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KALRO Secretariat
P O Box 57811-00200, Nairobi, KENYA

Email: directorgeneral@kalro.org, Tel. No(s): +254-722206986/733333223


Editors: Ouda J.O., Mukundi K.T., Nyabundi K.W., Maina P. and Aila Y.K.

Editing and Publication coordination: Kirigua V and Lung’aho C.

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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 is development of sustainable seed production and distribution systems for priority value chains to enhance availability and access to improved seeds, animal breeds and fingerlings by target beneficiaries. This will be supported under Component 1 namely ‘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 19 value chains being addressed. The training content is drawn from the CSA TIMPS that support respective value chains.

The contents are arranged in progressive modules supported by extensive information from research and background data drawn from the TIMPS. Their relevance is 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 of replicating 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
The Kenya Climate-Smart Agriculture Project (KCSAP) is a Government of Kenya project with support from both the World Bank and the government. The project runs for five years and implemented in 24 counties, mainly in the arid and semi-arid lands (ASALs), at an approximate cost of KSh. 25 billion. 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 gas (GHG) emissions (mitigation). Component 2 is tasked 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 the prioritized value chains. The crop-based value chains are 19 and include roots and tubers (cassava, potato), pulses (dry beans, green gram, pigeon peas, and garden peas), vegetables (tomato, onion, indigenous vegetables, kale), cereals (sorghum, millet, teff, maize) nuts (cashew nut), fruits (banana, mango, water melon) and fibre (cotton). Those that are animal production based are five (5) and include apiculture, indigenous chicken (meat and eggs), dairy (cattle and camel), red meat (cattle, sheep and goats) and aquaculture. Also, there are three (3) cross cutting themes on pastures and fodder, natural resource management, and animal health. The TIMPs were categorized into those ready for up scaling and those requiring validation. Furthermore, gaps that required further research and development of TIMPS were identified. Training of Trainers’ (ToT) manuals focusing on TIMPs that are ready for up scaling for each of the value chains were subsequently developed to form the basis of training county extension staff, service providers and lead farmers. Those trained are in turn expected to cascade the 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 the 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 Teff 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
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<th>Description</th>
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<td>AEZs</td>
<td>Agro-ecological zones</td>
</tr>
<tr>
<td>AIP</td>
<td>Agricultural innovation Platform</td>
</tr>
<tr>
<td>APVC</td>
<td>Agriculture Product Value Chain</td>
</tr>
<tr>
<td>ASALs</td>
<td>Arid and Semi-Arid Lands</td>
</tr>
<tr>
<td>B</td>
<td>Boron</td>
</tr>
<tr>
<td>CA</td>
<td>Conservation Agriculture</td>
</tr>
<tr>
<td>CCPs</td>
<td>Critical control points</td>
</tr>
<tr>
<td>CIGs</td>
<td>Common Interest Group</td>
</tr>
<tr>
<td>CLs</td>
<td>Critical limits</td>
</tr>
<tr>
<td>CTT</td>
<td>Core Team of Trainers</td>
</tr>
<tr>
<td>ESMF</td>
<td>Environmental and Social Management Framework</td>
</tr>
<tr>
<td>FFBs</td>
<td>Farmer Field Business School</td>
</tr>
<tr>
<td>FSMS</td>
<td>Food Safety Management System</td>
</tr>
<tr>
<td>GAP</td>
<td>Good Agronomic Practices</td>
</tr>
<tr>
<td>Ha</td>
<td>Hectare</td>
</tr>
<tr>
<td>HACCP</td>
<td>Hazard Analysis Critical Control Points</td>
</tr>
<tr>
<td>IDM</td>
<td>Integrated Disease Management</td>
</tr>
<tr>
<td>INRM</td>
<td>Integrated Natural Resource Management</td>
</tr>
<tr>
<td>IPM</td>
<td>Integrated Pest Management</td>
</tr>
<tr>
<td>ISFM</td>
<td>Integrated Son Fertility management</td>
</tr>
<tr>
<td>IWM</td>
<td>Integrated Weed Management</td>
</tr>
<tr>
<td>K</td>
<td>Potassium</td>
</tr>
<tr>
<td>KALRO</td>
<td>Kenya Agricultural and Livestock Research Organization</td>
</tr>
<tr>
<td>KCSAP</td>
<td>Kenya Climate Smart Agriculture Project</td>
</tr>
<tr>
<td>Kg</td>
<td>Kilogram</td>
</tr>
<tr>
<td>LF</td>
<td>Lead Farmers</td>
</tr>
<tr>
<td>Mo</td>
<td>Molybdenum</td>
</tr>
<tr>
<td>N</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>P</td>
<td>Phosphorus</td>
</tr>
<tr>
<td>S</td>
<td>Sulphur</td>
</tr>
<tr>
<td>TIMPs</td>
<td>Technologies, Innovations and Management Practices</td>
</tr>
<tr>
<td>ToTs</td>
<td>Training of Trainers</td>
</tr>
<tr>
<td>VMGs</td>
<td>Vulnerable and Marginalized Groups</td>
</tr>
<tr>
<td>Zn</td>
<td>Zinc</td>
</tr>
</tbody>
</table>
INTRODUCTION

About this manual

This training of trainers’ manual consist of two parts; namely part 1 and part II. Part I comprises notes for the facilitators while part II is made up of training module in the value chain.

PART 1

This part consists of four sections including the Background of the Teff value chain, Content of the Training, Training Design and Facilitators Guidelines.
SECTION ONE

BACKGROUND

1.1 The Role of Teff in the Kenyan Economy

Teff was brought in from Ethiopia where it is grown as the main staple crop. It is therefore relatively new in Kenya. Its importance in terms of adaptability has made it a crop of choice not only in Kenya but big economies like America and other western nations. It is grown in Kenya for subsistence by communities living along the Ethiopian border. It is a climate smart resilient crop which can thrive under limited moisture and in a wide range of soil from sandy loam to heavy clay. It performs well in warm climate with as little as 300 -500 mm of rain. It requires 12 hours of sunlight and about 32°C for quick germination and growth. Some varieties mature in 45 - 60 days.

Despite its high nutritive value and enormous health benefits it has received limited attention from both County and National governments. Its main problem in Kenya is low yield with a maximum of 910 kg against potential average yield of between 2.2 to 2.8 tons/ ha. A yield of up to 6 tons/ha has been realized under intensive management under research conditions.

1.2 Role of Teff as Food and Nutrition Security

Teff is well known by Ethiopians and Eritreans for its superior nutritional quality. It contains 11% protein, 80% complex carbohydrate and 3% fat. It has eight essential amino acids, especially lysine, the amino acid that is most often deficient in grain foods. Teff contains more lysine than barley, millet, and wheat and slightly less than rice or oats. Teff is also an excellent source of fibre and iron, and has many times the amount of calcium, potassium and other essential minerals found in an equal amount of other grains. When teff is used to make Injera, a short fermentation process allows the yeast to generate more vitamins. Its gluten free quality has attracted many people who are health conscious globally especially the Americans. The byproduct of teff is a good source of palatable fodder for livestock for making home based dairy cattle and the oxen feed.

1.3 Teff value chain as climate innovation

Teff is a super crop and a long-term solution to the problem of food security and climate change phenomena. Owing to its ability to thrive under adverse weather conditions, with limited amount of water and marginal soil. Teff is normally planted two weeks later after all other crops have been planted and sprouted and sometimes later when other crops begun showing signs of failure as rescue crop. The chaff from Teff after grain is threshed out (chidi) is good source of livestock feeds, especially for home-based milking animals and ploughing oxens. Teff is indispensable, pastoralist friendly and highly regarded because of health benefits and high nutritive value.

1.4 Objectives of the Training

The purpose of the training is to provide farmer trainers with knowledge and skills on facilitating and supporting farmers, for increased productivity through adoption of GAP. Specifically, the objectives of this training are to provide farmer trainers with:
a) Relevant attitude, knowledge and skill in farming as a business and market assessment techniques for market led production including establishment and management of Teff fields.

b) Knowledge and skills on Teff post-harvest management and value addition.

c) Knowledge and skills in participatory techniques for effective facilitation of adult learning processes through FFBS’s and developing inclusive stakeholder partnership development for sustainable up scaling of Teff.

d) Knowledge on improved Teff varieties and GAP.

After the training, the Trainer of Trainers as facilitators will train lead farmers (LF) in various aspects of Teff value chain. The training will involve providing the LF with techniques in participatory preparation, mobilization, planning, implementation, monitoring and evaluation of training sessions. The lead farmers and county extension personnel will thereafter up scale the adoption of GAPs through farmer groups in their villages and those in the neighbourhood.
SECTION 2

TRAINING CONTENT

2.1 Orientation of the Module

This section of the training manual deals with the training content. It outlines the orientation and outline of the 14 modules, which are orientated to ensure adoption and upscaling of Teff TIMPs, to improve productivity, resilience and mitigation of harmful greenhouse gases. The purpose of these modules is to enhance the knowledge and capacities of trainers in understanding and disseminating the climate-smart Teff practices to the intended beneficiaries, who are primarily farmers.

2.2 Module Outline

Each of the 14 modules consisting of 8 parts. These parts are:

a) **Introduction** – context 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 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 14 modules is presented in Table 1.
<table>
<thead>
<tr>
<th>No.</th>
<th>Module Name</th>
<th>Need Addressed</th>
<th>Expected Training Outcomes</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Climate change and climate smart agriculture</td>
<td>• The impact of climate crisis to Teff production</td>
<td>• Master trainers made aware of the potential impact of climate change on Teff production</td>
<td>3 hours 30 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The climate smart technologies for Teff value chain</td>
<td>• Master trainers updated on climate smart techniques for Teff</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Farmer Field Business School (FFBS) approach</td>
<td>• Skills/technologies for production, processing and marketing</td>
<td>• Improved technologies/innovations and agronomic practices for Teff availed</td>
<td>6 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enhance food safety through lowering presence of hazardous solids/organisms/pollutants pathogens</td>
<td>• Techniques for determining pollutants in food material explored for adoption in Teff value chain</td>
<td>6 hours 30 minutes</td>
</tr>
<tr>
<td>3</td>
<td>Good Agricultural Practices (GAP) and Food Safety Management System (FSMS) - Hazard Analysis Critical Control Points (HACCP) Plan</td>
<td>• Identify areas are suitable for Teff production</td>
<td>• Master trainers learn of Teff niche in the respective counties</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Awareness on improved Teff varieties</td>
<td>• Master trainers made aware of the new improved varieties</td>
<td>3 hours 30 minutes</td>
</tr>
<tr>
<td>4</td>
<td>Teff production niche and climate requirements</td>
<td>• Both formal and informal seed systems operations.</td>
<td>• The formal and informal seed supply systems analyzed.</td>
<td>4 hours</td>
</tr>
<tr>
<td>5</td>
<td>Teff variety selection</td>
<td>• Options for innovating increased Teff production</td>
<td>• Both water and input manipulations analyzed along benefits</td>
<td>3 hours 30 minutes</td>
</tr>
<tr>
<td>6</td>
<td>Teff seed systems</td>
<td>• Soil water and fertility enhancing techniques availed.</td>
<td>• All techniques analyzed for possible benefits</td>
<td>5 hours</td>
</tr>
<tr>
<td>7</td>
<td>Teff climate smart agronomics practices</td>
<td>• All major pests (invertebrate and vertebrate) and diseases organisms control mechanisms availed to the master trainers.</td>
<td>• Reduction of yield loss of Teff by the major pests and diseases</td>
<td>6 hours</td>
</tr>
<tr>
<td>8</td>
<td>Integrated soil and water management practices for Teff production</td>
<td>• Storage technologies to reduce losses in quantity and quality</td>
<td>• Trainees sensitized on proper harvesting techniques and storage facilities, hygiene and monitoring</td>
<td>3 hours</td>
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<td>9</td>
<td>Teff Crop Health</td>
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<td>10</td>
<td>Teff harvesting and Post- harvest management</td>
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<td>11</td>
<td>Various Teff products, for human and animal feeds</td>
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<td>Value addition and Teff products identified for the farming communities and business entities</td>
<td>6 hours 30 minutes</td>
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<td>12</td>
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<td>Opportunities Identified and Prioritized</td>
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<td>Options of mechanization for increased yield availed to farmer groups.</td>
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<td></td>
<td>Review what business options are available in Teff</td>
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<td>Type of aggregations by farmers availed for considerations. Contract farming</td>
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<td>13</td>
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<td>4 hours</td>
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<tr>
<td>14</td>
<td>Teff Cross cutting issues</td>
<td></td>
<td>Opportunities for marginalized groups identified and gains made</td>
<td>11 hours 30 minutes</td>
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<tr>
<td>(i) Innovation Platforms</td>
<td>Articulate how Voluntary Marketing Groups can draw benefits from Teff value chain</td>
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<td>Farmers get access to more information on Teff production</td>
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<tr>
<td>(ii) Gender mainstreaming and social inclusion</td>
<td>Options of employment opportunities in Teff production</td>
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<td>(iii) Policy</td>
<td>Sites for information profiled at the county levels</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total Duration</td>
<td></td>
<td></td>
<td></td>
<td>70 hours 30 minutes</td>
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SECTION 3

TRAINING DESIGN

3.1 Delivery System

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

a) **Establishment of a team of facilitators**
   - A Core Team of Trainers (CTT) to trains farmer trainers (service providers) as facilitators of a ToT course will be established. This is done using this manual and modules contained therein.
   - Each of the Mater trainers will facilitate trainers of farmers and other stakeholders to acquire knowledge and skills in facilitating Farmer-led Field and Business Schools through practical demonstrations.

b) **Up scaling** – This will be done by selecting lead farmers (LF) 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, Universities, and Tertiary Institutions offering crop sciences and State Department of Agriculture, MoALF will facilitate initial training of trainers of farmers and other stakeholders. They will also provide mentorship to farmers’ trainers during the first year of LF trainings. They should also be available in the evaluation of the first round of LF trainings.

b) **County Government Department for Crops and Livestock** - County Coordination Teams (CCT) including technical departments and service providers will play specific roles of LF trainers, mentors and coordinators at sub-county level. They will assist FFBS’s to form partnership with stakeholders for sustainability. They will also support LF’s to form their training and Teff TIMPs up scaling networks.

c) **Lead Farmer Networks**-association of LFs in the counties to take up farmer trainings and up scaling in the future. Lead farmer networks and groups will conduct exchange visits to learn best practices in other project implementing counties.

d) **Private Sector Service Providers** – Inputs suppliers, financial and business development service providers, market players and processors will partner and support growth of individual or Teff farmer groups.

3.3 Training Duration

The proposed TOT course for Master trainers for 14 modules in the Teff value chain shall take a total of 69 hours 30 minutes of training period. This does not include break hours of mid-morning, afternoon 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 proposed methods and sessions guidelines shall: (i) Introduce the module; (ii) Draw out the participant’s
expectations; (iii) Relate participants’ expectations with module objectives or learning outcomes; (iv) Explore the concept and content, switching to different methods of delivery of the content (group exercise, brainstorming, excursions, plenary discussions, role plays) as the session progresses; (v) Review the module at the end using participatory approaches like on participant reads one summary message and its application; and, (vi) Distribute the participants’ handouts.
SECTION 4

FACILITATOR GUIDELINES

4.1 Preparation of Training Materials

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

1. The facilitators should familiarize themselves and internalize the guidelines provided by this manual prior to the training.
2. 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.
3. Flip charts and good quality felt pens could be used interchangeably with LCD projections. Each participant will require one felt pen while the trainers will require two sets of felt pens.
4. Visual aids like field equipment and tools should also be arranged in time before the sessions start.
5. There should be adequate copies of participants’ handouts (one per participant) to be distributed at the end of each session or as may be suitable.
6. Copies of the modules are distributed at the end of each module.

4.2 Preparation of Training Venue and Sites

The training venue will include the training room, field demonstration sites and market areas.

a) Training Room – Should have adequate space for 25 participants seated in a semi-circle or U shape arrangement ensuring access and unobstructed view of the front. There should be adequate space for a desk and seats for 3 trainers preferably at the sides or at the back of the training room. There should also be a desk for the trainer, their training materials and LCD projector, a flip charts holder and white wall to act as a projector screen.

b) Demonstration Site – Should be within a walking distance with at least five distinct plots for demonstrations.

c) Market Sites – these include cereal retail outlets (kiosks, stalls, shops and supermarkets), 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 away preferably less than 10 minutes’ drive distance

4.3 The Trainees

The trainees who will participate are extension officers, lead farmers, educators, service providers and researchers with elaborate training back ground in extension and advisory services. They will be drawn from public and private sector based on considerable experience in training farmers but with minimal facilitative advisory or technology transfer approaches. 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 proposed consists of the actual training modules and the corresponding days and time allocation (Annex 1).

4.4 Training Methods

The training methods proposed 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 30 minutes continuously; but should be separated by the other participatory training methods. Table 2 presents a list of available training methods.

Table 2: Description of Training methods

<table>
<thead>
<tr>
<th>Training Method</th>
<th>Description of Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenary presentations</td>
<td>Use of PowerPoint or flip charts and plenary discussions in situations where knowledge and opinion or consensus is required</td>
</tr>
<tr>
<td>Group exercises, buzz groups, visits and brainstorming sessions</td>
<td>To be considered where skills are an issue requiring sharing and trying</td>
</tr>
<tr>
<td>Role plays and problem-solving exercises</td>
<td>Plenary discussions have been considered as training methods where attitude is an issue</td>
</tr>
<tr>
<td>On-farm practical demonstration and exchange visits</td>
<td>To be considered where hands-on practical skills are acquired through sharing and demonstration</td>
</tr>
</tbody>
</table>

4.5 Planning Schedule and Guideline for ToT Preparation

While planning for this training, the CTT leader should ensure the following before the training:

1. **Six weeks** – recruit master trainers, compose CTT, have at least 5 Teff demonstration plots planted with Teff

2. **Four weeks** – send out invitation letters to participants and special guests detailing purpose, venue and program. Follow up on demonstration sites. Brief CTT members

3. **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

4. **Four days** – Confirm training sites preparedness, prepare sitting arrangements, and brief assistants

5. **One day** - arrange training room furniture, place materials, equipment and stationery on the tables. Arrange for reception of trainees at residence proposed

6. **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
Welcoming to venue by host
Elaborate introduction of CTT and participants
Introduction to the project and training course
Ground rules
Groups formation

4.6 Evaluation of the Training

Half day has been allocated for planning for way forward and evaluation of the TOT on the last day of the training. This is as presented in the program just presented in section 4.4. The evaluation strategy should take two directions the first being the individual trainees evaluate through evaluation forms without conferring or refereeing to each other. The evaluation forms are then collected and analyzed by the CTT members.

Table 3: Sample Evaluation Form

<table>
<thead>
<tr>
<th>Aspect / Module</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Useful</td>
</tr>
<tr>
<td></td>
<td>(3 marks)</td>
</tr>
<tr>
<td></td>
<td>Useful</td>
</tr>
<tr>
<td></td>
<td>(2 marks)</td>
</tr>
<tr>
<td></td>
<td>Of Limited Use</td>
</tr>
<tr>
<td></td>
<td>(1 marks)</td>
</tr>
<tr>
<td>1. Climate change and Climate smart Agriculture</td>
<td></td>
</tr>
<tr>
<td>2. Farmer Field and Business School Approach in Teff Production</td>
<td></td>
</tr>
<tr>
<td>3. Good Agricultural Practices (GAPs) and Food Safety Management Systems (FSMS)</td>
<td></td>
</tr>
<tr>
<td>4. Teff production Niches and Climatic Requirements</td>
<td></td>
</tr>
<tr>
<td>5. Teff variety selection and access to quality seeds.</td>
<td></td>
</tr>
<tr>
<td>6. Teff Seed Systems</td>
<td></td>
</tr>
<tr>
<td>7. Climate Smart Agronomic Practices</td>
<td></td>
</tr>
<tr>
<td>8. Integrated Soil and Water Management Practices for Teff</td>
<td></td>
</tr>
<tr>
<td>9. Teff Crop Health</td>
<td></td>
</tr>
<tr>
<td>10. Teff Harvesting and Post-harvest Management</td>
<td></td>
</tr>
<tr>
<td>11. Teff Value Addition</td>
<td></td>
</tr>
<tr>
<td>12. Mechanization of Teff production Activities</td>
<td></td>
</tr>
<tr>
<td>13. Teff Business and Marketing</td>
<td></td>
</tr>
</tbody>
</table>
The second direction for evaluation is trainee’s group evaluation. They retreat to one room and elect a chair and a secretary. Ask them to objectively and constructively evaluate the training in about 45 minutes in the absence of the CTT members. They then present their evaluation to the CTT members and as they present, the CTT members should only give points of clarifications if any misunderstanding occurred but not try to be defensive. The CTT members then use the two evaluation results to write a report highlighting aspects that went on well and can be replicated, challenges that were encountered, and opportunities for future ToT’s improvement.

