CLIMATE SMART AGRICULTURE TECHNOLOGIES, INNOVATIONS AND MANAGEMENT PRACTICES FOR COTTON VALUE CHAIN

Training of Trainers’ Manual

MARCH 2021

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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, and 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 cotton 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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<td>--------------</td>
<td>--------------------------------------------------</td>
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</tr>
<tr>
<td>ASALs</td>
<td>Arid and Semi-Arid Lands</td>
<td></td>
</tr>
<tr>
<td>CSA</td>
<td>Climate Smart Agriculture</td>
<td></td>
</tr>
<tr>
<td>CODA</td>
<td>Cotton Development Authority</td>
<td></td>
</tr>
<tr>
<td>COPMAS</td>
<td>Community Production and Marketing System</td>
<td></td>
</tr>
<tr>
<td>CTT</td>
<td>Core Team of Trainers</td>
<td></td>
</tr>
<tr>
<td>ESMF</td>
<td>Environmental and Social Management Framework</td>
<td></td>
</tr>
<tr>
<td>GAP</td>
<td>Good Agronomic Practices</td>
<td></td>
</tr>
<tr>
<td>IDM</td>
<td>Integrated Disease Management</td>
<td></td>
</tr>
<tr>
<td>ISFM</td>
<td>Integrated Soil Fertility Management</td>
<td></td>
</tr>
<tr>
<td>IPM</td>
<td>Integrated Pest Management</td>
<td></td>
</tr>
<tr>
<td>IWM</td>
<td>Integrated Weed Management</td>
<td></td>
</tr>
<tr>
<td>KALRO</td>
<td>Kenya Agricultural and Livestock Research Organization</td>
<td></td>
</tr>
<tr>
<td>KARI</td>
<td>Kenya Agricultural Research Institute</td>
<td></td>
</tr>
<tr>
<td>KCSAP</td>
<td>Kenya Climate Smart Agriculture Project</td>
<td></td>
</tr>
<tr>
<td>Kg</td>
<td>Kilogram</td>
<td></td>
</tr>
<tr>
<td>LF</td>
<td>Lead Farmers</td>
<td></td>
</tr>
<tr>
<td>ToTs</td>
<td>Training of Trainers</td>
<td></td>
</tr>
<tr>
<td>VC</td>
<td>Value Chain</td>
<td></td>
</tr>
<tr>
<td>VMG</td>
<td>Vulnerable and Marginal Group</td>
<td></td>
</tr>
<tr>
<td>Zn</td>
<td>Zinc</td>
<td></td>
</tr>
</tbody>
</table>
INTRODUCTION

About this manual

This training of Trainers’ Manual consists of two parts; namely Part I and Part II. Part I comprises notes for the facilitators while Part II is made up of the training modules in the value chain.

PART I

This part consists of four sections including the Background of Cotton value chain, Content of the Training, Training Design and Facilitators Guidelines.
SECTION 1

BACKGROUND

1.1 The Role Cotton Value Chain in the Kenyan Economy

Cotton, \( Gossypium \) \( hirsutum \) (L.) is cultivated for fibre or lint, and has by products for confectionary and animal feed. It does not tolerate heavy rainfall but grows well where rainfall amounts range from 400-750 mm per year. The crop is grown widely at various altitudes from 0 up to 1400 metres above sea level (MASL). The average yield in Kenya is 572 kg/ha, far below global average. It is cultivated by small-scale farmers in western, Nyanza, eastern, central and coast regions. These areas are home to over 65 percent of Kenya’s population as well as more than 26 percent of livestock where crop fodder is fed to animals. Cotton in Kenya is mainly grown by small-scale farmers in marginal and arid areas, on small land holdings averaging about 1 hectare. It is estimated that currently Kenya has 140,000 small-scale cotton farmers compared to over 200,000 in the mid-1980s when the industry was at its peak with a production of 108,000 bales of lint annually. Currently the country produces 25,000 bales. As production declined so did the rest of the other segments of the value chain. However, in recent years, the Kenya Agricultural Research Institute (KARI), and now Kenya Agricultural and Livestock Research Organisation (KALRO), and other collaborating institutions have developed climate smart varieties together with adaptable agronomic Technologies, Innovations and Management Practices (TIMPs) which would increase crop production for food and nutritional security and higher earnings.

1.2 The Role of Cotton in Food and Nutrition Security

Cotton in Kenya is grown in the semi-arid regions of the former Eastern, Central, Nyanza, Coast, Western and Rift Valley regions. It is one of the few cash crops suitable for marginal areas with low rainfall which cover about 87% the country and are home to 27% of the population. During value addition, the main products are lint Cotton (40%) and seed (60%). After further processing the seed produces oil and seedcake among other products. The former is used as human food and the latter as animal feed. As part of Kenya government’s “Big 4” Agenda, value added products initiative aims to contribute towards food security, improve nutrition and increase employment opportunities through manufacturing of animal feeds and oil. The incomes derived from the production and employment is vital for food security, poverty reduction and wealth creation especially in the marginal areas of Kenya where cotton production is conducted. The increase in local of consumption of cotton oil will reduce oil importation while increased cotton seed cake will improve livestock production in arid and semi-arid areas.

1.3 Cotton crop as a Climate Smart Innovation

Cotton production is assumed to belong to arid and semi-arid land masses in about 50% of the counties. Due to climate changes, performance the of crop has been challenged and today new cotton varieties and production techniques have been developed for these areas that are considered
marginal to maintain and increase productivity. Production of cotton can be enhanced by matching drought tolerant varieties to specific climate smart TIMPs adaptable in specific regions.

1.4 Objectives of the Training

The purpose of this training is to enhance the capacity of farmer trainers to provide and promote knowledge and skills to farmers for increased productivity of cotton through adoption of appropriate and climate smart agricultural practices. Specifically, the objectives of this training are:

a) Provision of new and relevant knowledge, technologies and skills for cotton value chain

b) Refreshing knowledge and skills on good agricultural practices (GAPs) for cotton production including climate adaptations, variety selection, soil nutrient management, soil water conservation techniques, control of diseases and pests, harvesting, post-harvest handling, value addition, mechanization, marketing and gender mainstreaming.

c) Imparting knowledge and skills in participatory techniques for effective facilitation of adult learning processes and developing inclusive stakeholder partnership for sustainable up scaling of cotton technologies.

After the training, the Trainer of Trainers (TOTs) as facilitators will train lead farmers (LF) in various aspects of cotton 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 Modules

The training content is organized in 14 modules that are targeted and orientated to ensure the technology and innovation management practices (TIMPs) are adopted to improve productivity through improved cotton value chain competitiveness in a market driven production. The purpose of these modules is to enhance the knowledge and capacities of trainers in understanding and disseminating the climate-smart cotton practices to the intended beneficiaries, who are primarily the farmers.

2.2 Modules Outline

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

- Introduction to the module – context and background to training needs as well as knowledge and skills gaps being addressed.
- Module learning outcomes – what trainees are expected to learn in each module
- Module target group - trainee categories.
- Module users – facilitators, master trainers
- Module duration – minimum number of hours of training and exposure to materials
- Module summary – sequence of sessions, training methods, materials and duration
- Facilitators’ guidelines – detailed sessions, training methods, materials and session guides
- Participant’s hand-outs – detailed notes and reference materials for trainees.

The outline of the 14 Cotton modules is presented in Table 1 below.
<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>Awareness on the impact of climate crisis to cotton production</td>
<td>Potential impact of climate change on cotton production outlined</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Climate smart technologies for cotton value chain</td>
<td>Climate smart techniques described</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Farmer Field Business school (FFBS) approach</td>
<td>Enhanced Skills/technologies for production, processing and marketing</td>
<td>Improved technologies/innovations and agronomic practices for cotton described</td>
<td>4 hours 30 minutes</td>
</tr>
<tr>
<td>3</td>
<td>Good Agricultural Practices (GAP) and Food Safety Management System (FSMS)</td>
<td>Determination of presence of hazardous solids/organisms/ and pollutants pathogens</td>
<td>Techniques for determining pollutants in cotton value chain products demonstrated</td>
<td>6 hours 30 minutes</td>
</tr>
<tr>
<td></td>
<td>- Hazard Analysis Critical Control Points (HACCP) Plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cotton production niche and climate requirements</td>
<td>Identification of areas suitable for cotton production</td>
<td>Cotton production niches in the respective counties identified and described</td>
<td>4 hours</td>
</tr>
<tr>
<td>5</td>
<td>Cotton variety selection</td>
<td>Awareness on improved varieties</td>
<td>New improved cotton varieties identified and described</td>
<td>4 hours</td>
</tr>
<tr>
<td>6</td>
<td>Cotton seed systems</td>
<td>Awareness of both formal and informal seed systems operations.</td>
<td>The formal and informal seed supply systems explained</td>
<td>4 hours 30 minutes</td>
</tr>
<tr>
<td>7</td>
<td>Cotton climate smart agronomics practices</td>
<td>Options for innovating increased cotton production availed</td>
<td>Climate smart agronomics practices for cotton understood snd described</td>
<td>4 hours</td>
</tr>
<tr>
<td>8</td>
<td>Integrated soil and water management practices for cotton production</td>
<td>Soil water and fertility enhancing techniques availed.</td>
<td>Soil and water management practices for cotton production demonstrated</td>
<td>5 hours</td>
</tr>
<tr>
<td>9</td>
<td>Cotton crop Health</td>
<td>All major pests (invertebrate and vertebrate), diseases organisms, weeds and control mechanisms availed to the master trainers.</td>
<td>Identification and management of cotton pests demonstrated</td>
<td>5 hours</td>
</tr>
<tr>
<td>10</td>
<td>Cotton harvesting and Post-harvest management</td>
<td>Storage technologies to reduce losses in quantity and quality</td>
<td>Proper harvesting techniques and storage facilities, identified</td>
<td>3 hours</td>
</tr>
<tr>
<td>11</td>
<td>Cotton value addition</td>
<td>Avail various cotton products, for human and animal feeds</td>
<td>Value addition and cotton products identified and described</td>
<td>6 hours 30 minutes</td>
</tr>
<tr>
<td>12</td>
<td>Mechanization of cotton production activities</td>
<td>Mechanisation of cotton production operations</td>
<td>Mechanization Options for increased yield understood and explained</td>
<td>4 hours</td>
</tr>
<tr>
<td>13</td>
<td>Cotton business and Marketing</td>
<td>Identification of business options available apart from lint</td>
<td>The feed and confectionary industries and cottage options described</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Type of aggregations by farmers availed for considerations. Contract farming explained</td>
<td></td>
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<td>14</td>
<td>Cotton Cross cutting issues</td>
<td>Awareness on how VMGs can draw benefits from Cotton value chain and options of employment opportunities in Cotton production</td>
<td>Opportunities for marginalized groups identified</td>
<td>12 hours</td>
</tr>
<tr>
<td></td>
<td>(i) Innovation Platforms</td>
<td></td>
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<td></td>
<td>(ii) Gender mainstreaming and social inclusion</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(iii) Policy</td>
<td></td>
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<tr>
<td><strong>Total Duration</strong></td>
<td></td>
<td></td>
<td><strong>71 hours 30 minutes</strong></td>
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SECTION 3
TRAINING DESIGN

3.1 Delivery System

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

1. Establishment of a team of facilitators
   
   a) A Core Team of Trainers (CTT) for training farmer master trainers (service providers) as facilitators of a ToT course. This is done using this manual and modules contained therein.
   
   b) Each of the Master trainers will facilitate farmers to acquire knowledge and skills in facilitating Farmer-led Field and Business Schools through practical demonstrations.

2. Up scaling

   This will be done by selecting lead farmers (LF) to be trained in facilitation to reach out more farmers in the regions of production.

3.2 Partners and their roles

The partners envisioned in this training plan are:

1. Core Team of Trainers – Facilitators drawn from KALRO and State Department of Agriculture to facilitate initial training of Master Trainers in a TOTs course. They are also to provide mentorship to master trainers during the first year of their farmer trainings. They should also be available in the evaluations and trainings.

2. County Government Department of Agriculture – Master trainers and their supervisors referred to as County Coordination Teams (CCT) who will take the role of trainers, mentors and coordinators at sub county level. They will assist FFBS’s form partnership with stakeholders for sustainability. They should also participate in formation of information platforms and support lead farmers (LF’s) form their network.

3. Private Sector Service Providers – inputs suppliers, financial and business development service providers, market players and processors to partner and support promotion of Dry Bean.

3.3 Training duration

The ToT course for Master Trainers for the 14 modules in the Cotton value chain shall take a Total of seven days of training period. Programmes and timetables will be developed and will cater for this.
3.4 Logic Design

The logic of design and flow of each module is that the facilitator, paying attention to the proposed methods and sessions guidelines, shall: (1) Introduce the module; (2) Draw out the participant's expectations; (3) Relate participants’ expectations with module objectives or learning outcomes; (4) Explore the concept and content, switching to different methods of delivery of the content (group exercise, brainstorming, excursions, plenary discussions, role plays) as the session progresses; (5) Review the module at the end using participatory approaches where one participant reads one summary message and its application; and, (6) 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 early enough
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’ hand-outs filling
3. Flip charts and good quality felt pens could be used interchangeably with LCD projections
4. Visual aids like field equipment and tools should also be arranged in time before start of sessions
5. There should be adequate copies of participants’ hand-outs (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 venues and sites
The training venue will include the training room and field demonstration sites

1. **Training Room** – should have adequate space for 30 participants
2. **Demonstration Site** – ideally should be a 5-minute walking distance with at least 5 distinct plots for demonstration.

