016/s0301-6226 (99)00154-2

Lukuyu, B., Kitalyi, A, Franzel, S., Duncan, A. and Baltenweck, I. 2009. *Constraints and options to enhancing production of high quality feeds in dairy production in Kenya, Uganda and Rwanda*. ICRAF Working Paper no. 95. Nairobi, Kenya: World Agroforestry Centre.

Kenya Arid and Semi-Arid Land Program. 2009. *Dairy cattle value chain assessment: characterization of milk production in semi-arid Kenya.*

McDermott, J., Staal, S., Freeman, H., Herrero, M. and Van de Steeg, J. 2010. Sustaining intensification of smallholder livestock systems in the tropics. *Livestock Science* 130(1–3):95–109. http://dx.doi.org/10.1016/j.livsci.2010.02.014

Mwatate, C., Ramadhan, A. and Njunie, M. 1998. *Methodology for forage technology transfer in Kwale and Kilifi district of coast province*. In the 6th Biennial KARI conference (pp. 458–465). Nairobi: Kenya. Agricultural Research Institute.

Ng'ang'a, J.K., Bauni, S. M., Githunguri, C. M., Kariuki, C.W. 2006. Research priorities for KARI-Katumani mandate area. University of Nairobi Research Archive. http://erepository.uonbi.ac.ke:8080/xmlui/handle/123456789/53719

Njarui, D., Gatheru, E., Ondiko, C., Njunie, M., Ndungu, M. K. et al. 2016. A comparative analysis of livestock farming in smallholder mixed crop-livestock systems in Kenya: feed utilization, availability and mitigation strategies to feed scarcity. *Livestock Research for Rural Development* 28(67)

Njarui, D., Gatheru, M., Wambua, J., Nguluu, S., Mwangi, D. and Keya, G. 2011. Feeding management for dairy cattle in smallholder farming systems of semi-arid tropical Kenya. *Livestock Research for Rural Development* 23

Njunie, M. and Ogora, R. 1990. *Evaluation of forages of the semi-arid coastal lowland zones: recent advances in KARI's research programs*. In the 2nd KARI Annual Scientific Conference (pp.16–123). Nairobi: Kenya. Agricultural Research Institute

Okwiri, F., Kajume, J. and Odondi, R. 2007. An assessment of the economic viability of private animal health services delivery in pastoral areas of Kenya: summary of findings. *Kenya Veterinarian* 25(1). http://dx.doi.org/10.4314/kenvet.v25i1.39530

Ramadhan, A., Njunie, M., Wainaina, G., Mwatate, C., Bakari, P. and Busiene, P. 2001. *Participatory evaluation of sown herbaceous forage legumes, planted grasses and Gliricidia trees in Kilifi and Kwale Districts, coast Kenya.* In the end of project conference. Nairobi, Kenya: Kenya Agricultural Research Institute.

Riviere-Cinnamond, A. and Eregae, M. 2003. *Community-based animal health workers (CAHWS) in pastoralist areas of Kenya: A study on selection process, impact and sustainability–west Pokot, Wajir and Marsabit.* FAO.

Rodriguez, J., Molnar, J., Fazio, R., Sydnor, E. and Lowe, M. 2008. Barriers to adoption of sustainable agriculture practices: change agent perspectives. *Renewable Agriculture and Food Systems* 24(01): 60. http://dx.doi.org/10.1017/s1742170508002421

Sumberg, J. 2005. Systems of innovation theory and the changing architecture of agricultural research in Africa. *Food Policy* 30(1):21–41. http://dx.doi.org/10.1016/j.foodpol.2004.11.001

Thornton, P. K. 2010. Livestock production: recent trends, future prospects. *Phil. Trans. R. Soc. B.* http://doi.org/10.1098/rstb.2010.0134

Udo, H. and Cornelissen, T. 1998. Livestock in resource-poor farming systems. *Outlook Agric* 27:237–242.