4.7 Facilitator’s Training Notes and Reference Materials

4.8 Key references

Two key references should be provided for each module plus a list of other relevant publications for reference.

4.8.1 Guide on the use of the information

The trainers will be advised to issue farmers with at most two publications for each of the training sessions. This is because if they go away with 10 publications in one visit, they may be overwhelmed with the material load and thus limit knowledge uptake. Also, some will just take away as many as they can if allowed.
PART II

TRAINING MODULES

This part presents the content of 14 modules of training namely: Climate change and climate smart agriculture, Farmer Field Business school (FFBS) approach, Teff production niche and climate requirements, Good Agricultural Practices (GAP) and Food Safety Management System (FSMS), Teff variety selection, Teff seed systems, Teff climate smart agronomics practices, Integrated soil and water management practices for Teff, Teff Crop Health, Teff harvesting and Post-harvest management, Teff value addition, Mechanization of Teff production activities, Teff business and Marketing, and Teff Cross cutting issues (Innovation Platforms, Policy, gender mainstreaming and social inclusion).

All the modules will be divided into the following:

1. Introduction
2. Module learning outcomes
3. Module target group
4. Module users
5. Module duration
6. Module summary
7. Facilitator’s guidelines
8. Participants’ handouts
MODULE 1
CLIMATE CHANGE AND CLIMATE SMART AGRICULTURE

1.1 Introduction

The impacts of climate change (CC) and variability in agriculture, food systems and food security is a serious concern. Kenya’s agricultural production systems is highly impacted upon, due to the low adaptive capacity and the high exposure to climate related risks. The major agricultural activities are prone to risks and uncertainties of nature, which is affected by climate change, either in intensity, scope or frequency. Climate change is expected to modify risks, vulnerabilities and the conditions that shape the resilience of agriculture systems as well as introducing new uncertainties. Adoption of climate smart agriculture (CSA) through application of tools and technologies and effective communications of weather information, reduces the negative impacts of climate change and enhances access to food security in a changing environment. Thus, there is need to mainstream suitable climate resilient technologies, innovations and management practices (TIMPs) to increase productivity, resilience to climatic shocks and mitigate the causes of climate change.

1.2. Module Learning Outcomes

By the end of the module, the following outcomes should be achieved.

- Concept of the climatic change and availability discussed and explained.
- Impacts of the climate change and variability on agricultural and food security shared.
- Concept of climate smart agriculture (CSA) shared and explained.
- Future climate scenarios and how to manage projected and appreciated.

1.3 Module Target Group

This module targets public and public agricultural extension agents, service providers and lead farmers based at sub-county and ward level.

1.4 Module Users

This module is intended for use by Master trainers who are members of the core team of trainers (CTT) and lead Farmers in the target counties. The trainers using this module should thoroughly familiarize themselves with the participants’ handouts (training materials).

1.5 Module Duration

The module is estimated to take 3 hours and 30 minutes
1.6. Module Summary

<table>
<thead>
<tr>
<th>Module 1: Climate Change and Climate Smart Agriculture in Teff Value Chain</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.6.1 Introduction and Levelling Expectations</strong></td>
<td>• Personal Introduction • Power Point Presentation • Plenary discussion</td>
<td>• Projector • Laptop • Flip charts</td>
<td>30 minutes</td>
</tr>
<tr>
<td><strong>1.6.2 Introduction to climate change and variability</strong></td>
<td>• Power Point Presentation • Case study videos • Plenary discussion</td>
<td>• Projector • Laptop • Videos • Flip charts • Participants’ handouts</td>
<td>1 hour</td>
</tr>
<tr>
<td><strong>1.6.3 Concept of Climate smart agriculture (CSA) in Teff</strong></td>
<td>• Power Point Presentation • Plenary discussion</td>
<td>• Projector • Laptop • Videos • Flip charts • Participants’ handouts</td>
<td>1 hour</td>
</tr>
<tr>
<td><strong>1.6.4 Projected future climate scenarios affecting Teff and how to manage</strong></td>
<td>• Power Point Presentation • Case study videos • Plenary discussion</td>
<td>• Projector • Laptop • Flip charts • Participants handouts</td>
<td>40 minutes</td>
</tr>
<tr>
<td><strong>1.6.5 Module review</strong></td>
<td>• Participants’ questions and comments • Facilitator’ summary</td>
<td>• Module review</td>
<td>20 minutes</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>3 hours 30 minutes</td>
</tr>
</tbody>
</table>

1.7 Facilitator’s Guidelines

### 1.7.1. Introduction and Levelling Expectations (30 minutes)

*The trainer introduces the trainees to this module on climate change and climate smart agriculture.*

**Trainees’ expectation (20 minutes)**

*The facilitator organizes the trainees into groups to state and list their expectations.*

**Module Objectives (10 minutes)**

*The trainer presents module’s objectives on power point.*

By the end of the module training, the trainee should be able to:
- Explain climate change and adaptations.
- Describe Climate Smart Agriculture (CSA).
- Describe and explain available climate smart crop management practices in Teff production.
- Explain the benefits of selected climate smart crop management practices in Teff production.

| Session Guide | Power Point presentation
| Distribute Participants’ handouts |
1.7.2 Introduction to Climate Change and Climate Variability (1 hour)

(The trainer proceeds to introduce the module basics).

**Plenary presentation (40 minutes)**
- Basic terminologies used in the module (weather, climate, variability, adaptation, coping).
- Explain climate change and climate variability.
- The causes of climate change.
- Climate risks impacting agriculture.
- Proposed adaptation and mitigation measures

**Case study videos and discussion (20 minutes)**
- The impact of climate change

1.7.3 Concept of Climate Smart Agriculture (CSA) (1 hour)

(The trainer presents to the trainees the principles underpinning CSA and the link to deliverable of project objectives).

**Plenary Presentation (45 minutes)**
- Definition of the CSA approach and their characteristics
- The three pillars of CSA (productivity, Adaptation and Mitigation
- Why CSA is needed

**Plenary discussion (15 minutes)**
Discussions on the CSA concept

1.7.4 Projected Future Scenarios that will Impact Productivity (40 minutes)

(The trainer leads the trainees in discussing future climatic projections focusing on rainfall and temperature, which directly impacts on crop yields) are the long-term rainfall and temperature projections as impacted by climate change?

**Power Point presentation (20 minutes)**
- Projected impacts on food production and needed adaptation measures especially for Teff.

**Video presentation and discussion (20 minutes)**
- Short Video on showing projections of rainfall and temperature.

1.7.5 Module Review (20 minutes)

(The trainer leads the trainees in summarizing the key points discussed in the module)
1.8 Participants handouts

- Climate Change and CSA Factsheets
- Climate Change and CSA Leaflets

Reference

2.1. Introduction

This module is designed for training and exposing trainees to the Farmer Field and Business Schools (FFBS) approach and concepts. In addition, practitioners of FFBS need to have knowledge of this methodology in order to transfer various Technologies, Innovations and Management Practices (TIMPs) in Teff production to farmers. The trainees will thereafter facilitate farmers in the Common Interest Groups (CIGs) to learn by doing the available Technologies, Innovations and Management Practices (TIMPs) from a common plot of FFBS and then implement what they have learnt to their individual farms in order to meet the KCSAP project objective of increased productivity and building resilience to climate change. FFBS also empowers the learners with various skills in leadership, communication and agri-business. Since the methodology is participatory, it improves the learners’ observation skills and creates linkages with other value-chain players, thereby making Teff production profitable and sustainable.

2.2. Module Learning Outcomes

By the end of the module, the following outcomes should be achieved:
- Concept of Farmer Field and Business School approach, teaching and facilitating described and explained.
- Approaches to effective facilitation and participatory learning for FFBS demonstrated and explained.
- Knowledge and analytical skills to design simple experiments for testing options identified and demonstrated.
- Shift from the traditional focus to improving productivity to farming business proposition explained and facilitated.

2.3. Module Target Group

This module targets public and public agricultural extension agents, service providers and lead farmers based at sub-county and ward level.

2.4. Module Users

This module is intended for use by Master Trainers who are members of the Core Team of Trainers (CTT) and Lead Farmers in the Teff value chain target Counties. The facilitators using this module should thoroughly familiarize themselves with the participants’ Handouts (training materials).

2.5. Module Duration

The Module is expected to last for a time duration of 6 hours.
# Module 2: Farmer Field and Business School Approach

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.6.1 Introduction,</td>
<td>Setting norms and group discussion on expectations</td>
<td>Laptop</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Climate setting, leveling of expectations and</td>
<td>Plenary presentation</td>
<td>Projector</td>
<td></td>
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<tr>
<td>objectives.</td>
<td></td>
<td>Flip charts</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Mark pens</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Setting norms and group discussion on expectations</td>
<td>• Pictorials</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Plenary presentation</td>
<td>• Laptop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plenary discussions</td>
<td>• projector</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flip charts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mark pens</td>
<td></td>
</tr>
<tr>
<td>2.6.2 Overview of FFBS key activities</td>
<td>Plenary presentation</td>
<td>Plenary discussions</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>• Plenary discussions</td>
<td>• Presentation</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td>• Group exercise</td>
<td></td>
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<td></td>
<td></td>
<td>• Projector</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Laptop</td>
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<td></td>
<td></td>
<td>• Flip charts</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>• Felt pens</td>
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</tr>
<tr>
<td>2.6.3 Introduction to Communication and</td>
<td>Plenary presentation</td>
<td>Projector</td>
<td>1 hour</td>
</tr>
<tr>
<td>communication skills</td>
<td>• Plenary discussions</td>
<td>• Laptop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Group exercise</td>
<td>• Flip charts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Felt pens</td>
<td></td>
</tr>
<tr>
<td>2.6.4 Facilitation and leadership skills</td>
<td>Presentation</td>
<td>Plenary discussion</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Plenary discussion</td>
<td>• Projector and Power point</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Laptop</td>
<td></td>
</tr>
<tr>
<td>2.6.5 Organization and Management in FFBS</td>
<td>Plenary presentation</td>
<td>Plenary discussion</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Plenary discussion</td>
<td>• Projector and Power point</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Laptop</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flip charts and felt pens</td>
<td></td>
</tr>
<tr>
<td>2.6.6 Developing FFBS Curriculum for the</td>
<td>Plenary presentation</td>
<td>Plenary discussion</td>
<td>1 hour</td>
</tr>
<tr>
<td>teff value chain</td>
<td>• Plenary discussion</td>
<td>• Presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Group discussion</td>
<td>• Group exercise</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Power point, Projector, Flip</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>charts and felt pens</td>
<td></td>
</tr>
<tr>
<td>2.6.7 Module review</td>
<td>Presentation</td>
<td>Plenary discussion</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>• Plenary discussion</td>
<td>• Flip charts, Power point</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>presentations and projectors</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL**                                      |                                                                                 |                                | **6 hours** |
### 2.7 Facilitator’s guidelines

#### 2.7.1 Introduction, climate setting Leveling Expectations and Objectives (30 minutes)

*The trainer welcomes trainees to the module and thereafter invites them to state their expectations.*

**Trainee introduction and climate setting (20 minutes)**

Introduction of participants, setting training norms, formation of FFBS sub groups (Working groups) and trainees to share their expectations

**Module Objectives (10 minutes)**

*The facilitator presents modules objective in PowerPoint*

By the end of the module, the trainee should be able to:
- Describe and explain concept of Farmer Field and Business School approach, teaching and facilitation.
- Demonstrate and explain approaches to effective facilitation and participatory learning for FFBS.
- Identify and demonstrate knowledge and analytical skills to design simple experiments for testing options.
- Explain and facilitate shift from the traditional focus to improving productivity to farming business proposition.

#### 2.7.2 Overview of FFBS key activities (1 hour)

**Plenary presentation (45 minutes)**

The facilitator takes the trainees through the main concepts and pillars of FFBS which includes:
- The definition of FFBS
- Participatory Technology Development (PTD) for the Teff value chain TIMPS
- Agro ecosystems Analysis (AESA) of the Teff value chain
- Concept of what is this what is that
- FFBS principle of Integrated production and pest management (IPPM)
- FFBS Business concept and opportunities in the Teff value chain stages

**Plenary discussion (15 minutes)**

- Pillars of FFBS

#### 2.7.3 Introduction to Communication and Communication skills (1 hour)

**Session guide**

- Power Point presentation
- Plenary discussion
| Group exercise to gage the understanding of trainees **(45 minutes)** | Group exercise  
Communication channels,  
Barriers to effective communication and  
How to effectively communicate |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plenary presentation (15 minutes)</strong></td>
<td></td>
</tr>
</tbody>
</table>
Communication and communication skills |
| **1.1.4. Facilitation and leadership skills (1 hour)** | **Session guide**  
Definition of Facilitation, facilitator and effective facilitation.  
Qualities of a good facilitator.  
Golden rules of facilitation.  
Roles and responsibilities of FFBS Facilitators.  
Difference between facilitation and teaching  
Definition of leadership  
Elements of leadership  
Types of leadership  
Characteristics of a good leader |
| **Plenary presentation (45 hours)** |  
Power Point presentation  
Participants’ handouts  
Plenary discussion |
| **Plenary discussion (15 minutes)** |  
Discussion on facilitation |
| **2.7.5 Organization and management in FFBS (1 hour)** | **Session guide**  
Plenary presentation  
Steps of FFBS implementation framework:  
Ground working.  
Training of Facilitators.  
Establishing PTDs at the FFBS.  
Season long FFBS sessions.  
Evaluation of PTDs.  
Field days.  
Graduation.  
Establishment of Lead FFBS.  
Follow ups.  
Plenary discussion  
FFBS implementation Framework |
| **2.7.6 Developing FFBS Curriculum for the Teff value chain (1 hour)** | **Session guide**  
Plenary presentation  
Participants’ handouts  
Plenary discussion |
<table>
<thead>
<tr>
<th><strong>Plenary presentation (30 minutes)</strong></th>
<th><strong>Group exercises on</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Steps of Participatory technology development on the Teff value chain production</td>
<td>- pair wise matrix ranking of constraints and TIMPs in Teff value chain</td>
</tr>
<tr>
<td>• Identify the major constraints to increased yields of Teff value chain production</td>
<td></td>
</tr>
<tr>
<td>• Ranking of constraints in order from highest.</td>
<td></td>
</tr>
<tr>
<td>• Identify list of TIMPS to address the constraints</td>
<td></td>
</tr>
<tr>
<td>• Rank the TIMPS in order from the most preferred</td>
<td></td>
</tr>
<tr>
<td>• Develop PTD on the most preferred TIMP objective</td>
<td></td>
</tr>
<tr>
<td>• Decide on the parameters for AESA</td>
<td></td>
</tr>
<tr>
<td>• Develop FFBS curriculum using crop growth stage calendar for the Teff value chain</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Group exercises (30 minutes)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Constraint identification and ranking</td>
</tr>
<tr>
<td>• TIMPs options identification and ranking</td>
</tr>
<tr>
<td>• Identification of the growth stages of the value chain crop and development of FFBS training curriculum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>2.7.7 Module review (30 minutes)</strong></th>
<th><strong>Session guide</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Participants Questions and answers</td>
<td>• Power Point presentation</td>
</tr>
<tr>
<td>• Facilitators Summary</td>
<td>• Plenary discussion</td>
</tr>
<tr>
<td>• Guideline on FFBS teff action plans</td>
<td>• Module summary</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>2.8 Participants’ Handouts</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• FFBS Factsheets</td>
</tr>
<tr>
<td>• FFBS Guides</td>
</tr>
</tbody>
</table>

**References**

MODUOLE 3
GOOD AGRICULTURAL PRACTICES (GAPs) AND FOOD SAFETY MANAGEMENT SYSTEMS (FSMS)

3.1. Introduction

This module is designed for training and exposing trainees to good agricultural practices and food safety management system along the Teff value chain.

Good Agricultural Practices (GAPs) manage risk through risk prevention, risk analysis and sustainable agriculture by means of Integrated Pest and Disease Management (IPDM) and Integrated Crop Management (ICM). Declining food safety, reduced food quality, unsustainable farming practices and negative environmental impact from agricultural activities plague the food sector. Worker safety and health along with traceability requirements are a major concern to modern consumers. Good Agricultural Practices are vital in protecting consumer health by ensuring safety within the food chain. It is imperative to operate from the table upstream to include suppliers of agricultural inputs, providers of logistics and farm equipment. Good Agricultural Practices therefore constitute a certification system for agriculture, specifying procedures that must be implemented to produce and supply food that is safe for consumers and wholesome, using sustainable methods.

Food safety assures food quality based on the absence or occurrence of hazards that are risky to human and animal health, within acceptable limits. Hazards are common along food value chains that lack effective control measures and may be due to ‘bad’ agronomic practices or are introduced along the supply chain from the farm to fork continuum. Today, there is an increasing public concern on the negative environmental and health impacts of agro-chemicals as well as microbial pathogens and their toxins. Control of the hazards occurrence is done through the implementation of an effective Food Safety Management Systems (FSMS) through Hazard Analysis Critical Control Points (HACCP) management system. It involves a seven step management system that provides the framework for monitoring the entire food chain. This makes it more of a preventive, rather than a reactive tool designed to identify and control potential problems before they occur.

3.2. Module Learning Outcomes

By the end of the module, the following outcomes should be achieved:

1. GAP’s on food safety and enhanced quality along the crop value chains discussed and appreciated.
2. Knowledge on optimization and utilization of resources (water, soil, manure, fertilizers and other inputs), environmental protection and conservation acquired and described.
3. Worker safety and health within the crop production system explained.
4. Traceability in food safety and quality along the crop value chain mapped and implemented.

3.3. Module Target Group

This module targets public and public agricultural extension agents, service providers and lead farmers based at sub-county and ward level.
3.4. Module Users

This module is intended for use by Master Trainers who are members of the Core Team of Trainers (CTT) and Lead Farmers in the crops value chain target Counties. The facilitator using this module should thoroughly familiarize themselves with the participants’ handouts (training materials).