4.3. The trainees
The target trainees are agriculture extension officers with elaborate training background in agriculture and extension. The facilitator should not lecturer but 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 facilitator will require a program that consists of the actual training modules and the corresponding days and time allocation *(Annex 1).*

4.5. 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 present 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 power point 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 demonstrations</td>
<td>To be considered where skills are an issue requiring sharing and trying</td>
</tr>
<tr>
<td>Case studies</td>
<td>To be used where there is need to view a problem objectively and allow free exchange of ideas</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</td>
<td>To be considered where hand-on practical skills are acquired through sharing and demonstration</td>
</tr>
</tbody>
</table>

4.6. Planning Schedules and Guidelines for ToT Preparation

While planning for this training, the CTT leader should ensure that the activities in Table 3 are done before the training.

Table 3: Duration of activities to be done before Training

<table>
<thead>
<tr>
<th>Duration To Training</th>
<th>Activities To Be Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three months</td>
<td>At least 5 Cotton demonstration plots planted (staggered)</td>
</tr>
<tr>
<td>Six weeks</td>
<td>Recruit Master Trainers, compose CTT.</td>
</tr>
<tr>
<td>Four weeks</td>
<td>Send out invitation letters to participants and special guests detailing purpose, venue and program. Follow up on demonstration sites. Brief CTT members</td>
</tr>
<tr>
<td>Two weeks</td>
<td>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</td>
</tr>
<tr>
<td>Four days</td>
<td>Confirm training sites preparedness, prepare sitting arrangements and stationery, and brief assistants</td>
</tr>
</tbody>
</table>
## 4.7. Evaluation of the Training

Half a 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 in Section 4.4.

The evaluation strategy should take two directions with the first being the individual trainees filling evaluation forms without conferring or refereeing to each other. The evaluation forms are then collected and analysed by the CTT members.

### Table 4: Individual Sample Evaluation Form

<table>
<thead>
<tr>
<th>Aspect / Module</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very useful (3 marks)</td>
</tr>
<tr>
<td>1 Climate change and climate smart agriculture</td>
<td></td>
</tr>
<tr>
<td>2 Farmer Field Business school (FFBS) approach</td>
<td></td>
</tr>
<tr>
<td>3 Good Agricultural Practices (GAP) and Food Safety Management System (FSMS)</td>
<td></td>
</tr>
<tr>
<td>4 Cotton production niche and climate requirements</td>
<td></td>
</tr>
<tr>
<td>5 Cotton variety selection</td>
<td></td>
</tr>
<tr>
<td>6 Cotton seed systems</td>
<td></td>
</tr>
<tr>
<td>7 Cotton climate smart agronomic practices</td>
<td></td>
</tr>
<tr>
<td>8 Integrated soil and water management practices for cotton</td>
<td></td>
</tr>
<tr>
<td>9 Cotton Crop Health</td>
<td></td>
</tr>
<tr>
<td>10 Cotton harvesting and Post- harvest management</td>
<td></td>
</tr>
<tr>
<td>11 Cotton value addition</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 clarification, 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. This one does not need a guided template but the trainees should be allowed to use their own way to present their evaluation points.

### 4.8. Facilitator Reference Materials

#### 4.8.1. List of Publications

Cotton reference material will consist of the following:

- a) Cotton production manuals/ guides
- b) Pamphlets/brochures
- c) Factsheets on specific TIMPs
- d) Journal articles

The detailed list of all publications is summarized in [Annex 2](#).

#### 4.8.2 Guide on the use of the reference information

The trainers will be advised to issue trainee with hand-outs after each module. This will help them recap on what they learned even after they have left the training.

The list of all individual publications will be stored and available as electronic copies – mainly PDFs. The service providers are strongly advised to keep these electronic copies on a memory stick, CD or portable hard drive, so that trainees can easily access and if necessary print any of them out at a local cyber café.
PART II
COTTON 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, Cotton production niche and climate requirements, Good Agricultural Practices (GAP) and Food Safety Management System (FSMS), Cotton variety selection, Cotton seed systems, Cotton climate smart agronomics practices, Integrated soil and water management practices for cotton production, Cotton Crop Health, Cotton harvesting and Post-harvest management, Cotton value addition, Mechanization of Cotton production activities, Cotton business and Marketing, and Cotton Cross cutting issues (Innovation Platforms, Policy, gender mainstreaming and social inclusion).

All the modules will be divided into the following:
1. Introduction to the module
2. Module learning outcomes
3. Module target group
4. Module users
5. Module duration
6. Module summary
7. Facilitators’ guidelines
1.1 Introduction
The potential impacts of climate change and variability in agriculture, food systems and food security is a serious concern. Kenya’s agricultural production system is highly impacted 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 introduce 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 climate change and variability understood and explained
- Impacts of climate change and variability on agriculture and food demonstrated
- Concept of Climate smart agriculture (CSA) understood and explained
- Future climate scenarios and how to manage them, understood and demonstrated

1.3. Module Target Group
These module targets public and private agricultural extension service providers and lead farmers in the cotton value chain.

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 cotton value chain target Counties. The facilitator using this module should thoroughly familiarize themselves with the participant’s Handouts (training materials).

1.5. Module Duration
The Module is estimated to take 4 hours
### 1.6. Module Summary

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
</table>
| 1.6.1. Introduction to climate change and variability | • Presentation  
• Case study videos  
• Plenary discussions | • Power point  
• Videos  
• Flip charts  
• Handouts | 30 minutes |
| 1.6.2. Impacts of climate change and variability on agriculture and food security | • Presentation  
• Case study videos  
• Plenary discussions | • Power point  
• Videos  
• Flip charts  
• Handouts | 1 hour |
| 1.6.3. Concept of Climate smart agriculture (CSA) in cotton | • Presentation  
• Plenary discussions | • Power point  
• Flip charts  
• Handouts | 1 hour |
| 1.6.4. Projected future climate scenarios affecting cotton and how to manage | • Presentation  
• Case study videos  
• Plenary discussions | • Power point  
• Flip charts  
• Handouts | 1 hour |
| 1.6.5. Module review | • Participants’ questions and comments  
• Facilitator’ summary | • Module review | 30 minutes |

**TOTAL** | | | 4 hours |

### 1.7 Facilitators Guidelines

#### 1.7.1. Introduction and Levelling Expectations (1 hour)

*The facilitator should introduce the trainees to this module of climate change and climate smart agriculture and its important linkages in the achievement of KCSAP project objectives. Thereafter, present the module objectives.*

**Trainees’ expectation (30 minutes)**

*The facilitator organises the trainees into groups to brainstorm and come up with their expectations)*

**Module Objectives (30 minutes)**

*The facilitator presents modules objectives on power point*  
By the end of the training module the trainee should be able to:  
- To explain climate change and adaptations  
- Define ‘climate smart agriculture’  
- Describe and explain available climate smart crop management practices in cotton production  
- Project and explain the benefits of selected climate smart crop management practices in cotton production
<table>
<thead>
<tr>
<th>Session Guide</th>
<th>Session Guide</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The facilitator proceeds to introduce the module basics)</td>
<td>Plenary Presentation</td>
<td>Plenary discussion</td>
</tr>
<tr>
<td>The basic terminologies used in the module (weather, climate, variability, adaptation, coping)</td>
<td>• Explain climate change and climate variability</td>
<td>• What are the long term rainfall and temperature projections as impacted by climate change?</td>
</tr>
<tr>
<td>The causes of climate change</td>
<td>• Climate risks impacting agriculture</td>
<td>• Projected impacts on food production and needed adaptation measures especially for cotton.</td>
</tr>
<tr>
<td>Proposed adaptation measures (captured in TIMPS)</td>
<td></td>
<td>• Short Video on showing projections of rainfall and temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session Guide</th>
<th>Session Guide</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The facilitator presents to the trainees the principles underpinning CSA and the link to deliverables of project objectives)</td>
<td>Plenary Presentation</td>
<td>(The facilitator leads the trainees in discussing future climatic projections focusing on rainfall and temperature which directly impact on crop yields.</td>
</tr>
<tr>
<td>Definition of the CSA approach and their characteristics</td>
<td>• The three pillars of CSA (productivity, Adaptation and Mitigation</td>
<td>Plenary discussion</td>
</tr>
<tr>
<td>Why CSA is necessary</td>
<td>• Why CSA is necessary</td>
<td>• What are the long term rainfall and temperature projections as impacted by climate change?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Projected impacts on food production and needed adaptation measures especially for cotton.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Short Video on showing projections of rainfall and temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session Guide</th>
<th>Session Guide</th>
<th>Session Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The facilitator leads the trainees in summarizing the key points discussed in the module)</td>
<td>Plenary discussion</td>
<td></td>
</tr>
</tbody>
</table>
1.8. Reference Materials

1.8.1 Participant’s Handouts

- Fact sheet on climate change

1.8.2 References

MODULE 2
FARMER FIELD AND BUSINESS SCHOOL (FFBS) APPROACH IN COTTON VALUE CHAIN

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 Cotton 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 in 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 Cotton production profitable and sustainable.

2.2. Module Learning Outcomes

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

- Have a clear understanding of Farmer Field and Business School approach and be able to differentiate between teaching and facilitating.
- Be equipped with practical skills that help them feel informed and confident about their roles and ability to facilitate a participatory learning process.
- Be empowered with knowledge and analytical skills to design simple experiments to test and select the best option to mitigate the constraints in Cotton value chain through applying the TIMPs.
- Facilitated shift from the traditional focus to improving productivity towards Cotton farming business proposition.

2.3. Module Target Group

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

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 Cotton value chain target Counties. The trainers using this module should thoroughly familiarize themselves with the participants’ Handouts (training materials).

2.5. Module Duration

The Module is estimated to take 7 hours.
## 2.6 Module Summary

### Module 2.5 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, Climate setting, levelling of expectations and objectives.</td>
<td>Setting norms and group discussions on expectations</td>
<td>Power point, Projector, Flip charts and Mark pens</td>
<td>30 minutes</td>
</tr>
<tr>
<td>2.6.2 Overview of FFBS key activities</td>
<td>Presentations and plenary discussions</td>
<td>Pictorials, power point and projector</td>
<td>1 hour</td>
</tr>
<tr>
<td>2.6.3 Introduction to Communication and communication skills</td>
<td>Presentation, group discussions and plenary</td>
<td>Power point, Projector, Flip charts and felt pens</td>
<td>1 hour</td>
</tr>
<tr>
<td>2.6.4 Facilitation and leadership skills</td>
<td>Presentation and plenary</td>
<td>Power point and Projector</td>
<td>1 hour</td>
</tr>
<tr>
<td>2.6.5 Organization and management in FFBS</td>
<td>Presentation and plenary</td>
<td>Power point and Projector</td>
<td>1 hour 30 minutes</td>
</tr>
<tr>
<td>2.6.6 Developing FFBS Curriculum for the Cotton value chain</td>
<td>Group discussion and presentation, and plenary presentation</td>
<td>Power point, Projector, Flip charts and felt pens</td>
<td>1 hour 30 minutes</td>
</tr>
<tr>
<td>2.6.7 Module review</td>
<td>Discussions Conclusions and way forward</td>
<td>Flip charts, Power point presentations and projectors</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

**TOTAL** 7 hours
2.7 Facilitators Guidelines

2.6.1 Introduction, climate setting Leveling Expectations and Objectives (1 hour)

*(The trainer welcomes trainees to the module on FFBS and climate change and introduces him/herself stating his profile and experience of working with farmers and leads in climate setting).*

**Trainee introduction and climate setting**

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

**Plenary presentation on module Objectives**

The facilitator presents modules objective in power point

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

- Describe the concepts, characteristics, principles and plans of Farmer Field and Business School (FFBS) as a ‘learning by doing approach as it applies in Cotton
- Identify main differences between teaching and facilitation
- Understand how to conduct Agro Ecosystems Analysis (AESA) on the Cotton value chain enterprise
- Demonstrate how to successfully lay Participatory Technology Development (PTD) of the Cotton value chain TIMPs
- Develop FFBS Curriculum for the Cotton value chain

2.7.2 Overview of FFBS key activities (1 hour)

**Plenary presentation**

The facilitator takes the trainees through the main concepts and pillars of FFBS which include:

- The definition of FFBS
- Participatory technology development (PTD) for the Cotton value chain TIMPS
- Agro ecosystems Analysis (AESA) of the Cotton 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 Cotton value chain stages

2.7.3 Introduction to Communication and Communication skills (1 hour)

**Session Guide**

- Provide checklist for introduction of trainees to help them build confidence in participation
- Summarize and display trainees expectations
- Assign roles to the Sub groups
- Set Norms and nominate leaders
- Power point presentation on the Objectives of the FFBS training module

**Session guide**

- Power point presentation on the overview of Key activities in FFBS
### Group exercise to gauge the understanding of trainees on:
- What communication is,
- Communication channels,
- Barriers to effective communication and
- How to effectively communicate

<table>
<thead>
<tr>
<th>Plenary presentation</th>
<th>Communication and communication skills</th>
</tr>
</thead>
</table>

### Plenary presentation

#### Facilitation and leadership skills (1 hour)

<table>
<thead>
<tr>
<th>Plenary presentation</th>
<th>Session guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of Facilitation, facilitator and effective facilitation.</td>
<td>Power point presentation on Facilitation and leadership skills</td>
</tr>
<tr>
<td>Qualities of a good facilitator.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Golden rules of facilitation.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Roles and responsibilities of FFBS Facilitators.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Difference between facilitation and teaching</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Definition of leadership</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Elements of leadership</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Types of leadership</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Characteristics of a good leader</td>
<td>* Handouts</td>
</tr>
</tbody>
</table>