Valbuena, D., Erenstein, O., Homann-Kee T. S., Abdoulaye, T., Claessens, L. et al. 2012. Conservation agriculture in mixed crop–livestock systems: scoping crop residue trade-offs in Sub-Saharan Africa and South Asia. *Field Crops Research* 132:175–184. http://dx.doi.org/10.1016/j.fcr.2012.02.022

Annexes

Annex 1: Research protocol

Introduction

Livestock production is increasingly gaining importance as a source of livelihood in developing countries. However, livestock farmers in the tropics are often challenged by inadequate and seasonal feed availability and poor quality which compromises livestock productivity. The Feed Assessment Tool (FEAST) has been designed to facilitate assessment of local availability of feed resources and design appropriate feed intervention strategies aimed at optimizing feed utilization in site-specific contexts. The tool is appropriate for use by development agents, agricultural practitioners and other organizations. It combines participatory farmer centred diagnosis approaches with a computer application, which make analysis and reporting easy.

In order to enhance use and adoption of the tool, ILRI has developed some online materials which are accessible to anyone. The course includes lessons on designing participatory exercises, engaging rural communities, analysing and reporting. Under ILRI's creative commons licensing policy, the materials are open to organizations and individuals interested in applying a systematic farmer engagement and analysis to their livestock feeding interventions.

This research proposes to assess the impact of FEAST and training on the level of knowledge of FEAST content by FEAST users. It also aims to assess broader changes in knowledge, attitudes and practices around feed interventions, specifically the extent to which the experience of FEAST broadens the approach of users to feed intervention beyond a narrow focus on a few favorite feed interventions.

Conceptual framework

The livestock production officers will be put into two groups randomly, where one group will be exposed to both the FEAST application and e-learning materials and the other will only be exposed to the FEAST application. The two groups will then be assessed on the level of knowledge of the FEAST content.

Another assessment will be conducted after the two groups in the treatment group receive training from FEAST experts to determine if there is significant change in the level of knowledge after training.

Both groups will be assessed again for attitude and knowledge by completing pre- and post-training tests. Paired t-tests will be done to determine whether the change in attitude and knowledge is significant after training. Qualitative data will be analysed in NVIVO (Table 1).

Table 1: Summary of assessment

Group	Treatment	Assessment	Statistical test
31 participants who accessed e-learning materials before training	e-learning materials	Post assessment on knowledge and attitudes	Two sample t-tests
30 participants who did not access e-learning materials before training	No e-learning materials		
31 participants who accessed e-learning materials before training	Training	Pre- and post-assessment on knowledge and attitudes	Paired t-test
30 participants who did not access e-learning materials before training	Training	Pre- and post-assessment on knowledge and attitudes	Paired t-test

Aim

The study aims to evaluate change in attitude among FEAST users in adopting feed improvement technologies, engaging farmers and other stakeholders in feed improvement; and the impact of the FEAST training and e-learning materials on the level of knowledge the livestock officers have acquired on FEAST.

Specific objectives

1. Compare the change in attitude and level of knowledge among FEAST users exposed to e-learning materials and those who're not.
2. Determine how attitude and level of knowledge changes when the unexposed group is trained with FEAST e-learning materials.
3. Determine how the attitude and level of knowledge changes when the exposed group is trained with FEAST e-learning materials.

Study design

Randomized controlled trials will be conducted where 61 livestock production officers will be put into two groups randomly. Among them, 31 officers will be exposed to e-learning materials and 30 will not be exposed to e-learning materials. FEAST knowledge and attitude will be evaluated through a post-assessment surveys by both groups. A two-sample t-test will be used to evaluate if there is significant change in knowledge and attitude between the two groups when the treatment group accesses e-learning materials while the control group does not.

Both groups will then be trained using the new FEAST training materials and evaluated to determine if there is significant change in FEAST knowledge and attitudes with training. Both groups will complete the pre- and post-assessment on knowledge and attitudes. Paired t-tests will be done in Genstat to determine if there will be significant change in level of knowledge of FEAST in both groups after training. Other quantitative data will be analysed in excel, while qualitative data will be analysed in NVIVO.

Sampling frame

The sample will constitute 61 livestock officers in Taita Taveta, north-eastern, eastern and western Kenya.

Sample selection

Livestock officers were randomly selected from Isiolo, Garissa, Turkana, Wajir, Marsabit, Kisumu, Vihiga, Migori, Homabay, Busia, Siaya, Kitui, Makueni and Taita Taveta counties to participate in the study. Sampling was stratified at sub county level based on livestock production potential. A total of 61 participants were effectively selected.