3.5. Module Duration

The Module is estimated to take 6 hours and 30 minutes

3.6 Module Summary

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
</table>
| 3.6.1 Introduction, objectives and levelling of expectations           | • Groups to bring out expectations  
• Plenary presentation                                                      | • Module objectives  
• Marker pens  
• Flip charts  
• Projector  
• Laptop                                                      | 30 minutes |
| 3.6.2 Understanding what is GAP and its application in the Teff value chain | • Plenary presentations  
• Plenary discussion                                                      | • Flip charts  
• Marker pens  
• Projector  
• Laptop  
• Pictorials/video clips                                              | 30 minutes |
| 3.6.3 Discussion of what factors to consider when selecting a site for agricultural activities through Risk Assessment | • Plenary presentation  
• Plenary discussion                                                      | • Flip charts  
• Marker pens  
• Projector  
• Laptop  
• Pictorials/video clips  
• Data sheets                                                   | 30 minutes |
| 3.6.4 Review of GAP requirements for audit and types of protocols possible | • Plenary presentations  
• Plenary discussion                                                      | • Data forms  
• Flip charts  
• Marker pens  
• Projector  
• Laptop  
• Pictorials/video clips  
• Data sheets                                                   | 30 minutes |
| 3.6.5 Introduction to Site Selection                                   | • Plenary Presentation  
• Plenary discussion                                                      | • Projector  
• Laptop                                                      | 30 minutes |
| 3.6.6 GAP checklists and Audit                                        | • Plenary Presentation  
• Group exercise                                                        | • Flip charts  
• Marker pens  
• Projector  
• Laptop                                                      | 30 minutes |
| 3.6.7 Safe use of Pesticides and calibration of sprayers and nozzles | • Group work on nozzles  
• Rate of discharge  
• Safety guidelines | • Pictorials/video clips  
• Knapsacks  
• Measuring cylinders  
• Tape measure  
• Nozzles  
• Empty clean pesticide containers | 1 hour |
|---|---|---|---|
| 3.6.8 Understanding of food safety management system in crop value chains | • Plenary presentation  
• Plenary discussion | • Flip charts  
• Marker pens  
• Projector  
• Laptop,  
• Pictorials/video clips | 30 minutes |
| 3.6.9 Determination of food safety risk/hazards in crop value chains (hazard analysis) | • Plenary presentation  
• Group exercise | • Projector  
• Laptop  
• Flip charts  
• Marker pens  
• Participants’ handouts | 30 minutes |
| 3.6.10 Determination of critical control points (CCPs) and Critical limits (CLs) in Teff value chain | • Plenary Presentation  
• Group Exercise | • Projector  
• Laptop  
• Flip charts  
• Marker pens | 30 minutes |
| 3.6.11 Prevention and corrective measures for CCPs in Teff value chain | • Plenary Presentation  
• Group exercise | • Flip charts  
• Marker pens  
• Power point projector  
• Laptop  
• Pictorials/video clips | 30 minutes |
| 3.6.12 Module review | • Participants’ questions and comments  
• Facilitator’s summary | • Participants’ handouts  
• Module review | 30 minutes |
| TOTAL | | | 6 hours 30 minutes |
### 3.7 Facilitator’s Guidelines

#### 3.7.1 Introduction and Levelling Expectations (30 Minutes)

*The facilitator welcomes trainees to the sub-module on GAPs and introduces him/herself stating profile and experience of working with farmers.*

**Trainees’ introductions and expectations (20 minutes)**
The facilitator invites the trainees to state their expectations after brainstorming in their respective county groups.

**Module Objectives (10 minutes)**
*The facilitator presents module’s objectives in power point.*

By the end of the module, the trainee should be able to:

- Appreciate GAP’s on matters of food safety and quality along the crop value chain.
- Describe optimization and utilization of resources (water, soil, manure, fertilizers, and other inputs), environmental protection and conservation.
- Explain worker safety and health within the crop production system.
- Map and implement traceability in food safety and quality along the crop value chain.

#### 3.7.2 Understanding what is GAP and its application in the Teff value chain (30 minutes)

*Facilitator leads discussions on understanding of GAPs and its relevance to actors in the Teff value chain*

**Plenary Presentation (10 minutes)**

- Understanding GAP in the context of crop production
- Explain the role of GAPs in safe and sustainable food production system for growers and consumers.
- Understanding GAPs as the key to high commodity market destinations

**Plenary discussion**
GAP application in the Teff value chain

#### 3.7.3 Discussion of what factors to consider when selecting a site for agricultural activities through Risk Assessment (30 minutes)

*Session Guide*

- Summarize trainees’ Expectations on a flip chart
- Power Point presentation

- Power Point presentation
- Participants handouts
- Plenary discussion
Facilitator guides discussions on the key determinants of site suitability for agricultural activities.

### Plenary presentation and discussion (30 minutes)

- Factors to be considered in an agricultural site selection
- (Site history, slope of land, type of soil versus crop, water sources and physical quality, soil and water analysis)
- The need for documentation in a farm assurance system
- Types of mandatory farm records
- General guidelines to conservation agriculture (CA)

### 3.7.4 Review of GAP requirements for audit and types of protocols possible (30 minutes)

*The facilitator leads the trainees in summarizing the key points discussed in the module*

#### Plenary presentation and discussion (30 minutes)

- Methods and procedures required at on-farm level to obtain GAP certification in crops production.
- Good soil management practices (appropriate crop rotations, manure application)
- Careful management of water resources and efficient use of water for rain-fed crop production via irrigation.
- Selection of crop types and varieties to meet local consumer needs.
- Adoption of IPM practices to minimize the potential impact of pest control actions on workers, food, and environmental and health safety.
- Minimizing contamination at harvest, on-farm processing and storage.

### 3.7.5 Introduction to Site Selection (30 minutes)

*The facilitator introduces the various factors involved in site selection through Pictorials/video clips PPT's and farm walk*

#### Plenary Presentation and discussions (30 minutes)

- Factors to be considered in an agricultural site selection
  - (Site history, slope of land, type of soil versus crop, water sources and physical quality, soil and water analysis)
- The need for documentation in a farm assurance system
- Types of mandatory farm records
- General guidelines to conservation agriculture (CA)

### 3.7.6 GAP checklists and Audit (30 minutes)

*Session Guide*

- Power point presentation
- Participants’ handouts
- Plenary session
Facilitator guides the trainees on self-assessment (Internal audit and corrective measures for non-compliance)

### Plenary presentation (15 minutes)
- Need for mandatory records in GAPs
- Internal Audit procedures
- Practical on Mock Audits
- Interpretation of audit reports
- Compliance and corrective actions

### Group exercise (15 minutes)
- Groups audit a farm or a process within the training site
- Present audit results and verdict and corrective actions

#### 3.7.7 Safe use of Pesticides and calibration of sprayers and nozzles (1 hour 30 minutes)
**Session Guide**
- Power point presentation
- Global GAP checklists
- Participants’ handouts
- Group exercise

**The facilitator organizes the groups to identify level of knowledge on pesticide use and safety: Determination of less hazardous pesticides, fungicides and herbicides, quantities to apply and respective PHIs**

**Group exercise (30 minutes)**
- Practical session on how to handle different types of pesticides, fungicides and herbicides together with their calibrations

**Plenary presentation (30 minutes)**
- Guided knapsack calibration
- Different types of nozzles and their uses
- Pesticide safety

#### 3.7.8 Understanding Food Safety (30 minutes)
**Session Guide**
- Power point presentation
- Participants’ handouts
- Plenary discussion

**The facilitator should be able to introduce food safety system by defining it and sharing its benefits with the trainees. Power points**

**Plenary presentation and discussion**
- Overview of Food Safety Management Systems (FSMS).
- Why food safety is important in crops production systems.
- Risks to human/animal health due to chemical, biological and physical hazards exposure.
- Legal and market requirements for food safety practice.
- Food safety practices that reduce risks/hazards.
- Use of HACCP tool/system for monitoring crop production

#### 3.7.9 Determination of food safety risks/hazards (30 minutes)
Facilitator should guide discussions on the steps of identification of food safety hazards FSMS

### Plenary Presentation (15 minutes)
- Explain the concept of risk identification (Hazard analysis) in crop production chain.
- Listing the types of hazards that cause illness or death.
- Determine and identify factors influencing likely occurrence/severity of hazards.
- List hazards alongside the possible control measures.
- Explain the concept in a flow diagram.

### Group Exercise (15 minutes)
- Groups to identify major risk/hazards at points of crop production.
- Produce flow diagrams for the crop.

<table>
<thead>
<tr>
<th>3.7.10 Determination of critical control points (CCP) in crop value chains (30 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The facilitator introduces the topic on determination of critical control points (CCP)</strong></td>
</tr>
<tr>
<td><strong>Plenary presentation (15 minutes)</strong></td>
</tr>
<tr>
<td>- Why is important to determine CCP in production chain (preventing, eliminating or reducing risks).</td>
</tr>
<tr>
<td>- How to monitor and measure the CCP (point, step or procedure).</td>
</tr>
<tr>
<td>- How to document the CCP.</td>
</tr>
<tr>
<td>- How to establish critical limits (from standards or guidelines) for each CCP.</td>
</tr>
<tr>
<td><strong>Group Exercise (15 minutes)</strong></td>
</tr>
<tr>
<td>- Groups to identify and establish critical control points and critical limits.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.7.11 Prevention and corrective measures for CCP in crop value chains (30 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The facilitator introduces the topic on prevention and control of possible hazards</strong></td>
</tr>
<tr>
<td><strong>Plenary presentation (15 minutes)</strong></td>
</tr>
<tr>
<td>- Establishment of corrective actions against CCP</td>
</tr>
<tr>
<td>- Establish verification procedures for CCP</td>
</tr>
<tr>
<td>- Establish record-keeping and documentation procedures</td>
</tr>
<tr>
<td>- How to develop HACCP plan and Food safety tool kit for the crop value chain</td>
</tr>
<tr>
<td><strong>Group exercise (15 minutes)</strong></td>
</tr>
<tr>
<td>Groups to identify and establish corrective actions and verification procedures for crop value chain.</td>
</tr>
</tbody>
</table>
3.7.12 Module Review (30 minutes)
(The facilitator leads the trainees in summarizing the key points discussed in the module)

<table>
<thead>
<tr>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenary discussion</td>
</tr>
</tbody>
</table>

3.8. Participants’ Handouts

- Good Agricultural Practices (GAP) hand book
- HACCP hand book for crop production
- Farm management and production hand book

References

- Food Safety Manual for Farmer Field Schools (2010). A training reference guide on food safety in global FFS Programmes, FAO.
- Global GAP Version V
4.1 Introduction

This module exposes farmer trainers’ to the different types of ecological conditions comprising of altitudes, soils, climate and agro-ecological zones (AEZs) for teff production. These abiotic factors greatly influence the yields of teff due to their relationship with biotic factors (pests, diseases, weeds, beneficial soil-borne microbial activities). It is therefore important to understand the agro-ecological zone suitability for teff so as to ensure high productivity.

Teff is mainly grown by smallholder farmers under rain-fed conditions. The crop is mostly grown as a monoculture. The production systems are guided by the size of the farm, demand or purpose (e.g., for subsistence or commercialization where farmers strictly produce for markets). There is need for the knowledge on the production niches and climatic conditions for increased productivity of Teff.

4.2 Module Learning outcomes

By the end of the module, the trainees should be able to:

1. Importance of Teff in Kenya’s economy understood and appreciated.
2. Knowledge on altitudes and soil types/characteristics for Teff production enhanced.
3. Climatic conditions (temperatures, rainfall and humidity) required for Teff production understood and applied.
4. Specific County agro-ecological zones for Teff production explained and understood.

4.3 Module Target Group

This module is intended for public agricultural extension providers in the Teff value chain target Counties and service providers.

4.4 Module users

This module is intended for use by master trainers who are members of the Core Team of Trainers (CTT) and Lead Farmers in the teff value chain target Counties. The facilitator using this module should familiarize themselves with the participants’ handouts (training materials).

4.5 Module Duration

The Module session is expected to last for a time duration of 4 hours

4.6 Module Summary

<table>
<thead>
<tr>
<th>Module 4: Teff production niches and climatic requirements</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6.1 Introductions and climate setting</td>
<td>Self-introduction</td>
<td>Flips charts</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>Plenary discussion</td>
<td>Felt pens</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group exercise</td>
<td>Power point Presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Projector</td>
<td></td>
</tr>
</tbody>
</table>
### 4.6.2 Importance of Teff in Kenya’s economy

- Presentations
- Plenary discussion

- Flips charts
- Felt pens
- Laptop for power point presentations
- Projector
- Participants’ handouts

1 hour

### 4.6.3 Teff production ecological/climatic requirements for optimal yields

- Presentations
- Plenary discussion

- Flips charts
- Felt pens
- Laptop for power point presentations
- Participants’ handouts
- Projector

1 hour

### 4.6.4 Teff production Agro-ecological zones (AEZs)- average yields, and constraints in the target Counties

- Group exercise
- Presentations
- Plenary discussion

- Flips charts
- Felt pens
- Laptop for power point presentations
- Projector

1 hour

### 4.6.5 Module review

- Discussions/conclusion and way forward

- Flip charts
- Felt pens
- Laptop for power point presentations

30 minutes

**Total**

4 hours

### 4.7 Facilitator’s Guidelines

**Module 4: Teff production and appropriate climatic requirements**

#### 4.7.1. Introductions and climate setting (30 minutes)

(*The facilitator welcomes trainees to the module on Teff production and appropriate climatic requirements. They are then invited to introduce themselves and state their expectations*)

**Expectations (15 minutes)**

The trainees to form groups (e.g. county based) and list their expectations. *The facilitator presents module objectives*

**Objectives (15 minutes)**

By the end of the module, the trainee should be able to:

- To define the importance of Teff in Kenya’s economy.
- Indicate and describe altitudes and soil types/characteristics for Teff production.
- Describe climatic conditions (temperatures, rainfall and humidity) required for Teff production.
- Explain specific county agro-ecological zones for Teff production.

- Summarize the facilitator/trainees involvement in Teff value chains
### 4.7.2 Importance of Teff in Kenya’s economy (1 hour)

| Plenary Presentation (45 minutes) |  
|-----------------------------------|---
| • Origin of Teff                  |  
| • Teff in Kenyan households       |  
| • Key counties producing Teff in Kenya |  
| • General Teff production in Kenya |  

Facilitator’s guided discussions (15 minutes)

Questions/answers/comments

### 4.7.3 Teff production ecological/climatic requirements (1 hour)

| Plenary Presentation (45 minutes) |  
|-----------------------------------|---
| • Altitude and Agro-ecological zones for teff production |  
| • Climatic conditions (Rainfall, Temperatures and humidity) |  
| • Soils (soil types, pH, general fertility for teff) |  

Facilitator’s guided discussion (15 minutes)

Questions/answers/comments

### 4.7.4. Teff production AEZs (villages), average yields, and constraints in the target Counties (1 hour)

**Session Guide**

| Plenary Presentation (30 Minutes) |  
|-----------------------------------|---
| Facilitator guides in reviewing and discussing suitability map (County by County) |  

**Group exercise (15 minutes)**

Trainees to bring out specific county or sub-county AEZs, land size, yields and constraints to Teff production and present in the plenary:

- Agro-ecological zones (AEZs) and % area suitable for Teff
- Average land/farm size under Teff production in Kenya
- Average yield of Teff per farm
- Constraints to Teff production

**Discussions/presentations from the groups (15 minutes)**

Let the trainees/groups share the group exercise outcomes

### 4.7.5. Module review (30 minutes)

**Session Guide**

- Power point presentations
- Group work
- Open discussions with the guidance of the facilitator
- Plenary discussion
(The facilitator leads the trainees in reviewing the module)

Summary of the main points from the training (20 minute)

- Objectives and expectations (review done on basis of the expectations listed earlier)
- Trainees to recall the Teff production ecological/climatic requirements, Teff production AEZs (villages) average yields, and constraints in the target Counties
- Trainees to indicate new sets of skills and knowledge acquired from the module. The results are recorded per county presented
- Trainees to randomly pin-point the way forward issues.

Facilitator’s guided discussion (10 minutes)

4.7. Participants’ Handouts

- Teff production Guides
- Teff leaflets
- Teff factsheets

- The last participants’ Handouts/training materials
- Summarize the main points of the module on a flip chart and display
- Plenary discussion
5.1. Introduction

This module exposes service providers, lead farmers and facilitators to the improved Teff varieties, their uses and target area of production. The various Teff varieties are released for different ecological areas and different uses. There are varieties for semi-arid and arid areas which include dry low lands as well as dry cold high lands. These varieties are also grouped into categories such grain production varieties for human consumption, livestock fodder varieties and dual purpose varieties. However, farmers are not able to identify the varieties suited to their regions and their needs. There is therefore need to train farmer trainers in the target counties on the different Teff varieties, their suitable areas of production and their end uses.

5.2 Learning Outcomes

By the end of the module, the following outcomes should be achieved:

1. The Teff crop described.
2. The various improved Teff varieties, their ecological areas of cultivation and their attributes and uses identified.
3. Appropriate variety for specific regions identified.

5.3 Module Target Group

This module targets agricultural extension, service providers and lead farmers based at Teff target counties.

5.4. Module users

This module is intended for use by Master Trainers who are members of the Core Team of Trainers (CTT) and Lead Farmers in the Teff value chain target Counties. The facilitator using this module should thoroughly familiarize themselves with the participants’ handouts (training materials).

5.5 Module Duration

The Module is estimated to take 3 hours and 30 minutes

5.6 Module Summary

<table>
<thead>
<tr>
<th>Module 5. Teff Variety Selection</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
</table>
| 5.6.1. Introduction and Objectives Expectations | • Plenary presentation  
• Group discussion and presentation of expectations | • Flips charts  
• Felt pens  
• Laptop for power point presentations  
• Projector | 30 minutes |
## 5.6.2. Introduction to various improved Teff varieties, their ecological areas of cultivation and their attributes and uses.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Materials/Equipment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Exercises to identify local Teff landraces and varieties</td>
<td>Flips charts, Felt pens, Laptop for power point presentations, Projector, Manila papers</td>
<td>1 hour 30 minutes</td>
</tr>
<tr>
<td>Plenary Presentations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plenary discussion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 5.6.3 Recommended varieties for specific regions

<table>
<thead>
<tr>
<th>Activity</th>
<th>Materials/Equipment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenary Presentation</td>
<td>Flips charts, Felt pens, Laptop for power point presentations, Projector, Manila papers</td>
<td>Thour</td>
</tr>
<tr>
<td>Group exercise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field demonstration</td>
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</tbody>
</table>

## 5.6.4. Module review

<table>
<thead>
<tr>
<th>Activity</th>
<th>Materials/Equipment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Exercise</td>
<td>Participants’ handouts, Module review, TEFF manual</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Facilitator’s summary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## TOTAL

<table>
<thead>
<tr>
<th>Duration</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>3 hours 30 minutes</td>
</tr>
</tbody>
</table>

### 5.7. Facilitator’s Guidelines

#### Module 5: Teff Variety Selection

#### 5.7.1 Introduction and levelling of expectations and objectives (30 minutes)

**Session Guide**

*Introduction (15 minutes)*

(The facilitator welcomes trainees to the module on Teff varieties and introduces himself/herself by stating his/her profile and experience.)

The facilitator invites the trainees to introduce themselves and state their expectations.

**Module Objectives (15 minutes)**

(The facilitator presents modules objectives)

By the end of the module the trainee should be able to:

1. Describe the Teff crop and its climatic and ecological requirements.
2. Identify the various improved Teff varieties their ecological areas of cultivation and their uses.
3. Identify the varieties suited to the counties of interest.

#### 5.7.2 Introduction to Teff and the various improved Teff varieties and their uses (30 minutes)

**Session Guide**

- Summarize trainees’ “expectations” and display.
- Distribute participants’ handouts
- Module Objectives,
(The facilitator describes the TEFF crop and guides the trainees in identifying the various TEFF improved varieties and their uses).