### Organization and management in FFBS 1 hour

<table>
<thead>
<tr>
<th>Plenary presentation</th>
<th>Session guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenary presentation on FFBS implementation framework in the FFBS steps;</td>
<td>Power point presentation</td>
</tr>
<tr>
<td>Ground working.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Training of Facilitators.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Establishing PTDs at the FFBS.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Season long FFBS sessions.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Evaluation of PTDs.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Field days.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Graduation.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Establishment of Lead FFBS.</td>
<td>* Handouts</td>
</tr>
<tr>
<td>Follow ups.</td>
<td>* Handouts</td>
</tr>
</tbody>
</table>

### Developing FFBS Curriculum for the Cotton value chain (1 hour 30 minutes)

<table>
<thead>
<tr>
<th>Session guide</th>
<th>Session guide</th>
</tr>
</thead>
</table>

21
### Plenary presentations

Steps of Participatory technology development on the Cotton value chain production

- Identify the major constraints to increased yields of Cotton value chain production
- Ranking of constraints in order from highest.
- Identify list of TIMPS to address the constraints
- Rank the TIMPS in order from the most preferred
- Develop PTD on the most preferred TIMP objective
- Decide on the parameters for AESA
- Develop FFBS curriculum using crop growth stage calendar for the Cotton value chain

### Group exercises

- Constraint identification and ranking
- TIMPS options identification and ranking
- Identification of the growth stages of the value chain crop and development of FFBS training curriculum

### 2.7.7 Module review (30 minutes)

<table>
<thead>
<tr>
<th>Session guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants Questions and answers</td>
</tr>
<tr>
<td>Facilitators Summary</td>
</tr>
<tr>
<td>Guideline on FFBS Cotton action plans (Group discussions)</td>
</tr>
</tbody>
</table>

### 2.8 Reference Materials

#### 2.8.1 Participants’ Handouts

#### 2.8.2 References


### Group exercises on

- Pair wise matrix ranking of constraints and TIMPs in Cotton value chain
- Curriculum development based on the value chain growth stages
- Presentations of the group exercises on flip charts
- Power point presentations on PTD and curriculum development
MODULE 3
GOOD AGRICULTURAL PRACTICES (GAPs) AND FOOD/FEED SAFETY MANAGEMENT SYSTEMS (F/FSMS)

3.1. Introduction

This module is designed for training and exposing trainees to good agricultural practices and food safety management system along the cotton 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 into the hands of food management systems which is 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 matters of food safety and quality along the cotton value chains understood and explained.
2. Utilisation of resources (water, soil, manure, fertilizers and other inputs) while optimising environmental protection and conservation described.
3. Worker safety and health within the crop production demonstrated.
4. Traceability in food safety and quality mapped and implemented.
5. Need for legal safe food production as a moral market requirement understood and
explained.
6. Risks/hazards of food safety along the crop production chain identified.
7. Critical control point (CCPs) and critical limits (CLs) at different levels of crop production mapped and determined.
8. Preventive and corrective measures for the control of hazards identified and defined.

3.3. Module Target Group

This module targets private and public agricultural extension service providers based at sub-county and ward level, lead farmers and all crops value chain players.

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 cotton value chain target Counties. The facilitators using this module should thoroughly familiarize themselves with the participants’ handouts (training materials).

3.5. Module Duration

The Module is estimated to take 8 hours

3.6 Module Summary

<p>| Module 3. Good Agricultural Practices (GAPs) and Food Safety Management Systems (FSMS) |</p>
<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6.1 Introduction, objectives and levelling of expectations</td>
<td>• Groups to bring out expectations</td>
<td>• Module objectives</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>• Plenary presentation</td>
<td>• Marker pens</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flip charts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Projector</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Laptop</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.6.2 Understanding GAP and its application in the crop value chains</td>
<td>• Plenary presentations</td>
<td>• Flip charts</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Group work</td>
<td>• Marker pens</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plenary</td>
<td>• Projector</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Laptop</td>
<td></td>
</tr>
<tr>
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<td>• Pictorials/video clips</td>
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<tr>
<td>3.6.3 Discussion of the factors to consider when selecting a site for agricultural activities through Risk Assessment</td>
<td>• Group Work</td>
<td>• Flip charts</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>• Farm visit within training site</td>
<td>• Marker pens</td>
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<td></td>
<td>• Group presentations</td>
<td>• Projector</td>
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<td></td>
<td></td>
<td>• Laptop</td>
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<td></td>
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<td>• Pictorials/video clips</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Data sheets</td>
<td></td>
</tr>
</tbody>
</table>
| 3.6.4 Review of GAP requirements for audit and types of protocols possible | • Group work  
    • Plenary presentations  
    • Mock audit | • Data forms  
    • Flip charts  
    • Marker pens  
    • Projector  
    • Laptop  
    • Pictorials/video clips  
    • Data sheets | 1 hour |
| --- | --- | --- | --- |
| **3.6.5 Introduction to Site Selection** | • Videos  
    • Plenary presentations  
    • Farm Walk | • Flip charts  
    • Marker pens  
    • Projector  
    • Laptop  
    • Pictorials/video clips | |
| **3.6.6 GAP checklists and Audit** | • Plenary presentations  
    • Group Work | • Flip charts  
    • Marker pens  
    • Projector  
    • Laptop | |
| **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** | • Brain storming  
    • Plenary presentation  
    • Group discussions | • Flip charts  
    • Marker pens  
    • Projector  
    • Laptop  
    • Pictorials/video clips | 30 minutes |
| **3.6.9 Determination of food safety risk/hazards in cotton value chains (hazard analysis)** | • Plenary presentation  
    • Group discussions | • Projector  
    • Laptop  
    • Flip charts  
    • Marker pens  
    • Participants’ hand outs | 30 minutes |
### 3.6.10 Determination of critical control points (CCPs) and critical limits (CLs) in cotton value chain

- Plenary Presentation
- Group discussions
- Projector
- Laptop
- Flip charts
- Marker pens

1 hour

### 3.6.11 Prevention and corrective measures for CCPs in cotton value chain

- Plenary Presentation
- Group discussions
- Flip charts
- Marker pens
- Power point projector
- Laptop
- Pictorials/video clips

1 hour

### 3.6.12 Module review

- Participants’ questions and comments
- Facilitator’s summary
- Participants’ hand outs
- Module review

30 minutes

**TOTAL** 8 Hours

### 3.7 Facilitator 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 (30 minutes)**
The facilitator invites the trainees to state their expectations after brain storming in their respective county groups.

**Module Objectives (30 minutes)**
The facilitator presents module’s objectives in power point.

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

- Explain GAP’s on matters of food safety and quality along the crop value chain.
- Demonstrate optimisation of utilisation 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 crop value chains

**Session Guide**

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

**Plenary Presentation**

- 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

**Session Guide**

- Power point presentation
- Participants hand outs
- Group exercises

### 3.7.3 Discussion of the factors to consider when selecting a site for agricultural activities throughout Risk Assessment

**Session Guide**

**Facilitator guides discussions on the key determinants of site suitability for agricultural activities.**

**Plenary discussion**

- 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)

**Session Guide**

- Power point presentation
- Participants hand outs
- Plenary discussion

### 3.7.4 Review of GAP requirements for audit and types of protocols possible

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

**Plenary presentation**

- 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.

**Session Guide**

- Power point presentation
- Participants hand outs
### 3.7.5 Introduction to Site Selection (1 hour)

**Session Guide**
- Power point presentation
- Participants hand outs

**Plenary Presentation**
- 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 (1 hour)

**Session Guide**
- Power point presentation
- Global GAP checklists
- Participants hand outs
- Group exercise

**Plenary Presentation**
- Need for mandatory records in GAPs
- Internal Audit procedures
- Practical on Mock Audits
- Interpretation of audit reports
- Compliance and corrective actions

**Group Exercise**
- 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
- Pesticide containers
- Knapsack sprayers
- Nozzles
- Participants hand outs
- Group exercise

**Plenary presentation**
- Formation of groups for practical activities
- Guided knapsack calibration
- Different types of nozzles and their uses
- Pesticide safety

**Group Exercise**
- Practical session on how to handle different types of pesticides, fungicides and herbicides together with their calibrations
### 3.7.8 Understanding Food Safety (30 minutes)

*The facilitator introduces food safety system by defining it and sharing its benefits with the trainees). Power points*

**Plenary Presentation**
- Overview of Food Safety Management Systems (FSMS).
- Why food safety is important in crop production systems.
- Risks to human/animal health due to exposure to chemical, biological and physical hazards.
- 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 guides discussions on the steps in identification of food safety hazards FSMS*

**Plenary Presentation**
- 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**
- Groups to identify major risk/hazards at points of crop production.
- Produce flow diagrams for the crop.

### 3.7.10 Determination of critical control points (CCP) in crop value chains (1 hour)
The facilitator introduces the topic on determination of critical control points (CCP)

**Plenary presentation**
- Why is important to determine CCP in production chain (preventing, eliminating or reducing risks).
- How to monitor and measure the CCP (point, step or procedure).
- How to document the CCP.
- How to establish critical limits (from standards or guidelines) for each CCP.

**Group Exercise**
- Groups to identify and establish critical control points and critical limits.

<table>
<thead>
<tr>
<th>Session Guide</th>
<th>Session Guide</th>
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</thead>
<tbody>
<tr>
<td><strong>3.7.11 Prevention and corrective measures for CCP in crop value chains (1 hour)</strong></td>
<td><strong>Plenary discussion</strong></td>
</tr>
<tr>
<td><em>The facilitator introduces the topic on prevention and control of possible hazards</em></td>
<td><em>The facilitator leads the trainees in summarizing the key points discussed in the module)</em></td>
</tr>
<tr>
<td><strong>Plenary presentation</strong></td>
<td><strong>Power point presentation</strong></td>
</tr>
<tr>
<td>- Establishment of corrective actions against CCP</td>
<td>- Participants hand outs</td>
</tr>
<tr>
<td>- Establish verification procedures for CCP</td>
<td>- Group exercises</td>
</tr>
<tr>
<td>- Establish record-keeping and documentation procedures</td>
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</tr>
</tbody>
</table>
3.8. Reference Materials

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

3.8.2 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

Cotton, *Gossypium hirsutum* in Kenya is grown by an estimated 400,000 small scale farmers on 350,000 hectares spread in 24 out of 47 counties in Nyanza, Western, Coast, Central, Eastern and Rift Valley regions, largely under rain-fed conditions and on average plot size of 1.0 ha. The two current commercial varieties KSA 81M and HART 89M grow well in areas below 1400 m above sea level in ecological zones LM 3, LM 4, L 3 and L4 and grow in many soils except in saline and waterlogged soils. The yield potential of KSA 81M and HART 89M is 2000 to 2500 kg/ha of seed cotton under rainfed conditions and 3000 to 3500 kg/ha under irrigated conditions in Hola and Bura respectively. The average cotton season is 4.5 - 11 months. In Western and Nyanza regions where annual rainfall is 900-1250mm annually, cotton season lasts from March to September whereas in Eastern and Central with annual rainfall of 600-1200mm; the season lasts from October to August. Similarly, in Coastal region with annual rainfall of 800-1200mm the season last from April to November and in Rift valley the season lasts from March to October. Due to the changing climate conditions and the increased demand for cotton lint and other cotton by products for spinning, and oil/feed for human and animal feed, there is need to offer farmers varieties that can grow in wide range of ecological areas while also meeting their quality needs. Knowledge on the production niches and climatic conditions for the production of the crop in the various target counties is necessary.