Study site

The 61participants will complete surveys in person during the training exercises in Marsabit, Kisumu and Kitui.

Impact evaluation

Significance of impact of the e-learning materials and training on knowledge will be calculated using the formula:

$$ES = \frac{M2 - M1}{SD}$$

Where: ES is significance of impact

M2 is mean 2

M1 is mean 1

SD is standard deviation

Annex 2: Personal profiles survey

1. What is the highest level of education you have completed?
   - No formal schooling
   - Some formal schooling
   - Secondary school
   - Diploma/certificate qualification
   - Some university education
   - University degree
   - Graduate/Advanced degree (PHD, MD, master's degree etc.)
2. If you hold a degree, which subjects did you study?

3. Have you participated in livestock feed intervention projects before?
   - Yes, I have led livestock feed intervention projects in the past.
   - Yes, I have participated in livestock feed intervention projects in a supporting role.
   - No, but I am currently scheduled to participate in a livestock feed intervention project in the near future.
   - No, and I have no immediate plans to do so.
4. Typically, which of the following would you do as part of a feed intervention project? (check all that apply)
   - Conduct filed research
   - Examine animals/ inspect farms
   - Test feed samples/ soil sample
   - Suggest intervention strategies
   - Work on site with community to implement interventions
   - Interview farmers
   - Conduct focus group discussions

- Prepare a report on the findings of field research
- Create an implementation plan for interventions
- Follow up later (1 month, 6 months, 1 year etc.) to evaluate results of intervention

5. Are you familiar with the FEAST tool and FCD (farmer-centred diagnosis) methodology? Honesty is appreciated- we simply want to know if you have any prior experience with the subject matter of this course.

- Yes. I have used the FEAST tool and applied the FCD methodology on livestock feed intervention projects.
- I was aware of FEAST tool and FCD methodology prior to this training session, but never had an opportunity to apply them.
- The concepts of the FEAST tool and FCD methodology were briefly explained to me when I registered for this training session.
- No, I have never heard of the FEAST tool and FCD methodology prior to today.

6. Are you familiar with PRA (participatory rural appraisal) methodology?

- Yes, I have applied it on projects in the past.
- I am familiar with it but have never applied it.

7. Arrange the following list of items to rank them in terms of how critical you feel each skill is for conducting livestock feed interventions.

- Computer skills
- Agricultural/livestock expertise
- Field research/interview skills
- Data analysis/report writing
- Project management/community organizing

8. How would you rate your proficiency in the following areas?

	Advanced/expert		No experience	
Computer skills	☐	☐	☐	☐
Agricultural/livestock expertise	☐	☐	☐	☐
Field research/interview skills	☐	☐	☐	☐
Project management/community organizing	☐	☐	☐	☐

9. Have you ever participated in training offered by ILRI on the FCD methodology and/or FEAST tool before?

- No
- Yes

If the answer is no, please proceed to question 12.

10. How well did the previous training session prepare you to conduct a livestock feed intervention? Honesty is appreciated, as it will help us improve future training sessions.

- Very well. I learned many useful skills that I was able to apply in livestock feed intervention projects.
- Somewhat. I learned a few useful skills but there were other aspects of the livestock feed intervention project for which the training did not adequately prepare me.
- Not much. Very little from the training course proved useful during the livestock feed intervention project.
- I have not worked on any livestock feed intervention projects since completing the training.

11. Is there a particular reason why you are taking this training again? (check all that apply)

- It has been a long time since the previous training or since the last time I conducted a livestock feed intervention and I want to refresh my skills.
- The previous training did not adequately prepare me and I hope this one will be better.
- Participation was mandatory. I did not have a choice.
- I want to know if there have been any new developments since I last attended training/conducted a livestock feed intervention.
- I am accompanying other members of the organization who have not attended the training before.

12. Do you have reliable internet access?

- Yes, both at home and at my workplace.
- Yes, at my workplace.
- Yes, at home.
- I have internet access but it is not reliable (frequent outages, unable to access websites with video etc.)

13. Have you ever taken training classes online?

- Yes, and they have been generally positive experiences.
- Yes, but they were generally bad experiences.
- No, but I might be interested in taking online courses.
- No, and I have no interest in taking training classes online.