**Group exercise and discussion (10 minutes)**
Ask trainees highlight and describe some of the Teff varieties they know.

**Plenary Presentation (20 minutes)**
- What is Teff?
- Improved Teff varieties.
- Categories of Teff varieties for grain, forage, dual purpose

*Show trainees the photographs of each variety and the full description and its uses.*

**5.7.3 Recommended Teff varieties for the target counties (2 hours) Sessions Guide**

<table>
<thead>
<tr>
<th>Plenary Presentation</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varieties for the target counties (30 minutes)</td>
<td>• Distribute participants’ handouts.</td>
</tr>
<tr>
<td>• Teff growing regions and the new regions which are being targeted for Teff cultivation in Kenya.</td>
<td>• Group exercise</td>
</tr>
<tr>
<td>• Teff varieties suited for each county</td>
<td>• Field demonstration</td>
</tr>
<tr>
<td>• County climate conditions for target county (semi-arid, hot dry low land, cold dry highlands and high potential)</td>
<td></td>
</tr>
</tbody>
</table>

**Group exercises (30 minutes)**
Trainees discuss and come up with Teff varieties in their county.

**Field demonstration (1 hour)**
*(Ensure there is an established plot of all the varieties or TEFF plant samples).*
- Visit the Teff plots with the trainees and assist them identify and study the various varieties.
- After the field visit facilitate them to recall what they learned and discuss on any issue that may arise. (can also use Teff plant samples for the various varieties)

**5.7.4 Module review (30 minutes)**
*(The facilitator should be able to lead the trainees in reviewing the module)*

<table>
<thead>
<tr>
<th>Group Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summarize the main points of the training</td>
</tr>
<tr>
<td>Together with the trainees review the main points about improved Teff varieties</td>
</tr>
<tr>
<td>• What new things did you learn from this Module?</td>
</tr>
<tr>
<td>• What are some of the problems and issues that you have become more aware of in Teff varieties?</td>
</tr>
<tr>
<td>• What questions do you still have about identification of Teff varieties?</td>
</tr>
</tbody>
</table>

**5.8. Participants’ Handouts**
- Teff leaflets
- Factsheets
6.1 Introduction

Teff farmers either recycle their own seeds or source seeds from their neighbours, local markets and grain stores. Prolonged use of farmer-saved seeds significantly reduces yields and undermines the potential of private sector investment in commercial production and marketing of improved certified seeds. This has negatively impacted on the dissemination of improved high-quality Teff seed. As agricultural production increasingly becomes commercialized and global food markets become more competitive, farmers need to invest in improved Teff seed varieties for high sustainable yields. This module exposes county extension officers, private service providers, lead farmers and facilitators to the various seed systems and the importance of quality seed in Teff production. It also covers community seed production and gives direction on how to interface formal and informal seed production to enable farmers venture into commercial production of Teff.

6.2 Module learning outcomes

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

1. The main Teff seed systems in Kenya explained and appreciated.
2. Seed production in formal and informal seed system described.
3. The importance of informal seed system, community seed bulking and its interface with formal seed production for enhanced production of quality grain explained.

6.3 Module Target Group and Categories

This module is intended for public and private extension agents, service providers and lead farmers.

6.4 Module Users

This module is intended for use by Master trainers who are members of the Core Team of Trainers (CTT). The facilitator using this module should be well conversant with the participants’ handouts.

6.5 Module Duration

The Module is estimated to take a minimum of 4 hours.

6.6 Module Summary

<table>
<thead>
<tr>
<th>Module 6: Teff Seed System</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Time</th>
</tr>
</thead>
</table>
| 6.6.1 Introduction, objectives and expectations | • Self-introduction  
• Presentations  
• Plenary discussion | • Flips charts  
• Marker pens  
• Power Point presentation | 30 minutes |
| 6.6.2 Definition of seed and seed system in Kenya | • Group exercise  
• Plenary presentations | • Flips charts  
• Marker pens  
• Power Point Presentation | 1 hour |
|---|---|---|---|
| 6.6.3 Formal seed system in Kenya | • Plenary Presentation  
• Plenary discussion | • Power Point Presentation  
• Flips charts  
• Marker pens | 1 hour |
| 6.6.4 Informal seed system in Kenya | • Plenary Presentation  
• Plenary discussion  
• Group exercise | • Power Point Presentation  
• Flips charts  
• Marker pens | 1 hour |
| 6.6.5 Module review and discussions | • Group exercise  
• Plenary discussion  
• Presentation | • Flips charts | 30 minutes |
| **Total** | | | **4 hours** |

### 6.7  Facilitator’s Guidelines

**Module 6: Teff Seed System**

#### 6.7.1. Introduction and levelling of expectations and objectives (30 minutes)

**Introduction (20 minutes)**  
*The facilitator welcomes trainees to the module on the main Teff seed systems and thereafter invites trainees to introduce themselves and state their expectations.*

**6.7.1. Module Objectives (10 minutes)**  
*The facilitator presents modules objectives*

By the end of the module, the trainee should be able to:
- Appreciate Teff seed systems and its importance in production.
- Describe seed production in formal and informal seed system.
- Explain informal seed system, community seed bulking and its interface with formal seed production for enhanced production of quality grain.

**6.7.2. Definition of seed and seed system in Kenya (1 hour)**
<table>
<thead>
<tr>
<th>Session Guide</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group exercise and presentations: (30 Minutes)</strong></td>
<td><strong>Group exercise</strong></td>
</tr>
<tr>
<td>- What is quality seed?</td>
<td>Power Point presentation</td>
</tr>
<tr>
<td><strong>Plenary Presentation (30 Minutes)</strong></td>
<td>Distribute participants’ handouts</td>
</tr>
<tr>
<td>- Definition of a seed system and characteristics of main seed systems (formal and informal seed system)</td>
<td></td>
</tr>
<tr>
<td>- Commodity corridors</td>
<td></td>
</tr>
<tr>
<td><strong>6.7.3 Formal seed systems in Kenya (1 hour)</strong></td>
<td><strong>Session Guide</strong></td>
</tr>
<tr>
<td><strong>Plenary presentation and discussion (40 Minutes)</strong></td>
<td>Power Point presentation</td>
</tr>
<tr>
<td>- Legal requirements for seed certification</td>
<td>Distribute participants’ handouts</td>
</tr>
<tr>
<td>- Seed certification process</td>
<td></td>
</tr>
<tr>
<td>- Post certification activities for enforcing the seed act cap [326]</td>
<td></td>
</tr>
<tr>
<td>- Post certification activities for seed quality assurance</td>
<td></td>
</tr>
<tr>
<td>- Seed importation and exportation requirements</td>
<td></td>
</tr>
<tr>
<td><strong>Plenary Discussion (20 minutes)</strong></td>
<td>Group exercise</td>
</tr>
<tr>
<td>- Formal seed systems</td>
<td>Plenary discussion</td>
</tr>
<tr>
<td><strong>6.7.4 Informal seed system in Kenya (1 hour)</strong></td>
<td><strong>Session Guide</strong></td>
</tr>
<tr>
<td><strong>Plenary presentations: (40 minutes)</strong></td>
<td>Power Point presentation</td>
</tr>
<tr>
<td>- Seed multiplication</td>
<td>Distribute participants’ handouts</td>
</tr>
<tr>
<td>- Teff seed standards and commercial production</td>
<td>Group exercise</td>
</tr>
<tr>
<td>- Informal seed system</td>
<td>Plenary discussion</td>
</tr>
<tr>
<td>- Community seed bulking and how it is implemented</td>
<td></td>
</tr>
<tr>
<td>- Synergies for formal and informal seed systems</td>
<td></td>
</tr>
<tr>
<td><strong>Group exercise and discussion (20 Minutes)</strong></td>
<td>Participants’ handouts</td>
</tr>
<tr>
<td>Calculate seed requirements for the county/ward/farmer group and present</td>
<td>Summarize the main points from the module on a flip chart and display</td>
</tr>
<tr>
<td><strong>6.7.5 Module review (30 minutes)</strong></td>
<td><strong>Session Guide</strong></td>
</tr>
<tr>
<td><em>(The facilitator leads the trainees in reviewing the module)</em></td>
<td>Participants’ handouts</td>
</tr>
<tr>
<td>Summarize the module together with the trainees and have a recap of the main components in:</td>
<td>Summarize the main points from the module on a flip chart and display</td>
</tr>
<tr>
<td>- Teff seed systems and their characteristics</td>
<td></td>
</tr>
<tr>
<td>- Importance of using certified seed</td>
<td></td>
</tr>
<tr>
<td>- Informal seed</td>
<td></td>
</tr>
<tr>
<td><em>(Discuss the knowledge acquired and skills learnt from this module with the trainees. What are the observations made by trainees from this module?)</em></td>
<td></td>
</tr>
</tbody>
</table>

### 6.8 Participants’ Handouts
- Teff leaflets
- Teff fact sheets
MODULE 7
CLIMATE SMART AGRONOMIC PRACTICES FOR TEFF

7.1 Introduction

In order to optimize productivity of Teff, farmers need to adopt specific agronomic packages, without which the yield potential of improved varieties cannot be achieved. In addition, the weather vagaries occasioned by climate change effects make it necessary to incorporate adaptation or mitigation measures which can enable Teff farmers increase its productivity. In this respect, climate smart agronomic practices come to the fore. There is therefore need for farmer facilitators from the Teff target counties to be furnished with skills and knowledge that will enable them to guide farmers on the climate smart Teff agronomic practices, seed selection techniques, and disease and pest management strategies.

7.2 Module Learning outcomes

By the end of this module training, the following outcomes should be achieved:

1. Agronomic practices for Teff production described and explained.
2. Region specific agronomic practices for Teff production optimization outlined.
3. Appropriate inputs and their correct application rates for Teff production described.
4. Timing for operations or inputs application in Teff production described and explained.

7.3 Module Target Group and Categories

This module targets service providers, public and private extension agents and lead farmers from Teff value chain target counties.

7.4 Module users

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

7.5. Module Duration

The module is estimated to take a duration of 3 hours and 30 minutes

7.6 Module Summary

<table>
<thead>
<tr>
<th>Module 7: Teff climate smart agronomic practices</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.6.1 Introductions and climate setting, objectives and expectations</td>
<td>• Self-introduction • Plenary discussion • Presentations • Group exercise</td>
<td>• Flips charts • Felt pens • Laptop • Projector</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>
| 7.6.2 Agronomic practices for teff production | • Plenary presentation  
• Practical exercise (groups tour nearby farm for layout demonstration)  
• Plenary discussion resulting from the farm visit | • Flips charts  
• Felt pens  
• Laptop  
• Projector | 1 hour 30 minutes |
|---|---|---|---|
| 7.6.3 Appropriate inputs and their recommended application rates for optimum production of Teff | • Presentations  
• Group exercise (trainees enlist inputs and dosage in different counties)  
• Plenary discussion to share group work results | • Flips charts  
• Felt pens  
• Laptop  
• Projector  
• Participants’ handouts | 1 hour |
| 7.6.4 Module review and discussion | • Discussion/conclusion and way forward | • Flip charts  
• Felt pens  
• Laptop  
• Projector | 30 minutes |
| **Total** | | | **3 hours 30 minutes** |

### 7.7 Facilitator’s Guidelines

#### Module 7: Climate Smart Agronomic Practices for Teff

<table>
<thead>
<tr>
<th>7.7.1. Introductions, climate setting (30 minutes)</th>
<th>Session Guide</th>
</tr>
</thead>
</table>
| The facilitator welcomes trainees to the module. The trainees are then invited to introduce themselves and state their expectations. | • Summarize the trainees expectations  
• PowerPoint presentations  
• Group exercise (listing and presenting expectations).  
• Expectations lists kept for later reviewing compliancy |
| **Expectations (15 minutes)** | The trainees form groups (e.g., county based) and list expectations from the module. The facilitator presents the module objectives. |
| **Objectives (15 minutes)** | By the end of the training module, the trainee should be able to:  
• Explain and describe agronomic practices for Teff production.  
• Describe appropriate inputs and their correct rates of application for Teff production.  
• Outline region specific Teff production agronomic practices.  
• Specify the right timing for operations or inputs application in Teff production. |
<p>| <strong>7.7.2. Agronomic practices for Teff production (1 hour, 30 minutes)</strong> | |</p>
<table>
<thead>
<tr>
<th>Plenary Presentation (40 minutes)</th>
<th>Practical exercise (30 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The facilitator presents critical factors on:</td>
<td>Groups tour nearby for farm layout demonstration</td>
</tr>
<tr>
<td>- Factors for selecting Teff production as an enterprise</td>
<td></td>
</tr>
<tr>
<td>- Climate smart land preparation</td>
<td></td>
</tr>
<tr>
<td>- Climate smart planting (seed rates, plant density)</td>
<td></td>
</tr>
<tr>
<td>- Thinning,</td>
<td></td>
</tr>
<tr>
<td>- Weed control</td>
<td></td>
</tr>
<tr>
<td>- Pests and disease control</td>
<td></td>
</tr>
<tr>
<td>- Cropping systems</td>
<td></td>
</tr>
<tr>
<td>- Spacing (inter-and intra-row spacing)</td>
<td></td>
</tr>
<tr>
<td>- Conservation agriculture principles/benefits</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plenary discussion (20 minutes)</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions/answers and comments</td>
<td></td>
</tr>
</tbody>
</table>

### 7.7.3. Appropriate inputs for the optimal production of Teff and their correct/recommended application rates (1 hour)

<table>
<thead>
<tr>
<th>Group exercise (30 minutes)</th>
<th>Plenary presentation and plenary discussion (30 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The facilitator guides trainees to list or/and present the required inputs for use in Teff production</td>
<td>The recommended Teff inputs (seeds, fertilizers, manures, among others.), their rates and their time of application for optimal yields</td>
</tr>
<tr>
<td>The trainees get into county groups to provide lists of Teff inputs and their application rates as practiced by farmers.</td>
<td></td>
</tr>
<tr>
<td>The groups present their results in the plenary - opening up for questions, answers and discussion.</td>
<td></td>
</tr>
</tbody>
</table>

### 7.7.4. Module review (30 minutes)

**Session Guide**

*(The facilitator leads the trainees in reviewing the module)*

Summary of the main points from the training:

- Objectives and expectations (review done on basis of the objectives and expectations listed earlier)
- *Trainees to randomly indicate new sets of skills and knowledge learnt from the module. The results are recorded per county presented*
- Randomly (average of 10 cases) trainees pin-point the way forward issues.

### 7.8. Participants’ Handouts

1. Teff production Guides.
2. Teff leaflets
3. Teff Factsheets
4. Brochures
8.1 Introduction

Poor soil conditions and unreliable availability of moisture in most smallholder farming systems have been the main causes of low yields. Generally, crop yields have continued to decline over the years due to increased soil acidity, mining of nutrients not supplied in the applied fertilizers and poor soil structure caused by failure to use the available sources of organic matter. Macronutrients [nitrogen (N), phosphorus (P), potassium (K) and Sulphur (S)] and micronutrients [zinc (Zn), Molybdenum (Mo) and Boron (B)] have been identified as deficient in Kenyan soils. Additionally, climate change has accelerated the decline of the agricultural sector performance through limited and unpredictable water availability for the Teff production systems. Integrated Soil Fertility Management (ISFM), through conservation agriculture offers the best options for improving soil fertility in the advent of climate change adaptation.

Teff is mostly cultivated by smallholder farmers with minimal inputs. Drought management technologies to mitigate drought effects in teff production are available. However, farmers have not realized the full benefits due to limited integration of the developed Integrated Natural Resource Management (INRM) and sustainable intensification practices in their production systems. This module exposes public and private extension agents, service providers, lead farmers and facilitators to the integrated soil and water management practices for enhanced teff production.

8.2 Module learning outcomes

By the end of the module, the following training outcomes should be achieved:

1. Soil composition, the various physical, chemical and biological properties and what constitutes a healthy soil, including soil classification explained and appreciated.

2. Soil and plant tissue sampling for laboratory analysis, interpretation and utilization of results from accredited laboratories in Kenya discussed and described.

3. Soil health and Integrated Soil Fertility Management (ISFM) for climate resilient cropping explained.

4. Water harvesting technologies, soil and water management discussed and explained

5. Temporary or permanent decline of land productive capacity and various solutions to soil degradation identified.

6. Problematic soils and their management identified and described.

8.3 Module Target Group and Categories

This module is intended for public and private extension agents, lead farmers and service providers in the Teff producing regions.

8.4 Module Users

This module is intended for use by Master Trainers who are members of the Core Team of Trainers (CTT). The facilitators using this module should be well conversant with the participants’ handouts.
8.5 Module Duration

The Module is estimated to last for a duration of 5 hours

8.6 Module Summary

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Duration</th>
</tr>
</thead>
</table>
| 8.6.1 Introduction, objectives and expectations | - Self-introduction  
- Plenary Presentation  
- Plenary discussion | - Flip charts  
- Marker pens  
- Projector for Power Point presentation  
- Laptop | 30 minutes |
| 8.6.2 Soil composition, properties and health, | - Plenary Presentations  
- Plenary discussion | - Flip charts  
- Marker pens  
- Projector for Power Point presentation  
- Laptop  
- Participants’ handouts | 30 minutes |
| 8.6.3 Soil and plant tissue sampling and analysis | - Plenary Presentations  
- Field demonstrations (Conduct soil and plant tissue sampling and analysis) | - Projector for Power Point presentation  
- Participants’ handouts  
- Soil and plant tissue sampling tools | 1 hour |
| 8.6.4 Soil fertility and plant nutrition | - Plenary Presentation  
- Plenary discussion | - Flip charts  
- Marker pens  
- Projector for Power Point presentation  
- Laptop  
- Participants’ handouts | 30 minutes |
| 8.6.5 Soil health and (ISFM) for climate resilient cropping systems | - Plenary Presentation  
- Plenary discussion | - Flip charts  
- Marker pens  
- Power Point presentation  
- Participants’ handouts | 30 minutes |
| 8.6.6 Soil and water management and water harvesting technologies | - Plenary Presentation  
- Plenary discussion | - Flip charts  
- Marker pens  
- Power Point presentation  
- Participants’ handouts | 30 minutes |
| 8.6.7 Soil degradation and reclamation | - Presentations  
- Plenary discussion | - Flip charts  
- Marker pens  
- Power Point presentation  
- Participants’ handouts | 30 minutes |
Module 8: Integrated soil and water management practices for Teff production

8.7.1. Introduction, Objectives and Expectations (30 minutes)

(The facilitator welcomes trainees to the module on sustainable water and soil fertility management practices for optimal production of Teff in moisture stressed conditions. The trainees are then invited to introduce themselves and state their expectations)

Module Objectives (30 minutes)

(The facilitator presents modules objectives)

By the end of the module, the trainee should be able to:
- Appreciate soil composition and what constitutes a healthy soil, including soil classification.
- Describe soil and plant tissue sampling for laboratory analysis, interpretation and utilization of results from accredited laboratories in Kenya.
- Explain soil health and Integrated Soil Fertility Management (ISFM) for climate resilient cropping systems.
- Explain water harvesting technologies, soil and water management.
- Identify temporary or permanent decline of land productive capacity and provide various solutions to soil degradation.
- Identify and describe problematic soils and their management.