4.2 Module Learning outcomes

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

1. Importance of cotton in Kenya’s economy appreciated and explained
2. Altitudes and soil types/characteristics for cottons production identified
3. Climatic conditions (temperature, rainfall and humidity) required for cotton production described
4. County agro-ecological zones for cotton production described

4.3 Module Target Group and Categories

This module is intended for public and private agricultural extension service providers and lead farmers in the cotton value chain target Counties

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 cotton value chain target Counties. The facilitators using this module should thoroughly familiarize themselves with the participant’s handouts (training materials).
4.5. Module Duration

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

4.6 Module Summary

<table>
<thead>
<tr>
<th>Sessions</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>Presenter introductions</td>
<td>• Flips charts</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Participants expectations</td>
<td>Self-introduction of trainees (incl. individual</td>
<td>• Felt pens</td>
<td></td>
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<tr>
<td>Objectives</td>
<td>involvement in cottons</td>
<td>• Laptop for PowerPoint presentation</td>
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<tr>
<td></td>
<td>Plenary discussions to share expectations</td>
<td></td>
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<td></td>
<td>Presentations of objectives</td>
<td></td>
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</tr>
<tr>
<td>4.6.2 Importance of cotton in Kenya’s economy</td>
<td>Presentations</td>
<td>• Flips charts</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Plenary discussions</td>
<td>• Felt pens</td>
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<td>• Power Point presentation</td>
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<td>• Hand-outs</td>
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<tr>
<td>4.6.3 Cotton production ecological/climatic</td>
<td>Presentations</td>
<td>• Flips charts</td>
<td>1 hours</td>
</tr>
<tr>
<td>requirements for optimal yields</td>
<td>Plenary discussions</td>
<td>• Felt pens</td>
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<td>• Laptop for PowerPoint presentation</td>
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<td>• Hand-outs (Training notes)</td>
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<tr>
<td>4.6.4 Cotton production Agro-</td>
<td><strong>Group work to</strong> identify cotton production pockets</td>
<td>• Flips charts</td>
<td>1 hour</td>
</tr>
<tr>
<td>ecological zones (AEZs)- average yields, and</td>
<td>in the sub-Counties/ Counties</td>
<td>• Felt pens</td>
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<tr>
<td>constraints in the target Counties</td>
<td>Presentations</td>
<td>• Laptop for PowerPoint presentation</td>
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<td></td>
<td>Plenary discussions</td>
<td>• Hand-outs</td>
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<td></td>
<td>Field demonstration</td>
<td></td>
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<tr>
<td>4.6.5 Module review</td>
<td>Discussions/conclusion and way forward</td>
<td>• Flip charts</td>
<td>30 minutes</td>
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<td></td>
<td></td>
<td>• Laptop for power point presentations</td>
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**Total**                                         |                                                       |                                                | **4 hours** |
Module 4: Cotton production and appropriate climatic requirements

### 4.7.1. Introductions and climate setting (1 hour)

**Session Guide**

*The facilitator welcomes trainees to the module. Introduces him/herself. The trainers are then invited to introduce themselves and state their past or current involvement in cotton production - APVC*

**Objectives and expectations**

**Introduction of Objectives (30 minutes)**

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

- Define and explain the importance of cotton in Kenya’s economy
- Identify and describe altitudes and soil types/characteristics for cottons production
- Describe climatic conditions (temperatures, rainfall and humidity) required for cotton production
- Describe specific county agro-ecological zones for cotton production

**Expectations (30 minutes)**

The trainees go into groups (e.g. county based) and list their expectations from the module

**Session Guide**

- Summarize the facilitator/trainees involvement in cotton value chains
- PowerPoint presentations
- Group exercise (listing and presenting expectations).
- Expectations lists kept for later reviewing compliancy

### 4.7.2 Importance of cotton in Kenya’s economy (1 hour)

**Plenary Presentation (40 minutes)**

- Origin and place of cotton as crop
- Why cotton in Kenyan households
- Key counties producing cotton in Kenya
- General cotton production in Kenya

**Facilitator’s guided discussion (20 minutes)**

**Questions/answers/comments**

**Session Guide**

- PowerPoint presentation
- Distribute participants’ handouts (training materials)

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

**Plenary Presentation (40 minutes): Presentation on cotton topics such as:**

- Importance of cotton in Kenya’s economy
- Altitude and Agro-ecological zones
- Climatic conditions (Rainfall, Temperature and humidity)
- Soils (soil types, pH, general fertility for cotton)

**Facilitator’s guided discussion (20 minutes)**

**Questions/answers/comments**

**Session Guide**

- PowerPoint Presentation
- Distribute to participants Handouts (training materials)
### 4.7.4. Cotton production AEZs (villages), average yields, and constraints in the target Counties (45 minutes)

#### Plenary Presentation (15 Minutes)

#### Group work (30 minutes)

Facilitator guides in reviewing and discussing cotton suitability map (County by County)

Trainer to bring out specific County or sub-county AEZs, land size, yields and constraints to cotton production. Then, the trainees provide in the plenary:

- Agro-ecological zones (AEZs) and % area suitable for cotton
- Average land/farm size under cottons
- Average cottons yield per farm
- Constraints to cotton production

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

Let the trainee groups share the exercise outcomes

### 4.7.5. Module review (15 minutes)

*The facilitator leads the trainees in reviewing the module*

Together discuss and summarize the main points from the training with specific reference to:

- Objectives and expectations (review done on basis of the earlier listed objectives and expectations)
- Cotton production ecological/climatic requirements
- Cotton production AEZs (villages) average yields, and constraints in the target Counties
- Randomly (average of 10 cases), *trainees indicate new thing(s) learnt from the module. The results are recorded per county presented*
- Randomly (average of 10 cases) trainees pin-point the way forward issues.

### 4.8 Reference Materials

#### 4.8.1 Participants’ Handouts

2. Leaflets

#### 4.8.2 Reference

Cotton Handbook (A guide for farmers and extension officer), 2013 ; CODA
5.1. Introduction

This module is designed for training farmer Master Trainers on improved cotton varieties, their uses and target area of production. The various cotton varieties are released for different ecological areas. There are varieties for lower eastern, the western, the Lake Victoria region and the Rift Valley. Cotton is primarily grown for lint but seed oil can be extracted for confectionary and industrial uses, and for livestock feed. Due to the change of climate towards drier conditions and the increased demand for cotton lint for industrial processing farmers from a wide variety of ecological areas are demanding for superior cotton varieties. However, they are not able to identify the varieties suited to their regions and needs. There is therefore need for farmer trainers in the cotton target counties to be trained to understand the different cotton varieties, their suitable areas of production and their end uses.

Cotton belongs to the genus *Gossypium* which has 52 species. Of these four are cultivated, *G. hirsutum, G. arboreum, G. herbaceum* and *G. berbadense*. The two commercial varieties grown in Kenya belong to the species hirsutum. While most wild types are diploids, two of the cultivated species are tetraploids. The species and the varieties differ in their response to abiotic and biotic stress factors, yield and quality characteristics. The Bt. Varieties belong to any of the four species but have genes or crystal protein isolated from *Bacillus thuringiensis* inserted into its genome through genetic engineering. The proteins have toxicity to boll worms which is the most serious pest of cotton.

5.2. Learning Outcomes

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

1) The cotton crop described
2) The various improved cotton 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 private and public agricultural extension service providers and lead farmers in the cotton value chain in the target cotton growing 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 cotton value chain target Counties. The facilitator using this module should thoroughly familiarize themselves with the participant’s handouts (training materials).
5.5. Module Duration
The Module is estimated to take 4 hours

5.6. Module Summary

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1. Introduction and Objectives</td>
<td>Plenary presentation</td>
<td>• Flip charts</td>
<td>1 hour</td>
</tr>
<tr>
<td>and Expectations</td>
<td>Group discussions and presentation of expectations</td>
<td>• PowerPoint</td>
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<tr>
<td>5.2. Introduction to various</td>
<td>Group Exercises to identify local cotton varieties</td>
<td>• PowerPoint</td>
<td>1 hour 30</td>
</tr>
<tr>
<td>improved cotton varieties, their</td>
<td>Plenary Presentations</td>
<td>• Flip charts</td>
<td>minutes</td>
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<tr>
<td>ecological areas of cultivation</td>
<td>On-farm practical demonstration</td>
<td>• Manila papers</td>
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<td>and their attributes and uses.</td>
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<td>• Mark pens</td>
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<tr>
<td>5.3. Appropriate variety for</td>
<td>Plenary Presentation</td>
<td>• PowerPoint</td>
<td>1 hour</td>
</tr>
<tr>
<td>specific regions</td>
<td>Group Exercises</td>
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<tr>
<td>5.4. Module review</td>
<td>Group Exercises</td>
<td>• Participants’ handouts</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>Facilitator’s summary</td>
<td>• Module review</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Participants’ handouts</td>
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<tr>
<td></td>
<td></td>
<td>• Cotton manual</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>4 hours</strong></td>
</tr>
</tbody>
</table>
5.7. Facilitators Guidelines

Cotton Variety Selection

5.7.1 Introduction and levelling of expectations and objectives (1 hour)

**Introduction (30 minutes)**

(The facilitator welcomes trainees to the module on cotton 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 (30 minutes)**

(The facilitator presents modules objectives)

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

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

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

(The facilitator should describe the cotton crop, The facilitator should be able to guide the trainees in identifying the various cotton improved varieties and their uses).

**Group work (10 minutes)**

Ask trainees highlight and describe some of the cotton varieties they know.

**Plenary Presentation (20 minutes)**

- What is cotton?
- Improved cotton varieties.
- Categories of cotton varieties for quality lint and oil content.

Display to the trainees the photographs of each variety and the full description and its uses.
5.7.3 Recommended cotton varieties for the target counties (2 hours)

Plenary Presentation

Varieties for the target counties (30 minutes)
- Cotton growing regions and the new regions which are being targeted for cotton cultivation in Kenya.
- Cotton varieties suited for various agro-ecological zones and uses
- County climate conditions for target county (semi-arid, hot dry)

Group Exercises (30 minutes)
Trainees discuss and come up with cotton varieties in their counties

Group Exercises (1 hour)

(Ensure there is an established plot of all the varieties or cotton plant samples).
- Visit the cotton plot 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 cotton plant samples for the various varieties)

5.7.4 Module review (30 minutes)

(The facilitator leads the trainees in reviewing the module)

Group Exercise
Summarize the main points of the training
Together with the trainees review the main points about improved cotton varieties
- 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 cotton varieties?
- What questions do you still have about identification of cotton varieties?

5.8. Reference Materials

5.8.1 Participant’s Handouts
2. Leaflets
3. Cotton growing recommendations
4. Cotton production manual

5.8.2 References:
- Cotton Handbook (A guide for farmers and extension officer), 2013 ; CODA
- Munro J. M., 1987 ; Cotton
6.1. Introduction

Seed is that part of the plant that is used to produce the next generation plants. It is the most important and indispensable input in any crop enterprise and good quality seed is key to successful production. Seed should be available where and when the farmer needs it. Seed must be grown and processed following certain protocols as provided in the legislation. A bumper harvest starts with good quality seed, use of low quality or recycled seed reduces varietal potential even of the best variety. However in Kenya all cotton farmers use seed recycled from the ginneries bought throughout government subsidies. Continued use over many years of recycled seed has led to admixtures and varietal potential deterioration. Conditions in which seed is stored will determine viability and hence germination ability which is important to farmers. Cotton seed processing requires unique infrastructure considered uneconomical, thus undermining the incentives for private sector investment in commercial production and marketing of such seeds. This in turn has limited the dissemination of improved high-quality cotton seed. This module exposes service providers, lead farmers and facilitators to seed and the various seed systems in cotton production. The module also covers the importance of quality seed, how to improve on cotton seed provision. It also covers community seed production and gives direction on how to interface formal and informal seed production to enable farmers venture into commercial grain production. A proper seed system should include collection and maintenance of germplasm with novel traits apart from a certification and multiplication strategies. It is rather dangerous and risk to rely on importation and farmer saved seed. There is need to invest in long term seed storage because genetic purity of elite varieties can be lost if not handled professionally.

6.2 Module Learning outcomes

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

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

6.3. Module Target Group and Categories

This module is intended for service providers and county public extension agents.

6.4. 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 cotton value chain target Counties. The facilitators using this module should thoroughly familiarize themselves with the participants’ handouts (training materials).
6.5. Module Duration

The Module is estimated to take 4 hours

6.6. Module Summary

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.6.1 Introduction, objectives and expectations</td>
<td>Personal introductions</td>
<td>● Flips charts</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>Presentations</td>
<td>● Felt pens</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plenary discussions</td>
<td>● PowerPoint presentation</td>
<td></td>
</tr>
<tr>
<td>6.6.2 Definition of seed and seed system in Kenya</td>
<td>Group work</td>
<td>● Flips charts</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Presentations</td>
<td>● PowerPoint presentation</td>
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<td></td>
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<td>● Flips charts</td>
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<td></td>
<td></td>
<td>● Felt pens</td>
<td></td>
</tr>
<tr>
<td>6.6.3 Formal seed system in Kenya</td>
<td>Presentations</td>
<td>● PowerPoint presentation</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Discussions</td>
<td>● Flips charts</td>
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<tr>
<td></td>
<td></td>
<td>● Felt pens</td>
<td></td>
</tr>
<tr>
<td>6.6.4 Informal seed system in Kenya</td>
<td>Presentations</td>
<td>● PowerPoint presentation</td>
<td>1 hour</td>
</tr>
<tr>
<td></td>
<td>Discussions</td>
<td>● Flips charts</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>● Felt pens</td>
<td></td>
</tr>
<tr>
<td>6.6.5 Module review and discussions</td>
<td>Group work</td>
<td>● Flips charts</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>Discussions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>presentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>4 hours</strong></td>
</tr>
</tbody>
</table>
### Module 6: Cotton Seed System

#### 6.7.1. Introduction and levelling of expectations and objectives (1 hour)

**Introduction (30 minutes)**
*(The facilitator welcomes trainees to the module on main cotton seed system. They are then invited to introduce themselves and state their expectations)*

**6.7.1. Module Objectives (30 minutes)**
*(The facilitator presents modules objectives)*

*By the end of the training module the trainee should be able to:*
- Describe the main cotton seed systems in Kenya.
- Explain and discuss the importance of formal seed system in cotton production.
- Explain and discuss importance of 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)

**Group work and presentations: (30 Minutes)**
- What is quality seed?

**Plenary Presentation (30 Minutes)**
- What is a seed system and characteristics of main seed systems (formal and informal seed systems)?
- Commodity corridors

#### 6.7.3 Formal seed system in Kenya (30 minutes)

**Plenary presentations highlighting:**
- Legal requirements for seed certification
- Seed certification process
- Post certification activities for enforcing the Seed Act cap 326
- Post control activities for seed quality assurance
- Seed importation and exportation requirements

**Session Guide**
- Group work
- PowerPoint presentation
- Distribute participants’ handouts
- Brochures, Leaflets,

#### 6.7.4 Informal seed system in Kenya (1 hour)

**Plenary presentations: (30 Minutes)**
- Seed multiplication
- Cotton seed standards and commercial production
- Informal seed system
- Community seed bulking and how is it implemented
- Synergies for formal and informal seed system

**Group work and discussions (30 Minutes)**
Calculate seed requirements for the county/ward/farmer group) and present

**Session Guide**
- Group work
- PowerPoint presentation
- Distribute participants’ handouts
- Brochures, Leaflets,
6.7.5 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:

- Cotton seed systems and their characteristics
- Importance of using certified seed
- Informal seed

(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?)