Thank you. Any other questions or comments?

Annex 3: FEAST pre- and post-course assessment

Name: _____

Organization: _____

1. What is the defining characteristic of 'improved' livestock (cattle and buffalo)?

( ) Bred with exotic genes for improved milk/meat production

( ) Given special drugs to increase their production

( ) They require less feed than regular livestock

( ) Cost less than other cattle

( ) They are local species native to the region

2. What is 'feed ration'?

( ) A fixed amount of feed given to one animal within a fixed period of time

( ) The ratio of ingredients in one serving of feed given to animals

( ) The amount of feed that can be purchased for a fixed price

( ) The percentage that one animal eats out of all feed given to animals on a farm

3. Which of the following is commonly added to livestock feed to increase its nutritive value?

( ) Chlorine

( ) Thorazine

( ) Lye

( ) Guano

( ) Urea

4. Animals receiving 70% of dry matter (DM) from grazing might indicate:

( ) Low feed quality

( ) Too many herbaceous legumes

( ) Social constraints

( ) Low feed quality

( ) Lack of animal health services

5. What are some common sources of minerals for ruminants? (check all that apply)

( ) Naturally occurring rocks and soils

( ) Water

( ) Commercial supplements

( ) Green feeds

( ) Pasture

6. What is a good technique to resolve conflict between participants in a group discussion?

( ) Remain neutral and encourage participants to ask each other questions

( ) Have each participant make their case and let the facilitator decide

( ) Defer to the elder of the two participants

( ) Ask both participants to leave the meeting

( ) Have the group vote on whose opinion is correct

7. What is the best method for taking notes during a meeting?

( ) Summarize the most important points and decisions

( ) Write down everything word for word

( ) Write down every other word

( ) Memorize what is said and write it down later

8. Which of the following questions are open-ended? (check all that apply)

[ ] What is the average price of A.I. services?

[ ] How many members of your household migrate to the city?

[ ] Why do you think labour is so expensive?

[ ] How many hectares of land do you own or rent?

[ ] What do you think is the reason why so few farmers cultivate feed?

9. If you were to hold a meeting with 10 members of a community to discuss local agricultural issues, who should you invite to get a sense of the overall consensus within the community?

( ) Farmers of different ethnic groups, agriculture types, genders, etc.

( ) The male heads of each household

( ) Ten people chosen at random

( ) Government officials from each ministry or department

( ) Leaders of the largest ethnic or religious group

( ) The ten most successful farmers in the region;

What is a 'focus group'?

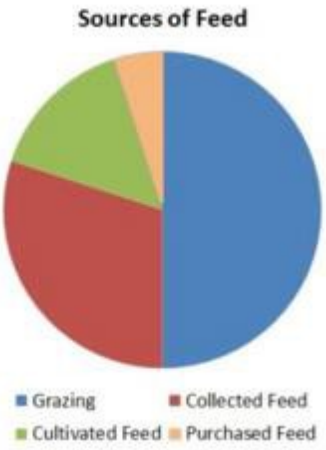
( ) The focus of a one-on-one interview

( ) A group of questions that survey respondents are asked to focus on

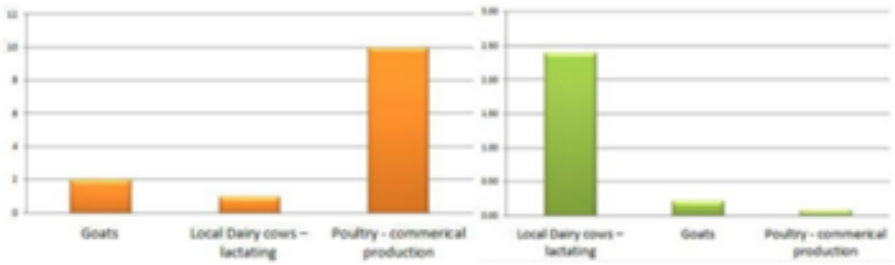
( ) A diverse group of people brought together to share opinions on a topic

( ) The five people in a survey sample with the answers closest to the average

11. Collected feed is how big a percentage of the animals' diet according to the graph below?



10. The charts below show data for the same farm. Select from phrases A–E to fill in the blanks in the sentence below the graphs explaining why the bars are such different sizes.