8.7.2. Soil composition, properties and health (30 minutes)

(The facilitator presents on soil composition, properties and health)

Plenary presentation (20 minutes)

Soil composition, properties and health
- Description of soil composition
- Description of soil properties
- Describe what soil health is all about

Plenary discussion (10 Minutes)

Let the trainees recall what they learnt and discuss any issues that may arise
### 8.7.3. Soil and plant tissue sampling and analysis (1 hour)

**Plenary Presentation (30 minutes)**
- Overview of the soil sampling methods
- Soil analysis results and interpretation
- Overview of soil analysis results using available examples
- Soil sampling guidelines

**Practical exercise and demonstration on soil sampling (30 minutes)**
- soil sampling methods

---

### 8.7.4. Soil fertility and plant nutrition (30 minutes)

**Plenary Presentation (20 minutes)**
- Potential role of different soil management techniques in addressing soil fertility challenges in Teff smallholder farming systems
- Integrated Soil Fertility Management techniques
- Soil management guidelines

**Plenary discussion (10 Minutes)**
Let the trainees recall what they learnt and discuss any issues that may arise.

### 8.7.5 Soil health and (ISFM) for climate resilient cropping systems (30 minutes)

**Plenary Presentation (20 Minutes)**
- Soil health
- Introduce integrated soil fertility management (ISFM)
- Soil health and ISFM for a climate resilient cropping system
- Manure management, mulching, organic amendments and composting for increased use of organic manure for improving agricultural production
- Conservation agriculture as a climate smart agriculture practice
- Teff inter crops and crop rotation as climate resilient cropping systems

**Plenary discussion (10 Minutes)**
Let the trainees recall what they learnt and discuss any issues that may arise.

### 8.7.6 Soil and water management and water harvesting technologies (30 minutes)

**Plenary Presentation (20 Minutes)**
- Principles of soil management for increased Teff productivity
- Methods of tillage systems that conserve water for teff use.
- Principles of soil fertility management for increased teff productivity
- Methods of soil fertility management for increased teff productivity

**Plenary discussion (10 Minutes)**
Let the trainees recall what they learnt and discuss any issues that may arise.
### 8.7.7 Soil degradation and reclamation (30 minutes)

**Plenary Presentation (20 minutes)**
- Overview of soil degradation and reclamation.
- Reclamation measures of degraded soil
- Identification of the causes of soil degradation
- Identification of reclamation measures of degraded soil

**Plenary discussion (10 Minutes)**
Let the trainees recall what they learnt and discuss any issues that may arise.

### 8.7.8 Problematic soils and their management (30 minutes)

**Plenary presentation (20 minutes)**
- Problematic soils and their management
- Soils with unsuitable biological properties
- Soils with unsuitable chemical properties
- Soils with unsuitable physical properties

**Plenary discussion (10 Minutes)**
Let the trainees recall what they learnt and discuss any issues that may arise.

### 8.7.9 Module review (30 minutes)

The facilitator leads the trainees in reviewing the module.
Summarize the main points of the training review the main points together with the trainees.
Discuss with trainees about new things learnt from this Module. Let them identify some of the problems and any other issues arising from the module.

### 8.8. Participants’ Handouts

- Soil Management Leaflets [KCEP-CRAL PAMHPLETS2019]
- OFRA Technical Training Manual
9.1 Introduction

Contrary to most cereals, Teff is a host to a few pests, diseases and weeds that are considered to be of economic significance. However, their cumulative effects on the yield, cost of production and quality of Teff grains and straw cannot be underestimated. Further, an acute shortage of knowledge among Teff farmers on the recommended crop health management options gets farmers frustrated and most of them may abandon the crop if timely interventions are not prioritized. Synthetic agro-chemicals are predominantly used as a control measure for most pests, disease pathogens and weeds and this practice poses long term hazardous impacts on soil biology and human health including terrestrial and aquatic ecosystems. Consequently, a proper insect pest, disease and weed management program is very crucial in minimizing losses and ensuring that both environmental and food safety concerns are adequately addressed. Available options for the control of these biotic impediments to high yields of Teff can cushion farmers especially in the marginalized areas. There is need to employ human and environmentally safe approaches to pest, disease and weed management so as to increase productivity and enhance food safety. Both cultural and chemical management are readily practical to farmers.

Teff should be grown in a weed free field for best results. Preparing the bed by multiple ploughing prior to planting the seeds helps to destroy the existing weeds. Teff field is tilled 3-5 times to ensure that the field is free from both annual and perennial weeds. Weed remnants can easily be smothered by Teff plant, especially during early plant growth, which is characterised by vigorous growth habit. Additionally as weed control measures, farmers prepares Teff field later after all other crops have been planted, as this helps not only in reducing vegetative growth at expense of grain formation but also a strategic traditional method of controlling weeds. Notorious and persistent weeds are manually uprooted as their presence are detrimental to Teff productivity. Herbicides are seldom used to control weeds mainly because of the cost and its residual effects. Weeds competition has major impact on Teff yields in the small scale production systems and therefore this calls for precautions before weeds establishes in the farm.

9.2 Module Learning Outcomes

By the end of the module, the following outcomes should be achieved:

1. Major pests, diseases and weeds identified.
2. Integrated pest, disease and weed management in Teff described and explained.
3. Safe use of agro-chemicals (pesticides, fungicides and herbicides) explained and appreciated.

9.3 Module Target Group

This module targets public and private extension agents, service providers and lead farmers

9.4 Module Users

This module is intended for use by Master Trainers who are members of the Core Team of Trainers (CTT). The facilitators using this module should be well conversant with the participants’ handouts.
9.5 Module Duration

The facilitation of this module is estimated to last for a period of 6 hours.

9.6 Module Summary

<table>
<thead>
<tr>
<th>Module 8: Crop Health</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6.1 Introduction, objectives and expectations</td>
<td>• Self-introductions • Group exercise • Plenary presentation • Plenary discussion</td>
<td>• Flips charts • Marker pens • Power Point presentation</td>
<td>30 minutes</td>
</tr>
<tr>
<td>9.6.2 Major Teff pests that cause economic losses and their control methods;</td>
<td>• Group work • Plenary presentation • Plenary discussion • Practical exercise</td>
<td>• Flips charts • Marker pens • Projector • Laptop • Participants’ handouts</td>
<td>1 hour</td>
</tr>
<tr>
<td>9.6.3 Sustainable Integrated Pests Management practices and scouting for threshold determination in Teff</td>
<td>• Plenary presentations • Plenary discussion</td>
<td>• Flips charts • Marker pens • Projector • Laptop • Participants’ handouts</td>
<td>30 minutes</td>
</tr>
<tr>
<td>9.6.4 Major Teff diseases that cause economic losses and conditions that favor their development including their control methods</td>
<td>• Group work • Plenary Presentation • Plenary discussion • Practical exercise</td>
<td>• Flips charts • Marker pens • Projector • Laptop • Participants’ handouts</td>
<td>1 hour</td>
</tr>
<tr>
<td>9.6.5 Sustainable Integrated Management of Teff diseases and scouting for threshold determination</td>
<td>• Presentations • Plenary discussion • Field demonstration</td>
<td>• Flips charts • Marker pens • Projector • Laptop • Participants’ handouts</td>
<td>1 hour</td>
</tr>
<tr>
<td>9.6.6 Integrated weed management (Major weeds of Teff)</td>
<td>• Plenary Presentation • Plenary discussion • Field demonstration</td>
<td>• Flips charts • Marker pens • Projector • Laptop • Participants’ handouts</td>
<td>1 hour</td>
</tr>
<tr>
<td>9.6.7 Safe use of agro-chemicals and update source for registered agro-chemicals (PCPB registered products)</td>
<td>• Presentations • Practical • Plenary discussion</td>
<td>• Projector • Laptop • Flip charts • Marker pens • Participants’ handouts</td>
<td>30 minutes</td>
</tr>
<tr>
<td>9.6.8 Module Review</td>
<td>• Discussion/ Recap of the module • Take away messages</td>
<td>• Flips charts • Marker pens • Participants’ handouts</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

**Total** 6 hours

9.7 Facilitator’s Guidelines

Module 9: Teff Crop Health
9.7.1. Introduction and leveling of expectations and objectives (30 minutes)

**Introduction (15 minutes)**
*(The facilitator welcomes trainees to the module on Teff crop health. They are then invited to introduce themselves and state their expectations through group work)*

**Module Objectives (15 minutes)**
*(The facilitator presents modules objectives)*

By the end of the module, the trainee should be able to:
- Identify major pests, diseases and weeds.
- Describe and explain integrated pest, disease and weed management in Teff.
- Explain safe use of agro-chemicals (pesticides, fungicides and herbicides).

---

9.7.2. Major Teff pests that cause economic losses and their control methods; emerging/migratory pests (1 hour)

*(The facilitator makes a presentation on the common Teff pests that are of economic importance)*

**Group work (15 minutes)**
- Trainees to share teff pest information from their respective Counties

**Plenary Presentation (20 minutes)**
- Names of pests and their descriptions
- Symptoms of their infestation/type of damage
- Data on economic significance of the common teff pests

**Practical exercise (15 minutes)**
- Identification of teff pests from provided specimens

**Discussion (10 minutes)**
- Let the trainees recall what they learned and discuss any issue that may arise

9.7.3. Sustainable Integrated Pest Management (IPM) practices in Teff; scouting and threshold determination (30 minutes)

**Plenary Presentation (20 minutes)**
- IPM principles; how to implement them with a focus on cultural, physical, biological and chemical pest management options.
- Critical considerations for proper scouting
- Threshold determination and when to implement control measures
- An overview on the safe use of agro-chemicals (demonstration on how to select most suitable pesticides, for the management of pests in Teff).

**Discussion (10 minutes)**
Let the trainees recall what they learned and seek clarification on the principles of sustainable IPM options

9.7.4. Major Teff diseases that cause economic losses, conditions that favour their development and their control methods (1 hour)

**Session Guide**
- Summarize trainees’ “Expectations”
- Power Point presentation
- Participants’ handouts

---

**Session Guide**
- Power Point presentation
- Group exercise
- Practical exercise
- Participants’ handouts

---

**Session Guide**
- Power Point presentation on scouting for pests
- Participants’ handouts (brochures, leaflets and manuals on pest specimens on Teff)**
<table>
<thead>
<tr>
<th>Group work (15 minutes)</th>
<th>Plenary Presentation (15 Minutes)</th>
<th>Practical Exercise (30 Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Determination of Teff diseases in specific Counties</td>
<td>• Presentations on Teff diseases and conditions that favor their development</td>
<td>• Identification of major disease species causing economic damage based on samples presented</td>
</tr>
</tbody>
</table>

9.7.5. Sustainable Integrated Diseases Management (IDM); scouting and threshold determination (1 hour)

<table>
<thead>
<tr>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Power Point presentation</td>
</tr>
<tr>
<td>• Participants’ handouts</td>
</tr>
<tr>
<td>• Disease identification guidelines</td>
</tr>
<tr>
<td>• Practical Exercise</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plenary presentation (30 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Critical considerations for scouting and when to implement Teff disease control measures</td>
</tr>
<tr>
<td>• Presentation on Integrated Disease Management (IDM) in Teff</td>
</tr>
<tr>
<td>• An overview on the safe use of recommended agro-chemicals (demonstration on how to select most suitable fungicides for the management of major Teff diseases).</td>
</tr>
</tbody>
</table>

Field visit (30 minutes)

<table>
<thead>
<tr>
<th>Field demonstration</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Visit to a nearby Teff field for collection and identification of diseased Teff samples</td>
</tr>
</tbody>
</table>

9.7.6 Integrated weed management (Major weeds of Teff) (1 hour)

<table>
<thead>
<tr>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Power Point presentation</td>
</tr>
<tr>
<td>• Participants’ handouts</td>
</tr>
<tr>
<td>• Disease management guidelines</td>
</tr>
<tr>
<td>• Field demonstration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plenary presentation (45 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identification of weeds</td>
</tr>
<tr>
<td>• Major types of weed in the Teff field</td>
</tr>
<tr>
<td>• Integrated Weed control measured</td>
</tr>
</tbody>
</table>

Plenary discussion (15 minutes)

<table>
<thead>
<tr>
<th>Integrated weed management</th>
</tr>
</thead>
</table>

9.7.7. Module review (30 minutes)

(The facilitator leads the trainees in reviewing the module)

Summarize the main points of the training: The facilitator should review the following main points about climatic conditions suitable for Teff production:

1. Major pests of Teff and their economic impacts on teff production.
2. Integrated Pest Management (IPM) options for Teff
3. Major diseases of Teff and their economic impact on teff production.
4. Integrated Disease Management (IDM) options for Teff
5. Major weeds of Teff and their economic impacts on teff production.
6. Integrated Weed Management (IWM) options for teff

(Discuss with trainees about new things learnt from this Module. What are some of the issues that need clarification)?

<table>
<thead>
<tr>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The last participants’ handouts</td>
</tr>
<tr>
<td>• Summarize the main points from the module on a flip chart and display</td>
</tr>
</tbody>
</table>

9.8. Participants’ handouts

1. Fact sheets on teff pest identification and control
2. Factsheets on teff disease identification and their control
3. Factsheets on teff weeds identification and their management
**MODULE 10**

TEFF HARVESTING AND POSTHARVEST MANAGEMENT

### 10.1. Introduction

Inappropriate harvesting, threshing, storage methods and pest infestation are major production constraints that cause yield and quality losses to Teff. The farmers have been concentrating more on the agronomy and other husbandry practices, with little regard and attention to the major causes of grain loses. Teff farmers tend to delay harvesting so that the plant attains full physiological maturity for ease of threshing and separation of chaff from the grain. However this leads to high loss of Teff due to the tiny seed size.

Farmers traditionally expresses their pain of these loss by a proverb in vernacular; *Amman baddu osoo bekani sila Nanqotan jette taffin*, which means that, had the farmers known how much was lost, no one would be willing to engage in Teff farming. From this proverb, one can understand two important things; that field and storage loses is a serious problem in Teff farming and knowing the exact loss amount is difficult. Therefore, it is important for the stakeholders to continue improving production and reducing loses. Improving production will enhance food security in Kenya, especially the inhabitants of ASAL areas. This module introduces farmer trainers’ to Teff harvesting and postharvest management.

### 10.2 Module Learning Outcomes

By the end of the module, the following outcomes should be achieved:

- The whole range of postharvest practices for Teff described
- Constraints and opportunities in Teff postharvest value chain explained
- Climate smart and gender friendly postharvest TIMPs for minimizing the losses and enhancing quality of the grain exp

<table>
<thead>
<tr>
<th>Module 10. Teff Harvesting and Postharvest management</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.6.1. Introduction, Expectations Objectives</td>
<td>Personal introduction, Group exercise, Plenary presentation</td>
<td>Flip charts, Felt pens, Projector, Laptop</td>
<td>30 minutes</td>
</tr>
<tr>
<td>10.6.2. Constraints and opportunities in postharvest handling of Teff</td>
<td>Group Exercise, Plenary presentations</td>
<td>Flip charts, Felt pens, Participants’ handouts, Videos</td>
<td>30 minutes</td>
</tr>
<tr>
<td>10.6.3. Teff Postharvest chain TIMPs</td>
<td>Group exercise, Plenary presentation, Practical demonstration, Video presentation</td>
<td>Power Point, Participants’ handouts, Materials for demos (Tarpaulins, Metal silos, threshers, grain moisture meters, among others.), Video</td>
<td>1 hours 30 minutes</td>
</tr>
<tr>
<td>10.6.4. Module review</td>
<td>Facilitator’s summary, Group exercise</td>
<td>Flip charts, Projector, Module evaluation forms</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

**TOTAL** 3 hours
10.3 Module Target Group

This module targets public and private agricultural extension agents, lead farmers and service providers, based at sub county and ward level. It can also be useful for private extension service providers.

10.4 Module Users

This module is intended for use by Master trainers who are members of the Core Team of Trainers (CTT) and Lead Farmers in the Teff value chain target Counties. The trainers using this module should thoroughly familiarize themselves with the participants’ handouts (training materials).

10.5 Module Duration

The Module is estimated to take 3 hours 10 minutes.

10.7 Facilitator’s guidelines

<table>
<thead>
<tr>
<th>Module 10: Teff Harvesting and Postharvest management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10.7.1 Introduction and levelling of expectations and objectives (30 minutes)</strong></td>
</tr>
<tr>
<td><strong>Introduction and Expectations (15 minutes)</strong></td>
</tr>
<tr>
<td><em>(The facilitator welcomes trainees to the module and thereafter trainees are invited to introduce themselves and state their expectations)</em></td>
</tr>
<tr>
<td><strong>Module objectives (15 minutes)</strong></td>
</tr>
<tr>
<td><em>(The facilitator presents module’s objectives)</em></td>
</tr>
<tr>
<td>By the end of the module trainees should be able to:</td>
</tr>
<tr>
<td>• Describe the whole range of postharvest practices for Teff,</td>
</tr>
<tr>
<td>• Explain the constraints and opportunities in Teff postharvest value chain</td>
</tr>
<tr>
<td>• Appreciate climate smart and gender-friendly postharvest TIMPs for minimizing the losses and enhancing quality of the grain</td>
</tr>
<tr>
<td><strong>10.7.2 Constraints and opportunities in postharvest handling of Teff (30 minutes)</strong></td>
</tr>
<tr>
<td><em>(Highlight the Teff postharvest value chain – harvesting, drying, threshing, storage, among others)</em></td>
</tr>
<tr>
<td><strong>Group exercise (15 minutes)</strong></td>
</tr>
<tr>
<td>• Trainees discuss constraints in the postharvest handling of Teff, and suggest solutions</td>
</tr>
<tr>
<td><strong>Plenary presentation (15 minutes)</strong></td>
</tr>
<tr>
<td>Trainees present results of group work in plenary</td>
</tr>
<tr>
<td><strong>10.7.3 Teff postharvest value chain TIMPs (1 hour 30 minutes)</strong></td>
</tr>
</tbody>
</table>

- Participants Handouts
- Power Point presentation
- Summarize trainees’ expectations and display on flip chart/board.
### (Facilitator uses slides to train)

#### PowerPoint Presentation (50 minutes)
PowerPoint presentation on the operations in the Teff postharvest chain highlighting:
- Maturity indices and harvesting of Teff (importance of harvesting at the right maturity index, advantages and disadvantages of harvesting too early or too late)
- Preparations farmers need to make prior to harvesting
- Teff harvesting methods
- Field drying of Teff before threshing
- Threshing (manual vs. mechanized threshing)
- Winnowing
- Sorting and grading
- De-stoning
- Teff quality standards
- Metal silos
- Teff stores – design and location, protection from rodents, e.g. rat-proof cages / cribs, among others.
- The correct moisture content for storage
- Precautions during storage

#### Video presentation (10 minutes)
Trainees watch a video on threshing of Teff, metal silo and grain storage

#### Practical demonstrations (30 minutes)
- Threshing of Teff
- Sorting and grading (a sample of Teff purchased from the market and grading into various grades with reference to any existing standards)

### 10.7.4 Training review (30 minutes)
(The facilitator should be able to lead the trainees in reviewing the module)

#### Plenary presentation (15 min)
Together with the trainees, summarize the main points of the training.

#### Group Exercise (15 min)
Together with the trainees review the main points about Teff post-harvest handling
- What new things did you learn from this Module?
- What are some of the problems and issues that you have become more aware of in harvesting and post harvesting?
- What questions do you still have about post-harvest handling?

### 10.8. Participant’s Handouts
- Teff Fact sheets
- Teff production guides
- Teff leaflets and brochure
MODULE 11
TEFF VALUE ADDITION

11.1. Introduction

Teff is a major food crop in Ethiopia and in communities of Northern Kenya, where it is a principal part of the diet. The grain is gluten-free and rich in minerals. However, the crop is neglected and underutilised. This module introduces farmer trainers to the importance of Teff in addressing food and nutrition security at the household level, community level and industrial level. The module also covers constraints in value addition and consumption of Teff and their suggested solutions, and various Teff value added products. It is anticipated that developments in processing and value addition will enhance production and consumption of this underutilised crop, and hence enhance food and nutrition security. The module also discusses potential of utilisation of Teff straw as a nutritive feed to a wide range of animals including beef, dairy, sheep and goats. Efforts towards improvement of Teff straw in nutrition, conservation and feeding include improvement in form of feed block, pellets and silage. This value addition will increase quality and can increase animal productivity by 40%. The straws have high dry matter, palatable to animals with crude protein ranging from 9-14% and total digestibility of 55-64%.

11.2 Module Learning Outcomes

By the end of the module, the following outcomes should be achieved:

- The role of Teff as a food and nutrition security crop explained and appreciated.
- Nutritional composition of Teff, health benefits, food security and income described.
- Constraints in value addition and consumption of Teff, and suggest solutions identified
- Teff-based value added products identified and explained.
- Use of Teff straw as a nutritive livestock feed explained.

11.3 Module Target Group

This module targets public and private extension agents, service providers and lead farmers

11.4 Module Users

This module is intended for use by Master trainers who are members of the Core Team of Trainers (CTT) and Lead Farmers in the Teff value chain target Counties. The trainers using this module should thoroughly familiarize themselves with the participant’s handouts (training materials).