6.8 Reference Materials

6.8.1 Participants’ Handouts

- Cotton growing recommendations
- Cotton production manual

6.8.2 References

1. Cotton production handbook 2012
2. Munro 1987
7.1 Introduction

There are eight registered cotton varieties in Kenya. In order for farmers to reap maximum benefits from these varieties they are advised to use the recommended agronomic practices. There is therefore need for farmer facilitators in the cotton target counties to be facilitated to guide farmers on the appropriate agronomic practices, seed selection techniques, and disease and pest management.

7.2 Module Learning outcomes

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

1. Agronomic practices for cotton production described and explained
2. Region specific advice on cotton production agronomic practices outlined
3. Inputs and their right measurements for cotton production identified
4. Timing for operations or inputs application in cotton production described and explained

7.3 Module Target Group and Categories

This module is intended for public agricultural and private extension providers in the cotton 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 thoroughly familiarize themselves with the trainees’ handouts or training materials.

7.5 Module Duration

The module is estimated to take 4 hours

7.6 Module Summary

<table>
<thead>
<tr>
<th>Module 7: Cotton climate smart agronomic practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sessions</strong></td>
</tr>
</tbody>
</table>
| 7.6.1 Introductions and climate setting | • Presenter introductions  
• Self-introduction of trainees individual involvement in cotton  
• Plenary discussions | • Flips charts  
• Felt pens  
• Laptop for power point presentation | 30 minutes |
### 7.6.2 Objectives and expectations
- Presentations
- Group work
- Plenary discussions
- Flips charts
- Felt pens
- Laptop for power point presentation

### 7.6.3 Agronomic practices for cotton production
- Presentations
- Practical work
- Plenary discussions
- Flips charts
- Felt pens
- Laptop for power point presentation

### 7.6.4 Appropriate inputs and their dosages in cotton optimal production
- Presentations
- Group work
- Plenary discussions
- Flips charts
- Laptop for power point presentation
- Participants’ handouts

### 7.6.5 Module review and discussion
- Plenary
- Flip charts
- Laptop for power point presentations

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentations</td>
<td>1 hour</td>
</tr>
<tr>
<td>Practical work</td>
<td>1 hour</td>
</tr>
<tr>
<td>Plenary discussions</td>
<td>1 hour</td>
</tr>
<tr>
<td>Flips charts</td>
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<tr>
<td>Felt pens</td>
<td></td>
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<tr>
<td>Laptop for power point presentation</td>
<td></td>
</tr>
<tr>
<td>Participants’ handouts</td>
<td></td>
</tr>
<tr>
<td>Plenary</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Flip charts</td>
<td></td>
</tr>
<tr>
<td>Laptop for power point presentations</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4 hours</td>
</tr>
</tbody>
</table>

### 7.7 Facilitator’s Guidelines

**Module 7: Climate smart agronomic practices for cotton**

#### 7.7.1. Introductions, climate setting (30 minutes)
*The facilitator welcomes trainees to the module. Introduces him/herself. The trainers are then invited to introduce themselves and state their past or current involvement in cotton production _APVC*

**Session Guide**
- Summarize the facilitator/trainees involvement in cotton value chains

#### 7.7.2 Objectives and expectations (1 hour)

**Facilitator guides on getting:**

**Objectives (30 minutes)**
The facilitator presents the module objectives.
By the end of the training module, the trainee must be able to:
1. Explain and describe agronomic practices for cotton production
2. Describe and explain inputs and their right dosages for cotton production
3. Provide region specific advice on cotton production agronomic practices
4. Specify the right timing for operations or inputs application in cotton production

**Expectations (30 minutes)**
The trainees go into groups (e.g. county based) and list expectations from the module

- PowerPoint presentations
- Group exercise (listing and presenting expectations).
- Expectations lists kept for later reviewing compliancy
### 7.7.3. Agronomic practices for cotton production (1 hour)

<table>
<thead>
<tr>
<th>Plenary Presentation (40 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The facilitator presents critical factors on:</td>
</tr>
<tr>
<td>• Factors for selecting cotton as an enterprise</td>
</tr>
<tr>
<td>• Climate smart land preparation</td>
</tr>
<tr>
<td>• Climate smart planting (seed rates, plant density)</td>
</tr>
<tr>
<td>• Thinning,</td>
</tr>
<tr>
<td>• Weed control</td>
</tr>
<tr>
<td>• Pests and disease control</td>
</tr>
<tr>
<td>• Rogueing,</td>
</tr>
<tr>
<td>• Cropping systems</td>
</tr>
<tr>
<td>• Spacing (inter-and intra-row spacing)</td>
</tr>
<tr>
<td>• Conservation agriculture principles/benefits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discussions (20 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions/answers and comments</td>
</tr>
</tbody>
</table>

### 7.7.4. Appropriate inputs for cotton optimal production and their correct doses (1 hour)

<table>
<thead>
<tr>
<th>Group work (30 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The facilitator guides trainees to list or/and present the required inputs for use in cotton production</td>
</tr>
<tr>
<td>• The trainees get into county groups to provide lists of cotton inputs and the rates used by farmers.</td>
</tr>
<tr>
<td>• The groups present their results in the plenary - opening up for questions, answers and discussions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plenary presentation (30 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The facilitator gives a PowerPoint presentation on the recommended cotton inputs (seeds, fertilizers, manures, etc.) and their rates, and their time of application for optimal yields of cotton.</td>
</tr>
</tbody>
</table>

### 7.7.5. Module review (30 minutes)

<table>
<thead>
<tr>
<th>(The facilitator leads the trainees in reviewing the module)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary for the main points from the training</td>
</tr>
<tr>
<td>• Objectives and expectations (review done on basis of the earlier listed objectives and expectations)</td>
</tr>
<tr>
<td>• Randomly (average of 10 cases), trainsees indicate new things learned from the module. The results are recorded per county presented</td>
</tr>
<tr>
<td>• Randomly (average of 10 cases) trainsees pin-point the way forward issues.</td>
</tr>
</tbody>
</table>
7.8 Reference Materials

7.8.1 Participants’ Handouts

- Cotton leaflets
- Cotton growing recommendations
- Cotton production manual

7.8.2 References

- Cotton Handbook (A guide for farmers and extension officer), 2013 ; CODA
- Munro J. M., 1987 ; Cotton
MODULE 8

INTEGRATED SOIL AND WATER MANAGEMENT PRACTICES FOR COTTON PRODUCTION

8.1 Introduction

Poor soil conditions and unreliable moisture availability in most smallholder cotton 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 cotton 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. Cotton is mostly cultivated by smallholder farmers with minimal inputs. Drought management technologies to mitigate drought effects in cotton 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 cotton production systems. This module introduces cotton value chain service providers, lead farmers, public Agriculture extension staffs and facilitators to the importance of integrated soil and water management practices for enhanced cotton 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 understood and described
2. Soil and plant tissue sampling for laboratory analysis, interpretation and utilization of results from accredited laboratories in Kenya outlined
3. Soil fertility and plant nutrition for increased crop productivity (4R Stewardship that includes nutrient source and application rates, timing and placement) understood and explained
4. Soil health and Integrated Soil Fertility Management (ISFM) for climate resilient cropping understood and explained
5. Water harvesting technologies, water quality for dry cotton production together with soil and water management described
6. Identification of temporary or permanent decline in the productive capacity of land and how to solve soil degradation challenges demonstrated
7. Occurrence of problematic soils and their management appreciated

8.3 Module Target Group and Categories

This module is intended for cotton value chain service providers and County extension agents in the cotton 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) and Lead Farmers in the cotton value chain target Counties. The facilitators using this module should thoroughly familiarize themselves with the participants’ handouts (training materials).

8.5 Module Duration

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

8.6 Module Summary

| Module 8: Integrated soil and water management practices for cotton production |
| --- | --- | --- | --- |
| Sessions | Training methods | Training materials | Duration |
| 8.6.1 Introduction, objectives and expectations | • Personal introduction  
• Presentations  
• Plenary discussions | • Flip charts  
• Marker pens  
• PowerPoint presentation | 30 minutes |
| 8.6.2 Soil composition, properties and health, | • Presentations  
• Practical’s on how to conduct soil sampling and analysis | • Flip charts  
• Marker pens  
• PowerPoint presentation  
• Participants’ handouts | 30 minutes |
| 8.6.3 Soil and plant tissue sampling and analysis | • Presentations  
• Field demonstrations (Conduct soil and plant tissue sampling and analysis) | • Flip charts  
• Marker pens  
• PowerPoint presentation  
• Participants’ handouts | 1 hour |
| 8.6.4 Soil fertility and plant nutrition | • Presentations  
• Field demonstrations | • Flip charts  
• Marker pens  
• PowerPoint presentation  
• Participants’ handouts | 30 minutes |
| 8.6.5 Soil health and (ISFM) for climate resilient cropping systems | • Presentations  
• Field demonstrations | • Flip charts  
• Marker pens  
• PowerPoint presentation  
• Participants’ handouts | 30 minutes |
<table>
<thead>
<tr>
<th>Topic</th>
<th>Activities</th>
<th>Time</th>
</tr>
</thead>
</table>
| **8.6.6 Soil and water management and water harvesting technologies** | • Presentation  
• Field demonstrations  
• Flip charts  
• Marker pens  
• PowerPoint presentation  
• Participants’ hand-outs | 30 minutes |
| **8.6.7 Soil degradation and reclamation**                            | • Presentations  
• Field demonstrations  
• Flip charts  
• Marker pens  
• PowerPoint presentation  
• Participants’ hand-outs | 30 minutes |
| **8.6.8 Problematic soils and their management**                      | • Presentations  
• Field demonstrations  
• Flip charts  
• Marker pens  
• PowerPoint presentation  
• Participants’ hand-outs | 30 minutes |
| **8.6.9 Module review and discussion**                                | • Discussions  
• Flip charts | 30 minutes |

**Total** 5 hours

### 8.7 Facilitator’s Guidelines

**Module 8: Integrated soil and water management practices for cotton production**

**8.7.1. Introduction, Objectives and Expectations (30 minutes)**

*Session Guide*
(The facilitator welcomes trainees to the module on sustainable water and soil fertility management practices for optimal production of cotton 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:
• Explain soil composition and what constitutes a healthy soil, including soil classification
• Describe and discuss soil and plant tissue sampling for laboratory analysis, interpretation and utilization of results from accredited laboratories in Kenya
• Explain soil fertility and plant nutrition for increased crop productivity (4R Stewardship that includes Right source, Right application rates, Right timing and Right placement)
• Demonstrate soil health and Integrated Soil Fertility Management (ISFM) for climate resilient cropping systems
• Describe water harvesting technologies, soil and water management
• Describe identification of temporary or permanent decline of land productive capacity and provide various solutions to soil degradation
• Demonstrate awareness of the occurrence of problematic soils and their management

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

Plenary Presentation (20 minutes)
Soil composition, properties and health
• Description of soil composition
• Description of soil properties
• Describe what soil health is all about

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 on soil sampling (30 minutes)
Demonstration on soil sampling method

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 dry cotton smallholder farming systems
- Integrated Soil Fertility Management techniques
- Soil management guidelines

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
- Dry cotton intercrops and crop rotation as climate resilient cropping systems

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)

Session Guide
- PowerPoint presentation
- Distribute participants’ hand-outs
- Brochures, leaflets and manuals

Practical Demonstration
Plenary Presentation (20 minutes)
- Principles of soil management for increased cotton productivity
- Methods of tillage systems that conserve water for cotton use.
- Principles of soil fertility management for increased cotton productivity
- Methods of soil fertility management for increased cotton productivity

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

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

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. Reference Materials

8.8.1 Participants’ Hand-outs
- Soil Management Leaflets [KCEP-CRAL PAMHPLETS 2019]

8.8.2 References
- OFRA Technical
9.1 Introduction

Cotton production in Kenya is faced with many production constraints which result in low yields of poor quality seed cotton. Among the constraints are pests, diseases and weeds which cause 40-70% yield losses. The most important cotton pests in Kenya include the aphids (Aphis gossypii Glover), red spider mites (Tetranychus telarius L), thourips (Frankliniella spp.), whitefly (Bemisia tabaci), cotton lygus and the African bollworm (Helicoverpa armigera Hubner). Aphids and whiteflies also act as vectors of viral diseases. Mealybugs have recently become a major pests of cotton especially in eastern and coastal regions of Kenya. The main disease problem in Kenya has been bacterial blight (Xanthomonas malvacearum) that has caused considerable damage to cotton in some parts of Kenya. Other diseases include angular leaf spot, verticilium and fusarium wilts, boll rots and damping off.

Weeds are undesirable plants growing amidst cotton where they compete for moisture, nutrients, light and space leading to low yields and poor quality cotton. The main pest management measure employed by majority of our farmers is the application of synthetic fungicides, insecticides, miticides and herbicides. These products should however be used only when damage reaches economic thresholds. Synthetic pesticides used may pose health hazards, environmental pollution, resistance development in insect pests, resurgence of new insect pests and toxicity to natural biological agents.

It is good to note that there is no single method that is sufficient for the control of pests, disease or weeds in cotton production. In order to avoid these problems, there is need for integrated methods in pest, disease and weed control. These should include cultural, physical, biological and chemical control methods.

9.2 Module Learning Outcomes

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

- Steps to identification of major pests, diseases and weeds are understood and explained
- Integrated pest, disease and weed management in cotton Described
- Skills and knowledge on safe use of pesticides demonstrated

9.3 Module Target Group

This module targets agricultural extension service providers, private extension 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) and Lead Farmers in the cotton value chain target Counties. The facilitators using this module should thoroughly familiarize themselves with the participants’ handouts.
(training materials).