The chart on the left shows _____while the chart on the right shows _____

a. tropical livestock units

b. the mean

c. data for the dry season

d. animals by headcount

e. data for the rainy season

11. Which of the following items represent 'quantitative' data? (click all that apply)

[ ] Average milk yield

[ ] Difficulty of securing credit

[ ] Overall health of animal

[ ] Feasibility of an intervention strategy

[ ] Number of animals owned

[ ] Distance to market

12. What are some broad categories of interventions? (check all that apply)

[ ]

Increasing production of feed

[ ]

Making better use of available resources

[ ]

Sourcing feed from outside the farm

[ ]

Reducing number of animals

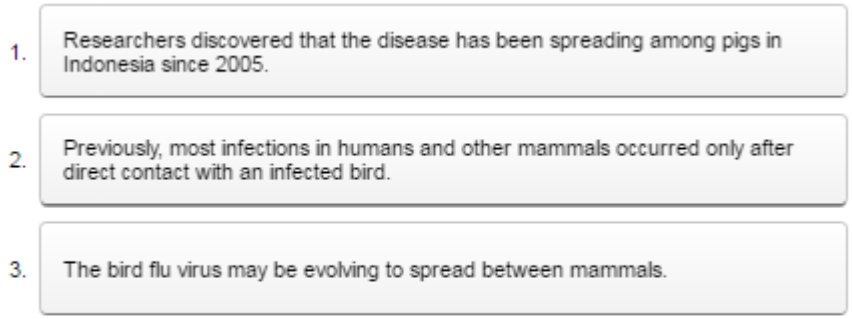
[ ]

Exporting fodder crops

[ ]

Confiscating feed from merchants

13. Which order should these sentences go in?



( ) 3,1,2

( ) 1,3,2

14. What is a livestock feed intervention?

( ) A project undertaken to improve livestock feed resources

( ) A shortage of livestock feed

( ) Substituting plant-based feed for animal material

( ) When customs officers inspect imported livestock feed

15. What should an action plan for a livestock feed intervention include?

( ) Target dates

( ) Constraints

( ) Success criteria

( ) Penalties for delays

( ) Biographies of team members

16. What is a livestock feed intervention?

( ) A project undertaken to improve livestock feed resources

( ) A shortage of livestock feed

( ) Substituting plant-based feed for animal material

( ) When customs officers inspect imported livestock feed

17. What should an action plan for a livestock feed intervention include?

( ) Target Dates

( ) Constraints

( ) Success Criteria

( ) Penalties for Delays

( ) Biographies of Team Members

Annex 4: Attitude and behavior survey

On a scale of 1 to 7 (1= strongly disagree, 7=strongly agree) rate the following aspects:

1. Farmers' primary objective in keeping livestock is to produce more milk and meat for the market

   Rating:

   Comment:

2. Keeping exotic breeds e.g. Friesian cows is generally advisable for small holder farmers

   Rating:

   Comment:

3. In general, farmers choose crops based on their yield of human food.

   Rating:

   Comment:

4. Researchers can design feed interventions with minimal input from farmers.

   Rating:

   Comment:

5. The reason why farmers do not adopt modern feeding practices is because they lack awareness of their benefits

   Rating:

   Comment:

6. Farmers often do not take advice about feeding practices from researchers/ extension workers because they are lazy

   Rating:

   Comment:

7. Good feed technologies work well anywhere

   Rating:

   Comments:

8. Feed interventions which work well for poor farmers are also likely to suit wealthy farmers

   Rating:

   Comments:

9. Farmers understand the costs and benefits of different strategies and this is a key factor in adoption.

   Rating:

   Comments

ISBN: 92-9146-586-x

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

The International Livestock Research Institute (ILRI) works to improve food and nutritional security and reduce poverty in developing countries through research for efficient, safe and sustainable use of livestock. Co-hosted by Kenya and Ethiopia, it has regional or country offices and projects in East, South and Southeast Asia as well as Central, East, Southern and West Africa. ilri.org

CGIAR

CGIAR is a global agricultural research partnership for a food-secure future. Its research is carried out by 15 research centres in collaboration with hundreds of partner organizations. cgiar.org