11.5. Module Duration

The Module is estimated to take 6 hours 30 minutes.
## 11.6. Module Summary

### Module 11. Teff value addition

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.6.1. Introduction, Objectives Expectations</td>
<td>• Personal introduction • Group work • Plenary Presentation</td>
<td>• Flip charts • Projector • Laptop</td>
<td>30 minutes</td>
</tr>
<tr>
<td>11.6.2 Role of Teff as a food and nutrition security crop</td>
<td>• Power Point Presentation • Group exercise • Plenary Presentation</td>
<td>• Flip charts • Felt pens • Projector • laptop • Participants’ handouts</td>
<td>30 minutes</td>
</tr>
<tr>
<td>11.6.3. Nutritional composition of Teff and its role in human health</td>
<td>• Power Point • Plenary presentation • Group exercise</td>
<td>• Power Point presentation • Flip charts • Felt pens • Participant handouts</td>
<td>45 min</td>
</tr>
<tr>
<td>11.6.4. Constraints in value addition and consumption of Teff</td>
<td>• Group exercise • Plenary Presentation</td>
<td>• List of value added products • Checklist for prioritization • Pair wise ranking tool • Flip charts • Felt pens • Participants’ handouts • Projector • Laptop</td>
<td>45 min</td>
</tr>
<tr>
<td>11.6.5 Teff based value added products:</td>
<td>• Plenary Presentations • Plenary discussion • Practical demonstration • Sensory evaluation of value added Teff products • Field visit to processing firms / groups</td>
<td>• Projector • Laptop • Participant handouts • Assorted value addition equipment and ingredients (Teff, Teff flours, among others.) • Sensory evaluation forms</td>
<td>2 hours 30 min</td>
</tr>
<tr>
<td>11.6.6 Use of Teff straw as livestock feed (hay, feedblock, pellets, sillage)</td>
<td>• Presentations • Group discussion • Practicals on silage making, feed block making feeding with reduced wastage.</td>
<td>• PowerPoint presentation • Participant’ hand out on silage making, feed block making, pellet making.</td>
<td>1 hour</td>
</tr>
<tr>
<td>11.6.7. Module review</td>
<td>• Plenary discussion • Presentations</td>
<td>• Flip charts • PowerPoint presentations • Module evaluation forms</td>
<td>30 minutes</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>6 hours 30 minutes</strong></td>
</tr>
</tbody>
</table>
11.7. Facilitator’s Guidelines

Module 11. Teff value addition

<table>
<thead>
<tr>
<th>11.7.1 Introduction, expectations and objectives (30 minutes)</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction and expectations (15 minutes) &lt;br&gt;(The facilitator welcomes trainees to the module on value addition of Teff. They are then invited to introduce themselves and state their expectations)</td>
<td>• Participants’ handouts  &lt;br&gt;• Power Point Presentation &lt;br&gt;• Summarize trainees’ expectations and display on flip chart/board.</td>
</tr>
</tbody>
</table>

Module Objectives (15 minutes) <br>(The facilitator presents modules objectives.)
By the end of the module, the trainee should be able to

• Appreciate the role of Teff as a food and nutrition security crop.
• Describe nutritional composition of Teff, health benefits, food security and income.
• Identify constraints in value addition and consumption of Teff, and suggest solutions.
• Explain how to make Teff-based value added products.
• Explain the use of Teff straw as a nutritive livestock feed (hay, feed block, pellets and silage, among others).

<table>
<thead>
<tr>
<th>11.7.2 Role of Teff as a food and nutrition security crop (30 minutes)</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The facilitator presents on malnutrition cases in Kenya and the importance of Teff in addressing food security and malnutrition challenges)</td>
<td>• Power Point presentation &lt;br&gt;• Participants’ handouts &lt;br&gt;• Recipe books &lt;br&gt;• Sample Teff and other processing ingredients &lt;br&gt;• Group exercise</td>
</tr>
</tbody>
</table>

Plenary Presentation (15 minutes)
PowerPoint presentation highlighting the critical elements:

• Micronutrient malnutrition cases in Kenya
• Dietary nutrient requirements (focusing on VMGs)

Group Exercises (15 minutes)
Trainees discuss in groups, the main malnutrition challenges in their respective counties / regions

<table>
<thead>
<tr>
<th>11.7.3 Teff nutritional composition and impact of consumption on human health (45 minutes)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Plenary presentation (45 minutes) &lt;br&gt;• Overview of the documented Teff nutritional composition and their role in human health and nutrition</td>
<td>• Power Point presentation &lt;br&gt;• Participant handouts &lt;br&gt;• Brochures, leaflets, manual, factsheets, posters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11.7.4. Constraints in value addition and consumption of Teff, and suggested solutions (45 minutes)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Session</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Group exercise (30 min)</strong></td>
<td>Groups discuss the constraints in Teff value addition and consumption</td>
</tr>
<tr>
<td><strong>Plenary presentation (15 min)</strong></td>
<td>Overview of constraints in value addition and consumption of Teff</td>
</tr>
<tr>
<td><strong>11.7.5 Teff based value added products (2 hours 30 min)</strong></td>
<td>Session Guide</td>
</tr>
</tbody>
</table>
| Plenary presentation (30 min) | • Overview of Teff based value added products  
• Meaning of value addition  
• Requirements for value addition of Teff  
• Teff based value added products; sensory evaluation of the products | • Handouts  
• Teff manual  
• Brochures  
• Leaflets  
• Recipes  
• Sensory evaluation forms  
• Assorted value addition equipment and ingredients |
| Practical exercise (2 hours) | • Demonstration on formulation of Teff based products  
• Practical on sensory evaluation of value added Teff products |  |
| **11.7.6 Use of Teff straw as livestock feed (hay, silage, among others.) 1 hour)** |  |
| Plenary presentation (30 min) | • Overview of use of Teff straw as livestock feed (hay, silage, among others.) |  |
| Practical exercise (30 minutes) | • Demonstration on using Teff to make hay, feedblock, pellets and silage |  |
| **11.7.6 Training review (30 minutes)** | (The facilitator leads the trainees in reviewing the module) | Summary of the main points from the Module. |
| Review the main points about Teff value addition together with the trainees. |  |
| • What new things did you learn from this Module?  
• What are some of the problems and issues that you have become more aware of in Teff value addition?  
• What questions do you still have about Teff value addition? |  |
| **11.8. Participants’ Handouts** |  |
| • Teff Manual  
• Pamphlets, leaflets.  
• Recipe books |  |
MODULE 12
MECHANIZATION OF TEFF PRODUCTION ACTIVITIES

12.1 Introduction
Agricultural mechanization supports in enhancing production, productivity and profitability in agriculture by achieving timeliness in farm operations. It comes along with precision in metering and placement of inputs, reducing available input losses, increasing utilization efficiency of costly inputs (seed, chemical, fertilizer, irrigation, water, among others.), reducing unit cost of produce, enhancing profitability and competitiveness in the cost of operation. It also helps in the conservation of agricultural produce and by-products from qualitative and quantitative damages; enables value addition and establishment of agro processing enterprises for additional income and employment generation from farm produce. Agricultural mechanization is one of the important inputs that has potential to revolutionize Teff farming in Kenya especially when applied to planting, weeding, pest control, harvesting and post-harvest activities.

12.2 Module learning outcomes
By the end of the module section, the following outcomes should be achieved:
- Climate smart tillage options identified and explained
- Calibration of fertilizer, seed rates for planters and rollers described and explained
- Use of pest control implements and tools demonstrated
- Harvest timing and yield estimation demonstrated
- Estimation of harvesting losses demonstrated
- Threshing and bailing equipment demonstrated

12.3 Module Target Group and Categories
This module is intended for private service providers and county public extension agents.

12.4 Module Users
This module is intended for use by Master Trainers who are members of the Core Team of Trainers (CTT). The facilitator using this module should thoroughly familiarize themselves with the participants’ handouts.

12.5 Module Duration
The Module is estimated to take a duration of 4 hours
### Module 12. Mechanization of Teff production activities

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Duration</th>
</tr>
</thead>
</table>
| 1.1.1 Introduction, objectives and expectations | • Personal introduction  
• Plenary Presentation  
• Plenary discussion | • Flip charts  
• Felt pens  
• Projector  
• Laptop | 30 minutes |
| 1.1.2 Climate smart tillage options | • Plenary Presentation  
• Plenary discussion | • Projector  
• Laptop  
• Flip chart  
• Felt pens  
• Participants’ handouts | 30 minutes |
| 1.1.3 Calibration of fertilizer and seed rates for planters and soil firming | • Plenary Presentations  
• Plenary discussion | • Flip chart  
• Power Point presentation  
• Participants’ handouts  
• Practical | 30 minutes |
| 1.1.4 Pest control equipment and tools usage | • Presentations  
• Plenary discussion | • Flip chart  
• Power Point presentation  
• Participants’ handouts  
• Practical | 30 minutes |
| 1.1.5 Teff harvesting machine and operating principles | • Presentations  
• Plenary discussion | • Flip chart  
• Power Point presentation  
• Participants’ handouts  
• Practical | 1 hour |
| 1.1.6 Module review | • Presentations | • Power Point presentation | 30 minutes |
| **Total** | | | **3 hours 30 minutes** |
## Module 12: Mechanization of Teff production activities

### 12.7.1 Introduction, Objectives and Expectations (30 minutes)

**Session Guide**

(The facilitator welcomes trainees to the module and thereafter invites them to introduce themselves and state their expectations)

**Module Objectives**

By the end of the module, the trainee should be able to:

- Identify and explain climate smart tillage options.
- Describe and explain calibration of fertilizer, seed rates for planters and rollers.
- Demonstrate use of pest control implements and tools demonstrated.
- Demonstrate harvest timing and yield estimation demonstrated.
- Demonstrated estimation of harvesting losses.
- Demonstrated threshing and bailing equipment.

- Summarize trainees’ “Expectations” and display.
- PowerPoint presentation
- Participants’ handouts

### 12.7.2. Climate smart tillage options (30 minutes)

**Session Guide**

(The facilitator presents on the commonly known Teff pests that are of economic importance)

**Plenary Presentation (20 minutes)**

- Overview of the Teff mechanization activities
- Climate smart tillage options

**Plenary discussion (10 minutes)**

Let the trainees recall what they learned and discuss any issue that may arise.

### 12.7.3. Teff calibration of fertilizer and seed rate for planters and soil firming (30 minutes)

**Session Guide**

**Plenary Presentation (20 minutes)**

- Techniques and methods of planter seed and fertilizer rate determination and soil firming

**Discussion (10 Minutes)**

Let the trainees recall what they learned and discuss any issue that may arise.

### 12.7.4. Pest control equipment and tools usage (30 minutes)

**Session Guide**

**Plenary Presentation (20 minutes)**

- Techniques and methods of using pest control equipment; knap sack and boom sprayer

**Plenary discussion (10 Minutes)**

Let the trainees recall what they learnt and discuss any issues that may arise.

### 12.7.5. Teff harvesting machine operating principles (1 hour)

**Session Guide**
<table>
<thead>
<tr>
<th>Plenary Presentation (30 minutes)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Reaper binding</td>
<td></td>
</tr>
<tr>
<td>- Harvesting machines</td>
<td></td>
</tr>
<tr>
<td>- Harvest timing and estimation of</td>
<td></td>
</tr>
<tr>
<td>- Machine harvest yield losses</td>
<td></td>
</tr>
<tr>
<td>Plenary discussion (30 Minutes)</td>
<td></td>
</tr>
<tr>
<td>Let the trainees recall what they learnt and discuss any issues that may arise</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12.7.6 Module review (30 minutes)</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>The facilitator leads the trainees in reviewing the module</em></td>
<td><em>The last participants’ handouts</em></td>
</tr>
<tr>
<td>Summarize the main points of the training and together with the participants review the main points:</td>
<td><em>Summarize the main points from the module on a flip chart and display</em></td>
</tr>
<tr>
<td>- Various climate smart tillage operations</td>
<td></td>
</tr>
<tr>
<td>- Calibration of fertilizer and seed rate for planters and rollers</td>
<td></td>
</tr>
<tr>
<td>- Chemical implements and tools operations</td>
<td></td>
</tr>
<tr>
<td>- Optimal crop Teff harvesting stage and yield estimation</td>
<td></td>
</tr>
<tr>
<td>- Reaper binder machine operating principles</td>
<td></td>
</tr>
<tr>
<td>- Threshing machine operating principles</td>
<td></td>
</tr>
<tr>
<td>- Baling machine operating principles</td>
<td></td>
</tr>
<tr>
<td><em>(Discuss with trainees about new things learnt from the module and any issues that may arise)</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12.8 Participants’ Handouts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Teff Mechanization Factsheet</td>
<td></td>
</tr>
<tr>
<td>- Mechanization leaflets.</td>
<td></td>
</tr>
</tbody>
</table>
13.1 Introduction

This module is designed to expose master trainers in Teff farming business and marketing in Kenya. The crop is considered as one of the most important cereal crops and a source of income for many people in ASALs of Kenya. Under the Kenya Government’s policy for addressing poverty, Teff has been identified as a key sub-sector with the potential to benefit 8 million people in the drier areas of the country. However, Teff is mainly grown solely by small-scale farmers in north eastern regions of Kenya. Farmers grow most of the Teff on holdings of less than one hectare. Currently the production of Teff is low compared to the projected potential. The smallholder production is estimated at 0.5-1 tonne while the projected potential is approximately 4 – 7 tonnes. Markets and marketing of Teff is a major issue of concern to small scale farmers and other actors in the Teff value chain in Kenya, particularly inconsistency in supplying sufficient volumes required for trade, seasonal supply and price fluctuations. To strengthen the Teff value chain it is important to equip farmer facilitators with the skills and knowledge on Teff farming business and marketing strategies.

13.2 Module Learning Outcomes

By the end of this module, the following training outcomes should be achieved:

- The business concept and emerging farming business models explained and appreciated.
- Planning a farm business using SWOT Analysis, farm budgeting and business plan described.
- Tools for implementing a farm business, record keeping, break-even, gross-margin and entrepreneurship explained and described.
- Marketing approaches of Teff identified

13.3 Module Target Group

This module targets agricultural extension, service providers and lead farmers.

13.4 Module Users

This module is intended to be used by a Master Trainer who is among the members of the core team trainers. The facilitator using this module should thoroughly familiarize and avail the participants’ handouts.

13.5 Module Duration

The Module is estimated to take a duration of 2 hours
## Module 13. Teff Business and Marketing

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
</table>
| 13.6.1. Levelling of participants’ expectations about the module and objectives | • Introduction  
• Plenary discussion | • Projector  
• Laptop  
• Flip charts  
• Marker pens  
• Masking tapes/flip chart holders | 20 minutes |
| 13.6.2. Business concept and emerging and farming business models | • Plenary presentation  
• Plenary discussion  
• Group exercise | • Projector  
• Laptop  
• Flip charts  
• Marker pens  
• Masking tapes/flip chart holders | 20 minutes |
| 13.6.3. Planning a farm business: SWOT Analysis, farm budgeting and business plan | • Plenary presentation  
• Plenary Discussion  
• Group exercise | • Projector  
• Laptop  
• Flip charts  
• Marker pens  
• Masking tapes/flip chart holders | 20 minutes |
| 13.6.4 Implementing a farm business: Record keeping, Break-even, Gross margin, entrepreneurship | • Plenary presentation  
• Plenary Discussion | • Projector  
• Laptop  
• Flip charts  
• Marker pens  
• Masking tapes/flip chart holders | 20 minutes |
| 13.6.5 Marketing Approaches | • Plenary presentation  
• Plenary Discussion | • Projector  
• Laptop  
• Flip charts  
• Marker pens  
• Masking tapes/flip chart holders | 20 minutes |
| 13.6.6. Training review | • Facilitator’s summary  
• Plenary presentation  
• Plenary Discussion | • Module review  
• Participants handouts | 20 minutes |
| **TOTAL** | **Facilitator’s summary  
• Plenary presentation  
• Plenary Discussion** | **Module review  
• Participants handouts** | **2 hours** |
13.7 Facilitators Guidelines

### Module 13. Teff Business and Marketing

#### 13.7.1 Levelling participants’ expectations about the module (20 minutes)

*(The facilitator welcomes trainees to the module and thereafter invites them to state their expectations)*

*(The facilitator presents module objectives)*

By the end of this module, the trainee is expected to:

- Appreciate business concept and appreciate emerging and inclusive farmer-market linking models.
- Describe how to plan a farm business using SWOT Analysis, farm budgeting and business plan.
- Describe and explain the tools for implementing a farm business: Record keeping, Break-even, Gross margin and entrepreneurship.
- Identify the marketing approaches of Teff.

#### 13.7.2 Business concept and emerging farm business models (20 minutes)

*(The facilitator to highlight elements of business concept and emerging farming business models)*

**Plenary Presentation (10 minutes)**

Make presentation on the business concept and emerging farming business models

**Group Exercise (10 minutes)**

Discuss areas of adjustments in the models

#### 13.7.3 Planning a farm business using SWOT Analysis, farm budgeting and business plan (20 minutes)

*(The facilitator highlights the components of SWOT matrix and their interactions to generate opportunities based on the other components)*

**Plenary Presentation (10 minutes)**

- SWOT analysis
- Budgeting
- Business planning

**Group Exercise (10 minutes)**

List the strengths, weaknesses, opportunities and threats in teff farming as a business and marketing

#### 13.7.4 Tools for implementing a farm business: Record keeping, Break-even, Gross margin and entrepreneurship (20 minutes)

*Session Guide*

- Summarize trainees’ “Expectations” and display on flip chart/board.
- Participants Handouts
- Program
- Power Point presentation
Plenary Presentation (10 minutes)
(The facilitator highlights the importance of the tools in managing Teff production as a farm business)
- The farmer as an entrepreneur
- Record keeping
- Profitability assessment (break-even & gross margin)

Plenary Discussion (10 minutes)

I.1.5 Marketing strategies (20 minutes)
(The facilitator highlights the marketing strategies for the Teff farm business)
- Market research
- Producer organizations
- Contract farming
- Online/internet marketing

Plenary Discussion (10 minutes)

I.1.6 Training review (20 minutes)
(The facilitator leads the trainees in reviewing the module. Conclude by thanking the trainees)
Plenary Presentation (10 minutes)
Summarize the main points of the training

13.8. Participants’ Handouts
- Teff Business and Marketing factsheets
- Teff production manual

References
14.1. Introduction

This module exposes the service providers, lead farmers and facilitators to an innovation system-based configuration of stakeholders called the Agricultural Innovation Platform (AIP). It is an organizational model for stimulating innovation and development and brings actors together in a way that pools together skills and knowledge used to address challenges and utilize opportunities. The actors include individuals, private and public sector organizations, policy makers and other value chain stakeholders and are brought together to seek a solution to a challenge hindering agricultural productivity within a value chain such as TEFF. The Agricultural Innovation Platform facilitates actors to interact, innovate, learn and change with time as they seek a solution to the common challenge or compelling agenda. In an innovation platform, information exchange takes place in an environment where every actor’s contribution is valued and various benefits accrue to all in a win-win situation. The AIP has been proved to be a useful methodology for catalyzing uptake, up scaling and sustaining use of various technologies.

SUB-MODULE 14.1: AGRICULTURAL INNOVATION PLATFORMS

14.1.1. Sub-Module learning Outcomes

By the end of the module, the following outcomes must be achieved:

1. The attributes of an innovation platform described and understood.
2. Stakeholders’ mobilization for initiation of an Agricultural Innovation Platform explained demonstrated.
3. The establishment, management and monitoring of Agricultural Innovation Platforms explained and demonstrated.
4. The process of innovation capacity of the actors explained and understood.