## 9.5 Module Duration

The Module is estimated to take **6 hours**

## 9.6 Module Summary

<table>
<thead>
<tr>
<th>Module 9: Crop Health</th>
<th>Sessions</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>• Personal introductions • Group work • Plenary Presentations • Plenary discussions</td>
<td>• Flips charts • Marker pens • Laptop • Projector</td>
<td>30 minutes</td>
<td></td>
</tr>
<tr>
<td>9.6.2 Major cotton pests that cause economic losses and their control methods; emerging/migratory (mealybugs and cotton jassids) pests.</td>
<td>• Group work • Plenary Presentations • Plenary discussions • Practical exercise • Group work to bring out major pests</td>
<td>• Flips charts • Marker pens • Laptop • Projector • Pest specimens and pictures • Participants’ handouts</td>
<td>1 hour</td>
<td></td>
</tr>
<tr>
<td>9.6.3 Sustainable Integrated cotton pest management practices; scouting, post-harvest pests and threshold determination.</td>
<td>• Presentations • Plenary discussions • Nearby field visit • Presentation</td>
<td>• Flip charts • Marker pens • Laptop • Projector • Participants handouts</td>
<td>30 minutes</td>
<td></td>
</tr>
<tr>
<td>9.6.4 Major cotton diseases that cause economic losses, conditions that favour their development and control methods determined</td>
<td>• Group work • Presentations • Plenary discussions • Practical Exercise</td>
<td>• Flip charts • Marker pens • Laptop • Projector • Pictures of cotton diseases • Participants’ handouts</td>
<td>1 hour</td>
<td></td>
</tr>
<tr>
<td>9.6.5 Sustainable Integrated cotton disease management; scouting and threshold levels determination</td>
<td>• Presentations • Plenary discussions • Field demonstration</td>
<td>• Flip charts • Marker pens • Laptop • Projector • Participants’ handouts</td>
<td>30 hours</td>
<td></td>
</tr>
<tr>
<td>9.6.6 Major cotton weeds that cause economic losses, conditions that favour their development and control methods</td>
<td>Presentations</td>
<td>Flip charts</td>
<td>1 hour</td>
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<tr>
<td>• Plenary discussions</td>
<td>• Marker pens</td>
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<td></td>
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<tr>
<td>• Field demonstration</td>
<td>• Laptop</td>
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<td></td>
<td>• Projector</td>
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<tr>
<td></td>
<td>• Participants’ handouts</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>9.6.7 Sustainable Integrated cotton weed management; scouting and threshold levels determination</th>
<th>Presentations</th>
<th>Flip charts</th>
<th>30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Plenary discussions</td>
<td>• Marker pens</td>
<td></td>
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</tr>
<tr>
<td>• Field demonstration</td>
<td>• Laptop</td>
<td></td>
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<tr>
<td>• Group work</td>
<td>• Projector</td>
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<tr>
<td></td>
<td>• Participants’ handouts</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>9.6.8 Safe use of pesticides and update source for registered pesticides</th>
<th>Presentations</th>
<th>Laptop</th>
<th>30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Practical Exercise</td>
<td>• Projector</td>
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</tr>
<tr>
<td>• Plenary discussions</td>
<td>• Flip charts</td>
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<tr>
<td></td>
<td>• Marker pens</td>
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<td>• Participants’ handouts</td>
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<table>
<thead>
<tr>
<th>9.6.9 Module Review</th>
<th>Discussions/ Recap of module</th>
<th>Flip charts</th>
<th>30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Take away messages</td>
<td>• Sharing of presentations</td>
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</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>6 hours</th>
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</thead>
</table>

### 9.7 Facilitator’s Guidelines

**Module 9: Cotton Crop Health**

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

**Session Guide**
**Introduction (15 minutes)**  
(The facilitator welcomes trainees to the module on cotton 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 cotton pests that cause economic losses
- Explain and describe sustainable Integrated Pest Management (IPM) practices and scouting for threshold determination
- Identify the symptoms for specific diseases common in cotton producing areas
- Demonstrate skills in Integrated Disease Management (IDM) of cotton
- Identify major cotton weeds that cause economic losses
- Explain and describe sustainable Integrated Weed Management (IWM) practices and scouting for threshold determination

- Summarize trainees’ “Expectations” and display
- PowerPoint presentation
- Distribute participants’ hand-outs on Module Objectives and Training Program

<table>
<thead>
<tr>
<th>9.7.2. Major cotton pests that cause economic losses and their control methods; emerging/migratory pests (1 hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The facilitator presents the commonly known cotton pests that are of economic importance)</td>
</tr>
</tbody>
</table>

**Trainees organise themselves into groups by county**

**Group work (15 minutes)**
- Trainees discuss and develop cotton pest information from their counties

**Plenary Presentation (20 minutes)**
- Pest names and descriptions
- Symptoms of their infestation/type of damage
- Data on losses caused by the pests

**Practical session (15 minutes)**
- Identification of cotton pests from provided specimens
- Practical: show photographs of major pests

**Discussion (10 minutes)**
- Let the trainees recall what they learned and discuss any issue that may arise
### 9.7.3. Sustainable Integrated cotton pest management practices; scouting and threshold determination (30 minutes)

**Plenary Presentation (20 minutes)**
*Facilitator gives a powerpoint presentation on the following*
- IPM principles; how to implement the components, including cultural, physical, biological and chemical
- Critical areas to consider include when scouting
- Threshold determination, and detection of pests at harvest and post-harvest and when to implement control measures
  - Overview of post-harvest pests of cottons (cotton seed bugs and rodents)

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

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

**Group work (15 minutes)**
Trainees fall into their groups to:
- Determine major cotton diseases in specific counties

**Plenary Presentation (15 Minutes)**
Group representative make their presentations on:
- Cotton diseases and conditions that favour their development

**Practical Exercise (30 Minutes)**
- Identification of major disease species causing economic damage based on samples presented

### 9.7.5. Sustainable Integrated Diseases Management (IDM); scouting and threshold determination (30 minutes)

**Plenary Presentation (15 minutes)**
Facilitator gives presentation and leads discussion on:
- Critical areas to consider including scouting and when to implement cotton disease control measures
- Presentation on Integrated Disease Management (IDM) in cotton
- Safe use of pesticides

**Field Visit (15 minutes)**
- Visit nearby field to collect and identify diseased samples

**Session Guide**
- PowerPoint presentation by facilitator and representative group leaders on information on scouting for diseases
- Distribute participants’ Hand-outs (brochures, leaflets and manuals)
- Disease management guidelines
## 9.7.6. Major cotton weed that cause economic losses, conditions that favour their development and their control methods (1 hour)

<table>
<thead>
<tr>
<th>Group work (15 minutes)</th>
<th>Trainees go into their groups and:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Determine major cotton weeds in specific counties</td>
</tr>
</tbody>
</table>

**Plenary Presentation (15 Minutes)**
Representative group leaders give presentation on:
- Cotton weeds and conditions that favour their development

**Practical Exercise (30 Minutes)**
- Identification of major weed species causing economic damage based on samples presented

## 9.7.7. Sustainable Integrated Weed Management (IWM); scouting and threshold determination (30 minutes)

**Plenary Presentation (15 minutes)**
Facilitator makes presentation on
- Critical areas to consider including scouting and when to implement cotton weed control measures
- Integrated Weed Management (IWM) in cotton
- Safe use of pesticides

**Field Visit (15 minutes)**
- Visit nearby field to collect and identify diseased samples

## 9.7.8. Safe use of pesticides and update source for registered pesticides (30 minutes)

**Practical (10 minutes)**
Trainees go into their groups and discuss:
- Ways used by farmers in mixing of pesticides/ ITK products; and their consideration on safe use of pesticides

Representative group leaders give presentation on findings of the discussion

**Plenary presentation (20 minutes)**
Facilitator makes presentation on:
- Safe use of pesticides
- Let the trainees ask questions on any of the covered topical issues and critical areas to share with farmers on safe use of pesticides

## 9.7.9. Module review (30 minutes)
(The facilitator leads the trainees in reviewing the module)

Summarize the main points of the training
Together with the trainees review the main points about climatic conditions suitable for cotton production

- Cotton major pests and their economic losses
- Cotton Integrated Pest Management (IPM)
- Cotton major diseases and their economic losses
- Cotton Integrated Disease Management (IDM)
- Cotton major weeds and their economic losses
- Cotton Integrated Weed Management (IWM)

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

9.8. Reference Materials

9.8.1 Participants’ hand-outs

1. Pest identification and control factsheet
2. Disease identification and control factsheet
3. Cotton growing recommendations
4. Cotton production manual
5. Weed Management manual

9.8.2 References

1. CODA 2012. Cotton production handbook
10.1. Introduction

The traditional way of cotton harvesting and handling involves manually picking the cotton from the bolls by grasping the cotton lint at the base and twisting it out of the boll and placing it in a bag often without separating the grades. Manual seed cotton picking is labour intensive. Harvesting and postharvest seed cotton losses are attributed to improper handling, biological spoilage, insects and rodents damage. Deterioration results from undesired moisture levels brought about by improper drying and storage. In order to reduce losses facilitators should be equipped with management strategies for controlling harvesting, handling and postharvest losses to enable them advice farmers adequately to secure high returns from seed cotton productivity through improved on-farm seed cotton management to minimize pre and post-harvest losses.

10.2 Module Learning Outcomes

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

- Stage wise harvesting, handling and post-harvest practices for quality seed cotton including separation of grades during harvesting described
- Use of smallholder harvesting machines for adoption to reduce drudgery explained

10.3 Module Target Group

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

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 cotton value chain target Counties. The facilitators 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 30 minutes

10.6 Module Summary

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.6. 1. Introduction, Expectations</td>
<td>- Personal introduction discussion on expectations</td>
<td>- Flip charts</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>- Plenary presentation</td>
<td>- PowerPoint</td>
<td></td>
</tr>
</tbody>
</table>
10.6.2 Cotton harvesting and grading to maintain quality
- Plenary presentations
- Group Exercise
- Participant’s handouts
30 minutes

10.6.3 Cotton sorting and grading
- Plenary presentation
- On-farm practical demonstration
- PowerPoint
- Twin pocket bag
30 minutes

10.6.4 Handling/transportation and drying to maintain quality
- Plenary presentations
- Group Exercise
- PowerPoint
- Participants’ handouts
- Cotton Handbook
45 minutes

10.6.5 Seed cotton storage, storage pests and monitoring
- Plenary presentation
- On-farm practical demonstration
- PowerPoint
45 minutes

10.6.6 Module review
- Facilitator’s summary
- Group Exercise
- Module review
- The module’s handouts
30 minutes

TOTAL 3 hours 30 minutes

10.7 Facilitators guidelines

Module 10. Cotton harvesting and post-harvest management

10.7.1 Introduction and levelling of expectations and objectives (30 minutes).

Introduction and Module Objectives (15 minutes)
(The facilitator welcomes trainees to the module on harvesting and post-harvest management in cotton and introduces him/herself by stating his/her profile and experience.)

The facilitator presents module’s objectives
By the end of the module trainees should be able to:
- Explain the whole range of harvesting and post-harvest practices for quality seed cotton
- Explain machine harvesting of cotton for adoption to reduce labour input

Expectations (15 minutes)
Assist the trainees to state their expectations based on the objectives

10.7.2 Cotton harvesting and grading to maintain quality (manual/mechanized) (30 minutes)
(Facilitator presents and leads discussion on seed cotton quality requirements)

Plenary presentation (20 minutes)
- Summarize the quality standards for seed cotton and lint in Kenya and globally
- Describe the harvesting and drying of seed cotton

Group Exercises (10 minutes)
Let the trainees recall what they learned, raise issues on harvesting and discuss

10.7.3 Cotton sorting and grading (30 minutes)  
(Facilitator uses slides to train)

Plenary presentation (20 minutes)
The process of sorting and grading

Group Exercises (10 minutes)
Let the trainees recall what they learned, raise issues on harvesting and discuss

10.7.4 Handling/transportation and drying to maintain quality (45 minutes)  
Session Guide
- Use power point
- Handouts
- Brochures
- Leaflets

Plenary presentation (15 minutes)
Make a presentation of handling and drying to maintain quality

On-farm practical demonstration (30 minutes)
Demonstrate to trainees:
- The drying methods and moisture meter testing of cotton moisture content
- How the cotton is dried. Discuss any issues on cotton drying

Requirements:
- Seed cotton
- Moisture meter

10.7.5 Cotton storage techniques (45 minutes)  
Session Guide
- Use power point
- Handouts
- Brochures
- Leaflets

Plenary presentation
Make a presentation of the storage methods used to store cotton

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

Summary of the main points from the Module.

### Plenary presentation

Together with the trainees, summarize the main points of the training.

### Group Exercise

Together with the trainees review the main points about cotton harvesting and post harvesting

- 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 harvesting and post harvesting?