14.1.2 Sub-Module Target Group and Categories

The target users are public county extension officers, private agricultural service providers, and lead farmers

14.1.3 Sub-Module Users

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

14.1.4 Sub-Module Duration

The Module is estimated to take a duration of 3 hours
14.1.5 Module Summary

<table>
<thead>
<tr>
<th>Sub-Module 14.1 Agricultural Innovation Platforms (AIP)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sessions</strong></td>
</tr>
<tr>
<td>-------------</td>
</tr>
</tbody>
</table>
| 14.1.6.1 Introduction, objectives and expectations | • Personal introduction  
• Plenary Presentations  
• Plenary discussion | • Flips charts  
• Felt pens  
• Projector  
• Laptop | 30 minutes |
| 14.1.6.2 An overview of attributes of an Agricultural Innovation Platform (The characteristics of an innovation platform) | • Power Point Presentation  
• Plenary discussion | • Flips charts  
• Felt pens  
• Projector  
• Laptop  
• Participants Handouts  
• Flip charts  
• Felt pens  
• Projector  
• Laptop  
• Handouts  
• Roles | 1 hour |
| 14.1.6.3 Pre-formation stage (Initiation, Establishment, Management and Sustenance) | • Power Point presentations  
• Plenary discussion  
• Role plays | • Flips charts  
• Felt pens  
• Projector  
• Laptop  
• Handouts  
• Roles  
• Participants Handouts  
• Flip charts  
• Felt pens  
• Projector  
• Laptop  
• Handouts  
• Roles | 1 hour |
| 14.1.5.4 Module review | • Discussion | • Flip Charts  
• Felt pens | 30 minutes |

**Total** 3 hours

14.1.6 Facilitator’s Guidelines

<table>
<thead>
<tr>
<th>Sub Module 14.1 Agricultural Innovation Platform (AIP)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>14.1.6.1. Introduction, levelling of expectations and objectives (30 Minutes)</strong></td>
</tr>
</tbody>
</table>

**Session Guide**

**Introduction**

*The facilitator welcomes trainees to the module on Agricultural Innovation Platforms. They are then invited to introduce themselves and state their expectations*

**Module Objectives**

*(The facilitator presents modules objectives and levels out expectations)*

By the end of the module, the trainee should be able to:

- Explain characteristics of an innovation platform
- Mobilize and sensitize stakeholders
- Describe how to initiate and establish Agricultural Innovation Platforms
- Explain how to manage and sustain innovation capacity of actors in Agricultural Innovation Platforms

**14.1.6.2. The characteristics of an innovation platform (1 hour)**

**Session Guide**

- Summarize Trainees’ “Expectations” and display.
- Power Point Presentation
The facilitator should present an overview of innovation platforms and their main characteristics

<table>
<thead>
<tr>
<th>Plenary Presentation (30 minutes)</th>
<th>Power Point Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past progression of research and extension models and their shortcomings</td>
<td>Participants’ handouts</td>
</tr>
<tr>
<td>Agricultural Innovation Systems perspective</td>
<td>Plenary discussion</td>
</tr>
<tr>
<td>Agricultural Innovation Platforms model</td>
<td></td>
</tr>
<tr>
<td>Comparison of Agricultural Innovation Platforms with social and technical events working through committees with different roles but common goals</td>
<td></td>
</tr>
<tr>
<td>Value chain actor linkages and other benefits</td>
<td></td>
</tr>
</tbody>
</table>

**Plenary discussion (30 minutes)**
Let the trainees recall what they learned and discuss any issue that may arise.

### 14.1.6.3 Preformation and formation phases of the Teff AIP (1 hour)

<table>
<thead>
<tr>
<th>Plenary Presentation (50 Minutes)</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initiation or preformation phase</strong></td>
<td><strong>Power Point Presentation</strong></td>
</tr>
<tr>
<td>Engagement or mobilization of stakeholders in the Teff value chain</td>
<td><strong>Participants Handouts</strong></td>
</tr>
<tr>
<td>Visioning process and rules of engagement mediated by an initiator such as a change agent</td>
<td><strong>Plenary discussion</strong></td>
</tr>
</tbody>
</table>

**Establishment**

- Assessment of the status of the value chain to clearly identify the compelling agenda or bottleneck - Agriculture Product Value Chain (APVC) analysis to identify weaknesses in the chains.
- Laying out of proper plans to define roles, establish task-based committees, expected milestones and resourcing strategies.

**Management**

- Keeping stakeholders focused on the vision and upholding values to ensure an inclusive and transparent process.
- Neutral facilitation to ensure joint strategy building and action and the coordination of support activities.
- Managing emerging experts taking up leading roles and issues as champions.

**Sustainability**

- Guiding in evolving and identifying fresh issues or challenges
- Maintaining capacity acquired to address new issues or challenges in subsequent cycles.

**Plenary discussion (10 minutes)**
Let the trainees recall what they learned and discuss any issue that may arise.
14.1.6.5. Module review (30 minutes)

(The facilitator leads the trainees in reviewing the module)
Summarize the main points of the training and together with the trainees review the main points on:
- AIP characteristics and initiation
- AIP establishment and management
- Sustenance of TEFF AIPs

(Discuss with trainees’ new things learnt from this Module. What are some of the problems and issues that they have become more aware of in the module?)

14.1.7. Participants’ Handouts

- Agricultural Innovation Platform (AIP) Factsheets
- Agricultural Innovation Platform (AIP) Guide

References


3. F. Makini, G. Kamau, M. Makello, A. Adekunle, G. Mburathi. (2013). Operational field guide for developing and managing local agricultural innovation platforms KARI ISSN 978-9966-30-004-1

![20cm width](image)

![Teff row planting style](image)
14.2.1 Introduction.

Teff is a major agro-enterprise and therefore all the gender categories (men, women, youth vulnerable marginalized groups (VMGs) are involved in its value chain from production, marketing and consumption. However, women perform most of the crop’s production activities such as planting and weeding while men mostly perform the task of marketing. Despite this huge women’s contribution, gender inequalities exist in all areas of the value chains. Some of these gender inequalities include: division of labour, access to and control of resources and decision making within and beyond the household. These inequalities limit women, youth and VMGs access to and benefits from the various Technologies Innovations and Management Practices (TIMPs) at different nodes of the value chain. At the macro-level, effective participation of women and youth in groups and market activities is constrained by their low decision-making power, lack of voice and lack of access to financial resources. Gender analysis examines the productive, community and reproductive roles of men and women; access, control and ownership of resources; levels of power relations; differential needs, constraints and opportunities; and impact of these differences (positive/ negative) on lives of men, women, youth and the VMGs.

Teff value chain TIMPs interventions, when designed and implemented with gender equitable principles, can foster adoption leading to increased productivity as well as enhanced social and environmental impacts.

The overall objective of this module is to ensure that gender mainstreaming and social inclusion in Teff TIMPs is enhanced by field agricultural practitioners and extension officers as an effort geared towards achieving Climate Smart Agriculture “triple win” in target counties.

14.2.2 Sub-Module learning outcomes

By the end of the training module, the following outcomes must be achieved:

1. The concept of gender mainstreaming and social inclusion in Teff value chain understood and appreciated.
2. Youth empowerment in Teff value chain explained and understood.
3. Women empowerment in Teff value chain explained and understood.
4. Strategies for inclusion of vulnerable and marginalized groups in Teff value chain understood and applied.
5. Knowledge on environmental and social management framework (ESMF) tool enhanced.

14.2.3 Sub-Module Target Group

This module is intended for lead farmers, service providers and county public and private extension agents.

14.2.4 Sub-Module Users

This module is intended for use by master trainers who are members of the Core Team of Trainers (CTT). This module outlines the learning outcomes, the category of trainees targeted,
module summary, and participants’ handouts. The facilitator using this module should thoroughly familiarize themselves with the participants’ handouts.

14.2.5 Sub-Module Duration

The Module is estimated to take a duration of 3 hours and 30 minutes

14.2.6 Sub-Module Summary

<table>
<thead>
<tr>
<th>Sub-Module 14.2 Gender mainstreaming and social inclusion in the Teff value chain</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.2.6.1 Introduction, Expectations and objectives</td>
<td>• Personal introductions • Presentations • Plenary discussion</td>
<td>• Flips charts • Felt pens • Power Point Presentation • Laptop • Participants’ handouts</td>
<td>30 Minutes</td>
</tr>
<tr>
<td>14.2.6.2 Gender mainstreaming in Teff value chain</td>
<td>• PowerPoint Presentations • Group Exercise • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentation • Participants handouts</td>
<td>30 minutes</td>
</tr>
<tr>
<td>14.2.6.3 Youth empowerment in Teff value chain</td>
<td>• PowerPoint Presentations • Group exercise • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentation • Participants handouts</td>
<td>30 minutes</td>
</tr>
<tr>
<td>14.2.6.4 Women empowerment in Teff value chain</td>
<td>• PowerPoint Presentations • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentation • Participants handouts</td>
<td>30 minutes</td>
</tr>
<tr>
<td>14.2.6.5 Strategies for inclusion of vulnerable and marginalized groups</td>
<td>• PowerPoint Presentations • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentation • Participants handouts</td>
<td>30 minutes</td>
</tr>
<tr>
<td>14.2.6.6 Environmental and Social Management Framework</td>
<td>• PowerPoint Presentations • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentation • Participants handouts</td>
<td>30 minutes</td>
</tr>
<tr>
<td>14.2.6.7 Module Review</td>
<td>• Plenary discussion</td>
<td>• Flips charts • Felt pens</td>
<td>30 Minutes</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>3 hours 30 minutes</td>
</tr>
</tbody>
</table>
### 14.2.7 Facilitator’s Guidelines

<table>
<thead>
<tr>
<th>Sub Module 14.2: Gender mainstreaming and social inclusion in Teff value chain</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>14.2.7.1 Introduction, Objectives and Expectations (30 Minutes)</strong></td>
<td><em>(The facilitator welcomes trainees to the module and thereafter invites them to state their expectations)</em></td>
</tr>
</tbody>
</table>

**Module Objectives (30 Minutes)**
*The facilitator presents modules objectives*

By the end of the module training, the trainee must be to:
- Understand gender mainstreaming and social inclusion, in Teff value chain
- Understand youth empowerment in Teff value chain
- Appreciate women empowerment in Teff value chain
- Recognize strategies for inclusion of vulnerable and marginalized groups in Teff value chain
- Understand the environmental and social management framework (ESMF) tool

**14.2.7.2 Gender mainstreaming and social inclusion in Teff value chain (30 Minutes)**
*(The facilitator should present and explain what is gender mainstreaming, who does what activity, who has access to what resources among others, and why gender mainstreaming is important in Teff value chain.)*

**Plenary Presentation (20 minutes)**
- Definition of gender
- What is gender mainstreaming and why it is important?
- Who does what? (gender division of roles in Teff value chain)
- Who owns what? (access and control of resources & benefits)
- Who makes which decisions?
- Existing policies in support of gender mainstreaming

**Group exercise and discussion (10 Minutes)**
Let the trainees recall what they learned and discuss any issue that may arise

**14.2.7.3 Youth empowerment in Teff value chain (30 minutes)**

**Plenary Presentation (20 minutes)**
- Why agriculture is not attractive to youth
- Youth’s role in the value chain
- Strategies to empower youth in Teff value chain

**Group exercise and discussion (10 Minutes)**
Let the trainees recall what they learned and discuss any issue that may arise.

**14.2.7.4 Women empowerment in Teff value chain (30 minutes)**

**Session Guide**
<table>
<thead>
<tr>
<th>Session Guide</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plenary Presentation (20 minutes)</strong></td>
<td></td>
</tr>
<tr>
<td>• Women’s role in the value chain</td>
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<tr>
<td>• Challenges facing women in the value chain</td>
<td></td>
</tr>
<tr>
<td>• Strategies for empowering women in the value chain</td>
<td></td>
</tr>
<tr>
<td><strong>Plenary Discussion (10 minutes)</strong></td>
<td></td>
</tr>
<tr>
<td>Let the trainees recall what they learned and discuss any issue that may arise</td>
<td></td>
</tr>
<tr>
<td><strong>14.2.7.5. Strategies for inclusion of vulnerable and marginalized groups in Teff value chain (30 minutes)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Plenary presentation (20 min)</strong></td>
<td></td>
</tr>
<tr>
<td>• Who are vulnerable and marginalized groups (VMGs)</td>
<td></td>
</tr>
<tr>
<td>• Why gender inequality exists</td>
<td></td>
</tr>
<tr>
<td>• Social inclusion and why</td>
<td></td>
</tr>
<tr>
<td>• Strategies of inclusion of VMG</td>
<td></td>
</tr>
<tr>
<td><strong>Plenary discussion (10 minutes)</strong></td>
<td></td>
</tr>
<tr>
<td>Let the trainees recall what they learned and discuss any issue that may arise</td>
<td></td>
</tr>
<tr>
<td><strong>14.2.7.6. Environmental and social management framework (ESMF) (30 minutes)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Plenary presentation (20 minutes)</strong></td>
<td></td>
</tr>
<tr>
<td>• Objective of ESMF in Teff value chain</td>
<td></td>
</tr>
<tr>
<td>• Environmental and social safeguards of Teff</td>
<td></td>
</tr>
<tr>
<td>• Safeguard policies triggered by the project</td>
<td></td>
</tr>
<tr>
<td><strong>Plenary discussion (10 minutes)</strong></td>
<td></td>
</tr>
<tr>
<td>Let the trainees recall what they learned and discuss any issue that may arise</td>
<td></td>
</tr>
<tr>
<td><strong>14.2.7.7. Module review (30 Minutes)</strong></td>
<td></td>
</tr>
<tr>
<td>The facilitator leads the participants in reviewing the module</td>
<td></td>
</tr>
<tr>
<td>Summarize the main points of the training and together with the trainees review the main points:</td>
<td></td>
</tr>
<tr>
<td>• What is gender mainstreaming and why it is important?</td>
<td></td>
</tr>
<tr>
<td>• Youth empowerment in Teff value chain</td>
<td></td>
</tr>
<tr>
<td>• Women empowerment in Teff value chain</td>
<td></td>
</tr>
<tr>
<td>• Strategies for inclusion of vulnerable and marginalized groups in Teff value chain</td>
<td></td>
</tr>
<tr>
<td>• Environmental and Social Management Framework of Teff activities</td>
<td></td>
</tr>
<tr>
<td>Let the trainees recall what they learned and discuss any issue that may arise.</td>
<td></td>
</tr>
<tr>
<td><strong>14.2.8 Participants’ Handouts</strong></td>
<td></td>
</tr>
<tr>
<td>• Gender mainstreaming and social inclusion factsheets</td>
<td></td>
</tr>
<tr>
<td>• Gender mainstreaming and social inclusion guides</td>
<td></td>
</tr>
<tr>
<td><strong>Reference</strong></td>
<td></td>
</tr>
</tbody>
</table>
14.3.1 Introduction

Kenya adopted Vision 2030 in 2007 as a new blueprint and roadmap for political, social and economic development of the country in the next two decades. The Vision also identifies Agriculture as the engine of growth through transformation of smallholder and subsistence agriculture to innovatively and commercially oriented agriculture. Kenya promulgated the new constitution in 2010 which proposes two levels of governments (national and county) with defined functions.

Agriculture is one of the devolved governance functions. However, agriculture in Kenya faces many challenges and threats such as climate change, declining agricultural performance, limited high potential agricultural land and over-reliance on rain fed agriculture, limited diversification of Agricultural production, poor and inadequate rural infrastructure, inadequate and declining research in agriculture, agricultural sector financing and related activities and low technical capacity among the actors. Therefore, agricultural policy in Kenya revolves around the main goals of increasing productivity and income growth, especially for smallholders; enhanced food security and equity, emphasis on irrigation to introduce stability in agricultural output, commercialization and intensification of production especially among small scale farmers; appropriate and participatory policy formulation and environmental sustainability. This module introduces the national and county governments, service providers, lead farmers, facilitators and relevant stakeholders in the design and implementation of effective climate-smart-sensitive agricultural policy options to promote the transition to climate-smart agriculture at the smallholder level. The policy context of this module is structured around six topics.

14.3.2 Sub-Module Learning Outcomes

By the end of this module, participants are expected to:

1. The role of agricultural policy frameworks in Kenya discussed and appreciated.
2. Climate-smart agriculture practices, policy options and approaches identified and understood.
3. Climate-smart-sensitive policy cycle explained and understood.
4. Implementation of the climate-smart-sensitive policy at the county level discussed and shared.
5. Financing and Investments for Climate-smart Agriculture discussed and appreciated.
6. The need for a Technology Policy explained and understood.

14.3.3 Sub-Module Target Group

This module is intended for public and private service providers, policy makers, public extension agents and lead farmers.

14.3.4 Sub-Module Users

This module is intended for use by Master trainers who are members of the Core Team of Trainers (CTT) and Lead Farmers in the Teff value chain target Counties. The facilitators using this module
should thoroughly familiarize themselves with the participants’ handouts (training materials).

### 14.3.5 Sub-Module Duration

The Module is estimated to take a duration of 5 hours

### 14.3.6 Sub-Module Summary

<table>
<thead>
<tr>
<th>Module 13.3: Climate-Smart Agricultural Policy Options</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.3.6.1 Introduction, learning expectations and outcomes</td>
<td>• Personal introductions • Group discussion • Plenary discussions • Presentations</td>
<td>• Flips charts • Felt pens • PowerPoint Presentations</td>
<td>30 minutes</td>
</tr>
<tr>
<td>14.3.6.2 Agricultural Policy Frameworks in Kenya</td>
<td>• Presentations • Practical exercises • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentations</td>
<td>30 minutes</td>
</tr>
<tr>
<td>14.3.6.3 Climate-smart agriculture practices, policy options and approaches</td>
<td>• Presentations • Practical exercises • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentations • Participants Handouts</td>
<td>1 hour</td>
</tr>
<tr>
<td>14.3.6.4 Climate-smart-sensitive policy cycle</td>
<td>• Presentations • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentations • Participants Handouts</td>
<td>20 minutes</td>
</tr>
<tr>
<td>14.3.6.5 Implementation of the climate-smart-sensitive policy at the county level</td>
<td>• Presentations • Practical exercise • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentations • Participants’ Handouts</td>
<td>50 minutes</td>
</tr>
<tr>
<td>14.3.6.6 Financing and Investments for Climate-smart Agriculture</td>
<td>• Presentations • Practical exercise • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentations • Participants Handouts</td>
<td>1 hour</td>
</tr>
<tr>
<td>14.3.6.7 Technology Policy</td>
<td>• Presentations • Plenary discussion</td>
<td>• Flips charts • Felt pens • PowerPoint Presentations • Participants Handouts</td>
<td>20 minutes</td>
</tr>
<tr>
<td>14.3.6.8 Module Review</td>
<td>Plenary discussion</td>
<td>• Flip charts • Felt pens</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td><strong>5 hours</strong></td>
</tr>
</tbody>
</table>
### Sub-Module 14.3: Climate-Smart Agricultural Policy Options

#### 14.3.7.1 Introduction, Expectations and Outcomes (30 Minutes)

*The facilitator welcomes trainees to the module and invites them to introduce themselves and state their expectations.*

**Trainees Expectations**

*The facilitator requests the participants to form groups and list their expectations.*

**Module Objectives**

*The facilitator presents module learning Objectives*

By the end of this module the trainee should be able to:

- Appreciate the role of agricultural policy frameworks in Kenya.
- Appreciate climate-smart agriculture practices, options and approaches.
- Recognize the stages in climate-smart-sensitive policy cycle.
- Understand the phases in the implementation of the climate-smart-sensitive policy at the county level.
- Be able to evaluate and select financing and investments options for Climate-smart Agriculture.
- Appreciate the need for a technology policy

#### 14.3.7.2 Agricultural Policy Frameworks in Kenya (30 minutes)

**Plenary presentation (20 minutes)**

- The role of agricultural policy frameworks in Kenya

**Practical exercise (10 minutes)**

Facilitator requests the trainees to form groups and identify the gaps between agricultural policy frameworks and the existing agricultural policies

#### 14.3.7.3 Climate-smart agriculture practices, policy options and approaches (1 hour)

**Plenary presentation (30 minutes)**

- Considerations for climate-smart production systems
- Existing systems, practices and methods suitable for climate-smart agriculture
- Institutional and policy options
- Ensuring farmer organizations for market access
- Gendered approach

**Practical exercise and plenary discussion (30 minutes)**

Facilitator requests the trainees to form groups and identify the existing climate-smart agriculture practices and the relevant policy options for implementation.