### 10.8. Reference materials

#### 10.8.1 Participant’s Handouts

1. Cotton Handbook
2. Cotton industry – Code of practice
3. Cotton leaflets
4. Brochures

#### 10.8.2 References

1. Cotton testing and classification guide – Ministry of Agriculture
2. Cotton Handbook - Ministry of Agriculture
 MODULE 11  
COTTON VALUE ADDITION

11.1. Introduction

Returns to value chain players are low due to limited knowledge of the various opportunities for value addition and product diversification to meet consumer needs. Farmers want better returns for their cotton but are not aware that uncharacterized lint does not attract good market. Testing of farmers’ cotton and availing important lint quality data to buyers during selling will mitigate loss of farmers’ lint value from subjective quality assessments. Apart from lint, two thirds of ginning process output is cotton seed as a by-product. There are market opportunities for products derived from seed value addition. Value addition will attract youth to agribusiness. It is therefore envisaged that promotion of value added options will greatly enhance adoption, production and returns from cotton. This module is designed for equipping the extension service providers with cotton value adding options and skills for training cotton farmers, youth and primary processors (ginners).

11.2 Module Learning Outcomes

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

- Cotton testing and classing described
- Value added products from cotton seed introduced and training outlined
- Value addition opportunities in cotton value chain identified and prioritized
- A value addition strategy for the priority opportunities emphasizing on suitability and growth demonstrated.

11.3 Module Target Group

This module targets agricultural extension service providers, home economics and food utilization extension staff and private extension service providers.

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 cotton value chain target Counties. The facilitators using this module should thoroughly familiarize themselves with the participants’ handouts (training materials).

11.5. Module Duration

The Module is estimated to take 7 hours
### Module 11. Cotton 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>• Introduction Presentation • Plenary Presentation</td>
<td>• Flip charts • PowerPoint</td>
<td>30 minutes</td>
</tr>
<tr>
<td>11.6.2. Cotton grading, testing and classing</td>
<td>• Plenary Presentation • Group Exercise</td>
<td>• Raw cotton samples • Lint samples • Cotton grading boxes • Cotton test reports and interpretation</td>
<td>1 hour</td>
</tr>
<tr>
<td>11.6.3. Introduction to good cotton ginning practices</td>
<td>• Plenary Presentation • Group Exercise</td>
<td>PowerPoint, leaflets</td>
<td>1 hour</td>
</tr>
<tr>
<td>11.6.4. Value added products from cotton seed and raw cotton/lint and their production</td>
<td>• Plenary Presentation • Samples demonstrated • Group Exercise</td>
<td>• Cooking oil, bio-diesel, hulls, seed cake, linters, yarns and handloom fabrics</td>
<td>1 hour 30 minutes</td>
</tr>
<tr>
<td>11.6.5. Prioritizing opportunities in cotton value addition</td>
<td>• Group exercise • Plenary Presentations</td>
<td>• List of value added products • Checklist for prioritization • Pair wise ranking tool • Flip charts</td>
<td>1 hour</td>
</tr>
<tr>
<td>11.6.6. Value addition strategy development</td>
<td>• Focused group discussion • Plenary presentation</td>
<td>• Flip charts • Participants’ handouts (sample charts)</td>
<td>1 hour 30 minutes</td>
</tr>
<tr>
<td>11.6.7. Module review</td>
<td>• Facilitator’s summary • Group Exercises</td>
<td>• Module review • Participants handout</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

**TOTAL** 7 hours

### 11.7. Facilitators Guidelines

**Module 11. Cotton value addition**

**11.7.1 Introduction and levelling of expectations and objectives (30 minutes)**
Introduction and Module Objectives (15 minutes)
(The facilitator welcomes trainees to the module on value addition opportunities in cotton and introduces him/herself by stating his/her profile and experience.)
The facilitator presents modules objectives.

Module Objectives
By the end of the module the trainee should be able to:
- Introduce and train on cotton value added products and services
- Identify and prioritize value addition opportunities in cotton value chain
- Demonstrate how to develop a value addition strategy for the priority opportunities

Expectations (15 minutes)
Assist the trainees to state their expectations based on the objectives

11.7.2 Introduction to Cotton grading, testing and classing (1 hour) SSession Guide
(Present slides on cotton grading (raw cotton) and lint testing and classing

Plenary Presentation (30 minutes)
Cotton fibre attributes
Make a PowerPoint presentation on important physical attributes for cotton fibres and their influencing factors

Group Exercises (30 minutes)
Discuss each quality parameter learnt about and let trainees raise issues

11.7.3. Introduction to good cotton ginning practices (1 hour) Session Guide
(Present slides on good ginning practices)

Plenary Presentation (30 minutes)
Cotton ginning
Make a PowerPoint presentation on good ginning practices

Group Exercises (30 minutes)
Discuss the practices and let trainees raise issues

11.7.4. Value added products from cotton seed and lint and their production (1 hour) Session Guide

- Handouts
- Program
- Note books
- pens

- Use PowerPoint
- Summarize trainees’ “Expectations” and display on flip chart/board.

- Cotton industry – Code of practice
- Cotton handbook
(Present slides on value added products from cotton seed and lint and introduce their production processes)

Plenary Presentation (30 minutes)
Make a PowerPoint presentation on value added products from cotton seed and lint and their production processes

Practical demonstration (2 hours)
Facilitator discusses and demonstrates each product

11.7.5 Prioritizing opportunities in cotton value addition (1 hour)

Group exercise (30 minutes)
(Facilitator guides the trainees to prioritize the cotton value added products)
- Divide the trainees into groups.
- Provide flipcharts, manila papers and pelt pens to each group.
- Let each group list cotton value products
- Assist the groups to priorities the listed products using pairwise ranking tool and present them.

Summarize the group work with the ranked list of products.

Group Exercise (30 minutes)
Allow trainees to raise any issues on cotton value added products and services ranking and discuss them.

11.7.6 Value addition strategy development (1 hour 30 minutes)

Focused group discussion (1 hour)
(Facilitator guides the trainees to develop the strategies for the value added products).
- Divide the trainees into groups. Provide flipcharts, manila papers and pelt pens to each group.
- Let each group discuss and come up with market strategies for the ranked products.
- Let each group present their strategies, discuss them and come up with a way forward.

Plenary Presentation (30 minutes)
Summarize the group work to come up with a list of market strategies for the products

11.7.7 Training review (30 minutes)
Group Exercise (30 minutes)
Review the main points about Cotton 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 cotton value addition?
- What questions do you still have about cotton value addition?

11.8. Reference Materials

11.8.1 Participants’ Hand outs
1. Pamphlets, leaflets.
2. Cotton industry – Code of practice
3. Cotton handbook

11.8.2 References
Cotton testing and classification guide – Ministry of Agriculture
Cotton Handbook - Ministry of Agriculture
Cotton industry – Code of practice, Kenya Bureau of Standards
12.1 Introduction

Agricultural mechanization is aimed at enhancing production, productivity and profitability in agriculture by achieving timeliness of farm operations. It comes along with precision in metering and placement of inputs, reducing susceptibility to input losses, increasing utilization efficiency of costly inputs (seed, chemical, fertilizer, irrigation, water, etc.), reducing unit cost of production, enhancing profitability and competitiveness in the cost of operation. It also benefits 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 have potential to revolutionize cotton 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
- Tractor mounted planter described and explained
- Use of pest control implements and tools demonstrated
- Harvest equipment identified and demonstrated

12.3. Module Target Group and Categories

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

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 participant’s handouts.

12.5. Module Duration

The Module is estimated to take a minimum of 32 hours

12.6. Module Summary

<table>
<thead>
<tr>
<th>Module 12. Mechanization of cotton production activities</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>
</tbody>
</table>
### 12.6.1 Introduction, Objectives and Expectations

- **Personal introductions/know your audience**
- **Presentations**
- **Plenary discussions**

- **Flip charts**
- **Power Point Presentations**

30 minutes

### 12.6.2 Climate Smart Land Preparation Tools

- **Presentations**
- **Plenary discussions**

- **Flip chart**
- **Power Point presentation**
- **Participants’ handouts**

30 minutes

### 12.6.3 Cotton Calibration of Fertilizer and Seed Rate for Planters

- **Presentations**
- **Plenary discussions**

- **Flip chart**
- **Power Point presentation**
- **Participants’ handouts**
- **Practical**

30 minutes

### 12.6.4 Cotton Chemical Implements and Tools Operations

- **Presentations**
- **Plenary discussions**

- **Flip chart**
- **PowerPoint presentation**
- **Participants’ handouts**
- **Practical**

30 minutes

### 12.6.5 Cotton Harvesting Machine Operating Principles

- **Presentations**
- **Plenary discussions**

- **Flip chart**
- **PowerPoint presentation**
- **Participants’ handouts**
- **Practical**

1 hour

### 12.6.7 Module Review

- **Presentations**

- **PowerPoint presentation**

30 minutes

**Total** 32 hours

### 12.7 Facilitator’s Guidelines

**Module 12: Mechanization of Cotton Production Activities**

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

*The facilitator welcomes trainees to the module on Cotton harvesting and post-harvest management that help reduce the post-harvest losses. They are then invited to introduce themselves and state their expectations*

**Module Objectives (30 minutes)**

The facilitator presents module objectives

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

- Identify and explain various climate smart tillage operations
- Describe and explain tractor mounted cotton planter operations
- Demonstrate pest control equipment and tools, usage
- Demonstrate cotton harvesting equipment

*In each case stating approximate prices and availability of machines*

**12.7.2 Cotton Climate Smart Land Preparation Tools (30 minutes)**

*Session Guide*

- Summarize trainees’ “Expectations” and display.
- PowerPoint Presentation
- Distribute Participants’ Handouts on Module Objectives and Training Program
(The facilitator gives a powerpoint presentation)

**Plenary Presentation (20 minutes)**

PowerPoint Presentation Highlighting:
- Overview of the cotton mechanization activities
- Climate smart tillage options

**Discussion (10 minutes)**

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

### 12.7.3. Cotton calibration of fertilizer and seed rate for planters (30 minutes)

**Plenary Presentation (20 minutes)**

PowerPoint Presentation Highlighting on:
- Description and explanation of tractor mounted cotton planting operations

**Discussion (10 Minutes)**

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

### 12.7.4. Cotton Chemical implements and tools operations (30 minutes)

**Plenary Presentation (20 minutes)**

PowerPoint Presentation Highlighting on:
- Techniques and methods of using cotton pest control equipment;

**Discussion (10 Minutes)**

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

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

**Plenary Presentation (30 minutes)**

PowerPoint Presentation Highlighting on:
- Techniques and methods of using cotton harvesting equipment

**Discussion (30 Minutes)**

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

### 12.7.6 Module review (30 minutes)

**Session Guide**

- PowerPoint presentation
- Distribute participants’ handouts
- Brochures, leaflets and manual
- All participants
The facilitator leads the trainees in reviewing the module.

Summarize the main points of the training and together with the participants review the main points:

- Various climate smart tillage operations
- Various tractor mounted planting operations
- Chemical implements and tools operations
- Harvester equipment operations
- Grading equipment operations

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

12.8. Reference Materials

12.8.1 Participants’ Handouts

1. KCEP Cotton Manual
2. Pamphlets, leaflets.
MODULE 13
COTTON BUSINESS AND MARKETING

13.1 Introduction

This module is designed to train Trainer of Trainers’ (ToTs’) in skills that are useful in cotton farming and marketing in Kenya. Cotton (Gossypium hirsutum) is considered as one of the most important fibre crops and a source of income for many people in the country. Under the Kenya Government’s policy for addressing poverty ‘Kenya Vision 2030’, cotton has been identified as a key sub-sector with the potential to benefit 8 million people in the drier areas of the country. However, currently, cotton is mainly grown solely by small-scale farmers in Western, Nyanza, Central, Rift Valley, Eastern and Coast regions of Kenya. Farmers grow most of the cotton on holdings of less than one hectare. Currently the production of cotton in farmers’ fields is low compared to research potential depending on the production region. The smallholder production is 500 – 1750 kilograms per hectare while the research potential is 2000 – 2500 per hectare. Markets and marketing of cotton is a major issue of concern to small scale farmers and other actors in the cotton value chain in Kenya, particularly inconsistency in supplying sufficient volumes required for trade, seasonal supply and price fluctuations. To strengthen the cotton value chain therefore it is important to equip farmer facilitators with the skills and knowledge on cotton farming business and marketing strategies.