#### 14.3.7.4 Climate-smart-sensitive policy cycle (20 minutes)

*Session Guide*

- Summarize Participants’ “Expectations” and display.
- PowerPoint presentation
- Participants handouts

---

*Note: The table above provides an overview of the sub-module's session guide, including the introduction, expectations, module objectives, and practical exercises for the agricultural policy frameworks in Kenya, climate-smart agriculture practices, and policy options, as well as the climate-smart-sensitive policy cycle. The session guide outlines the expected learning outcomes and activities for each segment.*
<table>
<thead>
<tr>
<th>Session Guide</th>
<th>14.3.7.5 Implementation of the climate-smart-sensitive policy at the county level (50 Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenary presentation (20 minutes)</td>
<td>Phases in the implementation of the climate-smart-sensitive policy at the county level</td>
</tr>
<tr>
<td>Practical exercise (30 minutes)</td>
<td>(The facilitator requests the trainees to form groups and develop a program showing steps, activities and stakeholders for the implementation of climate-smart policies)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14.3.7.6 Policy financing and investments for Climate-smart Agriculture (1 hour )</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenary presentation (30 minutes)</td>
<td>Why financing is needed, Financing gaps, Sources of financing, Financing mechanisms, Connecting action to financing, Types of subsidies to farmers</td>
</tr>
<tr>
<td>Practical exercises (30 minutes)</td>
<td>(The facilitator requests the trainees to form groups and identify potential sources of financing, financing mechanisms and connecting action to financing)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14.3.7.7 Need of Technology Policy (20 minutes)</th>
<th>Session guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenary presentation (10 minutes)</td>
<td>What is a technology policy?, Why do we need technology policy?, Is technology policy inconsistent with a market oriented economy?, Technology policy in Kenya</td>
</tr>
<tr>
<td>Plenary discussion (10 minutes)</td>
<td>Powerpoint presentation, Distribute participants’ handouts, Plenary discussion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14.3.7.8 Module review (30 minutes)</th>
<th>Session guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The facilitator leads the trainees in reviewing the module)</td>
<td>Q&amp;A session, Recap the main points, Participatory evaluation of the session</td>
</tr>
<tr>
<td>Plenary presentation (10 minutes)</td>
<td>Summarize the main points of the training and together with the trainees review the main points.</td>
</tr>
<tr>
<td>Plenary discussion (10 minutes)</td>
<td>Trainees lists the main points learnt during the training, Discuss with trainees new things learnt from this Module</td>
</tr>
<tr>
<td>Ask the trainees what are some of the problems and issues that they have become more aware of in the module</td>
<td></td>
</tr>
</tbody>
</table>
14.3.8 Participants’ Handouts

- Handout on Agricultural Policies in Kenya
- Teff policy guides

References

- GoK (2010). Kenya Constitution
The training program presented here assumes that the trainees report on Sunday evening as the first day.

KENYA CLIMATE SMART AGRICULTURE PROJECT
TEFF VALUE CHAIN TRAINING OF TRAINERS WORKSHOP FOR MARSABIT COUNTY

TRAINING VENUE:  KALRO-DAIRY RESEARCH INSTITUTE NAIVASHA
DATES: 12TH TO 20TH JULY 2021 (DRAFT PROGRAMME)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Duration</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 0: Sunday 12th</td>
<td>Travel and Arrival in Naivasha</td>
<td>Whole day</td>
<td>KALRO Secretariat Jane Njiru /Gladys Mueni Value chain Leader: Aila Y. Kiria</td>
</tr>
<tr>
<td>Day 1: Monday 13th</td>
<td>Chair: Dr. David Changwony (Dl. SG&amp;CI) Rapporteur: Aila Y. Kiria</td>
<td>Facilitator</td>
<td>KALRO Secretariat Jane Njiru /Gladys Mueni Value chain Leader: Aila Y. Kiria</td>
</tr>
<tr>
<td>8.00 a.m.-8.30 a.m.</td>
<td>Registration</td>
<td>30 mins.</td>
<td>Secretariat</td>
</tr>
<tr>
<td>8.30 a.m.-10.00 a.m.</td>
<td>Official opening of the Teff Value Chain ToT Workshop</td>
<td>1hr 30 mins.</td>
<td>Dr. David changwony (Chair)</td>
</tr>
<tr>
<td>10.00 a.m.-10.30 a.m.</td>
<td>Climate setting and class organization</td>
<td>30 mins.</td>
<td>Mr. Aila Y. Kiria</td>
</tr>
<tr>
<td>10.30 a.m.-11.00 a.m.</td>
<td>HEALTH BREAK</td>
<td>30 mins.</td>
<td>ALL</td>
</tr>
<tr>
<td>11.00 a.m.-12.00 a.m.</td>
<td>Farmer field and business school (FFBS) approach in Teff production</td>
<td>1 hr.</td>
<td>Mr. Mark Otieno</td>
</tr>
<tr>
<td>12.00 p.m.-1.00 p.m.</td>
<td>Climate Change and Climate Smart Agriculture in Teff value chain</td>
<td>1 hr.</td>
<td>Mr. Ann Gudere</td>
</tr>
<tr>
<td>1.00 p.m.-2.00 p.m.</td>
<td>LUNCH BREAK</td>
<td>1hr.</td>
<td>ALL</td>
</tr>
<tr>
<td>2.00 p.m.-4.00 p.m.</td>
<td>Teff production, niche and climatic requirements</td>
<td>2 hrs.</td>
<td>Mr.Yk. Aila</td>
</tr>
<tr>
<td>4.00 p.m.</td>
<td>TEA BREAK</td>
<td>ALL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Close of Day 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Duration</td>
<td>Responsible</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------------</td>
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<td>----------------------------------</td>
</tr>
</tbody>
</table>
| **Day 2: Tuesday 14th July 2021** | **Chair:** Dr. David changwony (DSGC&I)  
**Rapporteur:** Ms. Rachael kisilu  
**Period**  
**Facilitator** | | |
| 8.00 a.m. – 8.30 a.m.       | Registration, Prayer  
Recap of Day1 activities                                                | 30 mins. | Mr. Mark Otieno Group 1          |
| 8.30 a.m. – 9.30 a.m.       | Teff Crop Health: Teff pests                                             | 1 hr.    | Mr. Harun odhiambo               |
| 9.30 a.m.-10.30 a.m.        | Teff Crop Health: Teff diseases                                          | 1 hr.    | Mr. Harun odhiambo               |
| 10.30 a.m.-11.00 a.m.       | **HEALTH BREAK**                                                         | 30 mins. | ALL                              |
| 11.00 a.m.-1.00 p.m.        | Teff harvesting and post-harvest management                              | 2 hrs.   | Mr. Hussein walaga               |
| 1.00 p.m.-2.00 p.m.         | **LUNCH BREAK**                                                          | 1 hr.    | ALL                              |
| 2.00 p.m. - 3.00 p.m.       | Teff value addition                                                     | 1 hr.    | Mr. James Ndambuki               |
| 3.00 p.m.–4.00 p.m.         | Teff value added products demonstrations and sensory evaluation          | 1 hr.    | James Ndambuki/Dr Francis wayua  
Asha Burje/kame okotu       |
| 4.00 p.m-4.30 p.m.          | **HEALTH BREAK**                                                         | 30 mins. | ALL                              |

**End of day 2**

| **Day Wednesday 15th July 2021** | **Chair:** Dr. Hussein walaga (1.0)  
**Rapporteur:** James Ndambuki  
**Period**  
**Facilitator** |                  |
|-------------------------------|-------------------------------------------------|----------|
| 8.00 a.m. – 8.30 a.m.         | Registration, Prayer  
Recap of Day 2 activities                          | 30 mins. | Mr. Mark Otieno Group 2          |
| 8.30 a.m.– 10.30 a.m.         | Teff Variety and Selection                        | 2 hrs.   | Ms. Rachael Kisilu               |
| 10.30 a.m.-11.00 a.m.         | **HEALTH BREAK**                                  | 30 mins. | ALL                              |
| 11.00 a.m.–1.00 p.m.          | Teff climate smart agronomic practices            | 2 hrs.   | Mr. Yussuf Aila                  |
| 1.00 p.m.-2.00 p.m.           | **LUNCH BREAK**                                  | ALL      |
| 2.00 p.m.-4.00 p.m.           | Teff Seed Systems  
Commodity corridor approach to enhance Seed access and grain production and marketing | 2 hrs.   | Mr. Karanja                      |
| 4.00 p.m. - 4.30 p.m.         | **HEALTH BREAK**                                  | 30 mins. | ALL                              |

**Close of Day 3**

| **Day 4 Thursday 16th July 2021** | **Chair:** Dr. A. O. Esilaba  
**Rapporteur:** Harun odhiambo  
**Period**  
**Facilitator** |                  |
|----------------------------------|-------------------------------------------------|----------|
| 4.00 a.m. - 5.00 p.m.            | Excursion: Field trip to KALRO Kiboko Teff farm  
Spend the Night at Wote Town     | Whole day| Yussuf/ Rachael Kisilu           |

| **Day 5: Friday 17th July 2021** | **Chair:** Dr changwony  
**Rapporteur:** Ann Gudere  
**Period**  
**Facilitator** |                  |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>7.30 a.m. - 5.00 p.m.</td>
<td>Excursion: Field trip to KALRO Katumani</td>
<td>Whole day</td>
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<tr>
<td>Travel Back to Naivasha</td>
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<td></td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Duration</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------------------------------</td>
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</tr>
<tr>
<td><strong>Day 6: Saturday</strong></td>
<td><strong>Chair: Yussuf Aila</strong>&lt;br&gt;<strong>Rapporteur: Rachael Kisilu</strong></td>
<td><strong>Period</strong></td>
</tr>
<tr>
<td>8.00 a.m.–8.30 a.m.</td>
<td>Registration, Prayer and Recap of day 4 &amp; 5 activities</td>
<td>30 mins.</td>
</tr>
<tr>
<td>8.30 a.m.–10.30 a.m.</td>
<td>Integrated soil and water management practices for Teff production Part 1</td>
<td>2 hrs.</td>
</tr>
<tr>
<td><strong>10.30 a.m.–11.00 a.m.</strong></td>
<td><strong>HEALTH BREAK</strong></td>
<td>30 min.</td>
</tr>
<tr>
<td>11.00 a.m.–1.30 p.m.</td>
<td>Integrated soil and water management practices for Teff production Part 11</td>
<td>2 hrs. 30 mins.</td>
</tr>
<tr>
<td><strong>1.30 p.m.–2.30 p.m.</strong></td>
<td><strong>LUNCH BREAK</strong></td>
<td>1 hr</td>
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<tr>
<td>2.30 p.m.–4.00 p.m.</td>
<td>Mechanization of Teff production</td>
<td>1 hr. 30 min.</td>
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<tr>
<td>4.00 p.m.–5.00 p.m.</td>
<td>Guidelines on action planning at County Level</td>
<td>1 hr.</td>
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<tr>
<td><strong>5.00 p.m.</strong></td>
<td><strong>HEALTH BREAK</strong></td>
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<tr>
<td><strong>Close of Day 6</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Day 7: Sunday</strong></td>
<td><strong>Chair: Qabale Diba</strong>&lt;br&gt;<strong>Rapporteur: James Ndambuki</strong></td>
<td><strong>Period</strong></td>
</tr>
<tr>
<td>8.00 a.m.–8.30 a.m.</td>
<td>Registration, Prayer and Recap of Day 6 activities</td>
<td>30 mins.</td>
</tr>
<tr>
<td>8.30 a.m.–10.30 a.m.</td>
<td>Teff Business and Marketing</td>
<td>2 hrs.</td>
</tr>
<tr>
<td><strong>10.30 a.m.–11.00 a.m.</strong></td>
<td><strong>HEALTH BREAK</strong></td>
<td></td>
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<tr>
<td>11.00 a.m.–1.00 p.m.</td>
<td>Climate-Smart Agricultural Policy Options</td>
<td>2 hrs.</td>
</tr>
<tr>
<td><strong>1.00 p.m.–2.00 p.m.</strong></td>
<td><strong>LUNCH BREAK</strong></td>
<td></td>
</tr>
<tr>
<td>2.00 p.m.–4.00 p.m.</td>
<td>Agricultural Innovation Platforms (AIPs)</td>
<td>2 hrs.</td>
</tr>
<tr>
<td><strong>4.00 p.m.–4.30 p.m.</strong></td>
<td><strong>HEALTH BREAK</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Close of Day 7</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Day 8: Monday</strong></td>
<td><strong>Chair: Dr. Qabale Diba</strong>&lt;br&gt;<strong>Rapporteur: Mark Otieno</strong></td>
<td><strong>Period</strong></td>
</tr>
<tr>
<td>8.00 a.m.–8.30 a.m.</td>
<td>Registration, Prayer and Recap of day 7 activities</td>
<td>30 mins.</td>
</tr>
<tr>
<td>8.30 a.m.–11.00 a.m.</td>
<td>Gender mainstreaming and social inclusions in the Teff value chain</td>
<td>2 hrs. 30 min.</td>
</tr>
<tr>
<td><strong>11.00 a.m.–11.30 a.m.</strong></td>
<td><strong>HEALTH BREAK</strong></td>
<td></td>
</tr>
<tr>
<td>11.30 a.m.–1.00 p.m.</td>
<td>• Course Evaluation&lt;br&gt;• Presentations of County Action plans</td>
<td>1 hr.</td>
</tr>
<tr>
<td><strong>1.00 p.m.–2.00 p.m.</strong></td>
<td><strong>LUNCH BREAK</strong></td>
<td></td>
</tr>
<tr>
<td>2.00 p.m.–3.00 p.m.</td>
<td>• Way Forward</td>
<td>1 hr.</td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Duration</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
</tbody>
</table>
| 3.00 p.m.-4.30 p.m. | **Official Closing of The ToT Workshop**  
• Remarks by the group Leader (Governor)  
• Remarks by the CPC  
• Remarks by KCSAP Crops coordinator - **Ms. Violet Kirigua**  
• Remarks by KCSAP NPCU - **Dr. Charles Lungaho**  
• Issuance of Certificates – **Dr. Lusike Wasilwa**  
Official Closing Address by Director Crops - **Dr. Lusike Wasilwa**  
• Closing Prayer | 1 hr. 30 mins. | Chair. Ms. Violet Kirigua |

**Close of Day 8**

**Day 9 Tuesday 21st July 2021**

8.00 a.m. | Departure from Naivasha |

8.00 a.m. | Registration, Prayer and Departure | ALL |
### ANNEX 2: GENERAL REFERENCE MATERIALS

<table>
<thead>
<tr>
<th>Category / Modules</th>
<th>Publication title</th>
<th>Reference types</th>
<th>No Pages</th>
<th>Farmer Category</th>
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<tbody>
<tr>
<td><strong>General Teff production</strong></td>
<td>Teff production Guide in Kenya</td>
<td>Manual</td>
<td>25</td>
<td>A/B</td>
</tr>
<tr>
<td></td>
<td>A Manual for Teff</td>
<td>Training Manual</td>
<td>26</td>
<td>A/B</td>
</tr>
<tr>
<td><strong>Teff Varietal Selection</strong></td>
<td></td>
<td>Leaflet</td>
<td>2</td>
<td>A/B</td>
</tr>
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<td></td>
<td></td>
<td>Leaflet</td>
<td>2</td>
<td>A/B</td>
</tr>
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<td></td>
<td></td>
<td>Leaflet</td>
<td>2</td>
<td>A/B</td>
</tr>
<tr>
<td></td>
<td>Variety Characteristics and Production Guidelines of Traditional Crops</td>
<td>Training Manual</td>
<td>38</td>
<td>A/B</td>
</tr>
<tr>
<td><strong>ALVs Crop Health</strong></td>
<td>Crop Management Guidelines</td>
<td>Manual</td>
<td>34</td>
<td>B/A</td>
</tr>
<tr>
<td></td>
<td>Integrated Pest Management (Cost saving Techniques for Smallholder Farmers)</td>
<td>Manual</td>
<td>34</td>
<td>B/A</td>
</tr>
<tr>
<td><strong>ALVs Business Management</strong></td>
<td>ALVs Production Guide</td>
<td>Manual</td>
<td>30</td>
<td>B/A</td>
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<tr>
<td></td>
<td></td>
<td>Booklet</td>
<td>89</td>
<td>B</td>
</tr>
</tbody>
</table>
ANNEX 3: FFBS LEARNING MATERIALS
PARTICIPATORY TECHNOLOGY DEVELOPMENT (PTD) AND CURRICULUM ON TEFF CROP SPACING MANAGEMENT

<table>
<thead>
<tr>
<th>Value Chain</th>
<th>Teff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Enterprise</td>
<td>Teff</td>
</tr>
<tr>
<td>Funded Enterprise</td>
<td>Teff VC at production level</td>
</tr>
<tr>
<td>Background Problem</td>
<td>Low Teff production due to poor spacing</td>
</tr>
<tr>
<td>Objective</td>
<td>To increase production through improved spacing mgt strategies</td>
</tr>
</tbody>
</table>

Factors to consider:
- Land topography
- Runs (blocks should face East to West)
- Certified seeds of preferred Teff variety
- Local seeds from the farmers.

Setting the P.T.D blocks:
- Plots to be laid (10x10) M, arranged three in a row with a footpath of 1M apart.
- Improved Teff varieties and the farmers local variety
- The blocks must be right angled.
- The number and length of planting drills must be equal in each plot.
- The recommended spacing 20cmXdrill
- During data collections: collect the data using 3-4 plants in the midst of each block.
- Other TIMPS should be applied equally in each block.
- Planting should be done on the same day in all blocks.
- Weeding and spraying should also be done the same time

Parameters Measurement
- No of leaves per crop
- Leaf width and length
- Crop height
- No of pods per plant
- No of bean grains per pod
- Average weight of 20 bean grains
- Yield /unit area
Setting of Blocks

<table>
<thead>
<tr>
<th>Plot 1</th>
<th>Plot 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing at 20cm X Drill</td>
<td>Farmer practice of Broadcasting</td>
</tr>
</tbody>
</table>

AGRO ECOSYSTEMS ANALYSIS (AESA) ON TEFF.

AESA NO .............

General information

<table>
<thead>
<tr>
<th>Variety</th>
<th>Fertilizer</th>
<th>Planting date</th>
</tr>
</thead>
<tbody>
<tr>
<td>..........</td>
<td>------------</td>
<td>---------------</td>
</tr>
</tbody>
</table>

Agronomic data

<table>
<thead>
<tr>
<th>Average Leaf length</th>
<th>Average plant height</th>
<th>Average Leaf width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of leaves/Plant</th>
<th>Wt of head per plant</th>
<th>Wt of seeds per head</th>
<th>Yield in Kg per plot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Weather: ..............................

Time of observation: .................

Diagram of crop of enemies and insects observed

Natural Enemies

1.
2.
3.

insects observed

1.
2.
3.

Observation

1. Weeds
2. Holes on the leaves
3. Yellow leaves

Recommendation

Weeding after 2 weeks
Keep monitoring and control pests
Add foliar feeds or control disease
Kenya Climate Smart Agriculture Project (KCSAP)
P.O. Box 57811, City Square, Nairobi, 00200, Kenya