13.2 Module Learning Outcomes

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

- Demonstrate understanding of business concept and appreciate emerging and inclusive farmer-market linking models
- Formulate a farm plan business using SWOT Analysis, farm budgeting and business plan
- Describe the tools for implementing a farm business: Record keeping, Break-even, Gross margin and entrepreneurship
- Explain the marketing approaches of cotton

13.3 Module Target Group

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

13.4 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 cotton value chain target Counties. The facilitators using this module should thoroughly familiarize themselves with the participants’ handouts (training materials).
13.5 Module Duration

The Module is estimated to take 2 hours

13.6. Module Summary

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.6.1. Levelling of participants’ expectations about the module</td>
<td>Personal introduction</td>
<td>PowerPoint</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Module introduction, Objectives</td>
<td>Discussion</td>
<td>Flip charts</td>
<td></td>
</tr>
<tr>
<td>Expectations</td>
<td>Personal introduction</td>
<td>Plenary presentations</td>
<td></td>
</tr>
<tr>
<td>13.6.2. Business concept, emerging and inclusive farmer-market linking models</td>
<td>Plenary presentations</td>
<td>Power point</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Exercise</td>
<td>Discussion</td>
<td>Flip charts, pelt pens</td>
<td></td>
</tr>
<tr>
<td>13.6.3. Planning a farm business: SWOT Analysis, farm budgeting and business plan</td>
<td>Plenary presentations</td>
<td>PowerPoint</td>
<td>20 minutes</td>
</tr>
<tr>
<td>13.6.4 Implementing a farm business: Record keeping, Break-even, Gross margin, entrepreneurship</td>
<td>Plenary presentations</td>
<td>PowerPoint</td>
<td>20 minutes</td>
</tr>
<tr>
<td>13.6.5 Marketing Approaches</td>
<td>Plenary presentations</td>
<td>PowerPoint</td>
<td>25 minutes</td>
</tr>
<tr>
<td>13.6.6. Training review</td>
<td>Facilitator’s summary: Takeaways</td>
<td>Module review</td>
<td>10 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participants</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Handouts</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL** 2 hours
13.7 Facilitators Guidelines

Module 13. Cottons Business and Marketing

13.7.1 Module introduction Levelling participants’ expectations about the module, objectives and expectations (25 minutes)

13.7.1.1 Module Title
(The facilitator welcomes trainees to the module on cottons farming as a business and marketing strategies and introduces him/herself by stating his/her profile and experience. The facilitator asks the trainees to state their expectations by listing on a flip chart)

(The facilitator introduces the module and states the objectives and expectations)

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

- Understand business concept and appreciate emerging and inclusive farmer-market linking models
- Be able to plan a farm business using SWOT Analysis, farm budgeting and business plan
- Understand the tools for implementing a farm business: Record keeping, Break-even, Gross margin and entrepreneurship

Understand the marketing approaches of cotton

Plenary Discussion

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 (5 minutes)
Make presentation on the business concept and emerging farming business models

Group Exercise (15 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)

Session Guide

- Handouts
- Program
- Note books
- Pens
- PowerPoint slides
- Summarize trainees’ “Expectations” and display on flip chart/board.
- PowerPoint slides
- Factsheets
(The facilitator highlights the components of SWOT matrix and their interactions to generate opportunities based on the other components)

Plenary Presentation (10 minutes)
- SWOT (S = Strengths, W = Weaknesses, O = Opportunities, T = Threats)
- Budgeting
- Business planning

Group Exercise (10 minutes)
List the strengths, weaknesses, opportunities and threats in cottons 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)

Plenary Presentation (15 minutes)
(The facilitator highlights the importance of the tools in managing cottons production as a farm business)
- The farmer as an entrepreneur
- Record keeping
- Profitability assessment (break-even & gross margin)

Plenary Discussion (5 minutes)

13.7.5 Marketing approaches (25 minutes)

Plenary Presentation (20 minutes)
(The facilitator highlights the marketing strategies for the cottons farm business)
- Market research
- Producer organizations
- Contract farming
- Online/internet marketing

Plenary Discussion (5 minutes)

13.7.6 Training review (10 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

Session Guide
- Handouts
- Flip charts,
- Manila papers,
- Felt pens

Session Guide
- Use power point
- Handouts

Session Guide
- Use power point
- Handouts

Session Guide
Summary of the main points from the Module.
13.80 References Materials

13.8.1 Participants handouts

13.8.2 References

3. United States Agency (USAID) (2018). Policy brief enhancing investment attractiveness in
MODULE 14
CROSS CUTTING ISSUES

This module consists of issues that influence the uptake and up-scaling of TIMPS in the Cotton value chain. The issues are namely Agricultural Innovation Platforms, Gender and social-environmental concerns and climate smart agricultural policy.

Agricultural Innovation Platforms provide a forum for stakeholders to interact and develop technical, institutional and organizational innovations to solve value chain challenges. Gender and social-environmental concerns are considerations aimed at avoiding inappropriate solutions to value chain challenges. Climate smart agricultural policy creates awareness on policy formulation and the various regulations that are put in place to facilitate the development of value chains. The method of delivery of each of these cross cutting issues is presented below.

SUB-MODULE 14.1: COTTON AGRICULTURAL INNOVATION PLATFORMS

14.1.1 Introduction

This module exposes the extension staff, private service providers, lead farmers and facilitators to an innovation systems 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 to address challenges and utilize opportunities. The actors include individuals, private and public sector organizations, policy makers and other value chain stakeholders. These actors are brought together in an innovation platform to seek technical, institutional or organizational solutions to a critical challenge hindering agricultural productivity within a value chain. The Agricultural Innovation Platform facilitates actors to interact, innovate, learn and change with time as they seek a solution to the common challenge. In an innovation platform every actor’s contribution is valued and benefits accrue to all in a win-win situation. The AIP is a useful methodology for development and testing and scaling of innovations in the Cotton value chain.

14.1.2 Module learning Outcomes

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

1. The definition of innovations clearly described
2. The attributes of an innovation platform described
3. Mobilization of stakeholders for initiation, establishment, management and sustenance of an Agricultural Innovation Platform explained and demonstrated
4. The innovation capacity building process of the AIP actors understood and explained

14.1.3 Module Target Group and Categories

The target users are county extension staff, private agricultural service providers and lead farmers
1.1.4 **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 participant’s hand outs.

1.1.5 **Module Duration**

The Module is estimated to take a minimum of 3 hours.

1.1.6 **Module Summary**

<table>
<thead>
<tr>
<th>Sub-Module 14.1 Agricultural Innovation Platforms (AIP)</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1.6.1 Introduction, objectives and expectations</td>
<td>• Personal introductions • Presentations • Plenary discussions</td>
<td>• Flips charts • PowerPoint presentation</td>
<td>20 minutes</td>
</tr>
<tr>
<td>14.1.6.2 The characteristics of an innovation platform</td>
<td>• Power point Presentations • Flip charts • Plenary discussions</td>
<td>• Flip charts • PowerPoint presentation • Participants Hand outs</td>
<td>10 minutes</td>
</tr>
<tr>
<td>14.1.6.3 Preformation and formation phases of the cotton AIP</td>
<td>• Power point Presentations • Plenary discussions</td>
<td>• Flip charts • PowerPoint presentation • Participants Hand outs</td>
<td>45 minutes</td>
</tr>
<tr>
<td>14.1.6. 4. Module review</td>
<td>• Discussions</td>
<td>• Flip Charts</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

**Total** 3 hours

14.1.7 **Facilitator’s Guidelines**

<table>
<thead>
<tr>
<th>Sub Module 14.1 Agricultural Innovation Platform (AIP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1.7.1. Introduction, levelling of expectations and objectives (30 Minutes)</td>
</tr>
</tbody>
</table>
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:
- Define innovation process and the innovation products
- Explain characteristics of an innovation platform
- Describe how to initiate and establish Agricultural Innovation Platforms
- Explain how to manage and sustain innovation capacity of actors in Agricultural Innovation Platforms
- Describe successful cotton innovation platforms
- Describe the benefits and challenges of agricultural innovation platforms

14.1.7.2. The characteristics of an innovation platform (1 hour) Session Guide
The facilitator presents an overview of innovation platforms and their main characteristics

Plenary Presentation (30 minutes)
- Past progression of research and extension models and their shortcomings
- Agricultural Innovation Systems perspective
- and Agricultural Innovation Platforms model
- Comparison of Agricultural Innovation Platforms with social and technical events working through committees with different roles but common goals
- Value chain actor linkages and other benefits

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

14.1.7.3 Preformation and formation phases of the cotton AIP (1 hour) Session Guide

- PowerPoint Presentation
- Notes Handouts
- Brochures, information leaflets and manuals
The facilitator presents Preformation and formation phases of the cotton

**Plenary Presentation (50 Minutes)**

**Initiation or preformation phase**
- Engagement or mobilization of stakeholders in the cotton value chain
- Visioning process and rules of engagement mediated by an initiator such as an agent of change

**Establishment**
- Assessment of the status of the value chain to clearly identify the compelling agenda or bottleneck - 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.

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

<table>
<thead>
<tr>
<th>14.1.7.4. 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>- The last Participants’ Hand outs</td>
</tr>
<tr>
<td>Summarize the main points of the training and together with the trainees review the main points on:</td>
<td>- Summarize the main points from the module on a flip chart and display</td>
</tr>
<tr>
<td>- AIP characteristics and initiation</td>
<td></td>
</tr>
<tr>
<td>- AIP establishment and management</td>
<td></td>
</tr>
<tr>
<td>- Sustenance of cotton AIPs</td>
<td></td>
</tr>
</tbody>
</table>

*(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?)*
14.1.8. Reference Materials

14.1.8.1 Participants’ Handouts

14.1.8.2 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

SUB-MODULE 14.2: COTTON GENDER, VULNERABLE AND MARGINALIZED GROUPS (VMGs), SOCIO, ENVIRONMENTAL CONCERNS AND COHESION

14.2.1 Introduction to the Sub-Module

Cotton 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 tomarketing and consumption. However, women perform most of the crop’s production activities such as planting, weeding and harvesting while men mostly perform the task of marketing. Despite this huge women’s contribution, gender inequalities exist in all areas of the value chain. 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.

Cotton 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 cotton 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 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 cotton value chain understood and explained
2. Youth empowerment in cotton value chain understood and explained
3. Women empowerment in cotton value chain understood and explained
4. Strategies for inclusion of vulnerable and marginalized groups in cotton value chain described
5. Socio-cultural barriers in cotton value chain outlined
6. Environmental and social management framework (ESMF) tool understood and explained.

14.2.3 Module Target Group

This module is intended for public and private agricultural service providers and lead farmers.

14.2.4 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’ hand-outs. The facilitator using this module should thoroughly familiarize themselves with the participant’s hand-outs.

14.2.5 Module Duration

The Module is estimated to take 4 hours.

14.2.6 Module Summary

<p>| Module 14.2: Gender mainstreaming and social inclusions in the cotton value chain |</p>
<table>
<thead>
<tr>
<th>Sessions</th>
<th>Training methods</th>
<th>Training materials</th>
<th>Duration</th>
</tr>
</thead>
</table>
| **14.2.6.1 Introduction, expectations and objectives** | *Personal introductions*  
*Presentations*  
*Plenary discussions* | *Flips charts*  
*Felt pens*  
*PowerPoint Presentation*  
*Laptop*  
*Participants’ handouts* | 30 Minutes |
| **14.2.6.2 Gender mainstreaming and social inclusion in Cotton value chain** | *PowerPoint Presentations*  
*Group discussions*  
*Plenary discussions* | *Flips charts*  
*Felt pens*  
*PowerPoint Presentation*  
*Participants’ handouts* | 30 minutes |
<table>
<thead>
<tr>
<th>Topic</th>
<th>Activities</th>
<th>Duration</th>
</tr>
</thead>
</table>
| 14.2.6.3 Youth empowerment in cotton value chain                     | - PowerPoint Presentations  
- Group discussions  
- Plenary discussions  
- Flips charts  
- Felt pens  
- PowerPoint Presentation  
- Participants’ handouts | 30 minutes |
| 14.2.6.4 Women empowerment in cotton value chain                     | - PowerPoint Presentations  
- Group discussions  
- Plenary discussions  
- Flips charts  
- Felt pens  
- PowerPoint Presentation  
- Participants handouts | 60 minutes |
| 14.2.6.5 Strategies for inclusion of vulnerable and marginalized groups | - PowerPoint Presentations  
- Group discussions  
- Plenary discussions  
- Flips charts  
- Felt pens  
- PowerPoint Presentation  
- Participants handouts | 30 minutes |
| 14.2.6.6 Environmental and Social Management Framework               | - PowerPoint Presentations  
- Group discussions  
- Plenary discussions  
- Flips charts  
- Felt pens  
- PowerPoint Presentation  
- Participants handouts | 30 minutes |
| 14.2.6.7 Module Review                                               | - Plenary discussions  
- Flips charts  
- Felt pens | 30 minutes |
| **Total**                                                            |                                                                          | **4 hours** |
14.2.7 Facilitator’s Guidelines

Sub Module 14.2: Gender mainstreaming and social inclusion in cotton value chain

14.2.7.1 Introduction, Objectives and Expectations (30 Minutes)

(The facilitator welcomes trainees to the module on gender mainstreaming and social inclusion in cotton value chain. They 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 training the trainee must be to:

- Explain gender mainstreaming and social inclusion, in cotton value chain
- Describe youth empowerment in cotton value chain
- Demonstrate women empowerment in cotton value chain
- Explain strategies for inclusion of vulnerable and marginalized groups in cotton value chain
- Describe the environmental and social management framework (ESMF) tool

14.2.7.2 Gender mainstreaming and social inclusion in cotton value chain (30 Minutes)

(The facilitator presents and explains what is gender mainstreaming, who does what activity, who has access to what resources etc. and why gender mainstreaming is important in cotton 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 cotton 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

Session Guide

- Summarize Trainees “Expectations” and display.
- PowerPoint Presentation
- Flipcharts
- Group exercise
- Objectives and Training Program

- PowerPoint Presentation, Group exercise
- Plenary discussions
- Distribute Participants Hand-outs
- Group exercise
- Plenary discussions
### 14.2.7.3 Youth empowerment in cotton value chain (30 minutes)

*The facilitator presents Youth empowerment in cotton value chain*

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

**Group work and Discussion (10 Minute)**
Let the trainees recall what they learned and discuss any issue that may arise.

### 14.2.7.4 Women empowerment in cotton value chain (30 minutes)

*The facilitator presents Women empowerment in cotton value chain*

**Plenary Presentation (20 minutes)**
- Women’s role in the value chain
- Challenges facing women in the value chain
- Strategies for empowering women in the value chain

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

### 14.2.7.5 Strategies for inclusion of vulnerable and marginalized groups in cotton value chain (30 minutes)

*The facilitator presents and leads strategies for inclusion of vulnerable and marginalized groups in cotton value chain*

**Plenary Presentation (20 hour)**
- Who are vulnerable and marginalized groups (VMGs)
- Why gender inequality exists
- Social inclusion and why
- Strategies of inclusion of VMG

**Plenary Discussion (10 minutes)**
Let the trainees recall what they learned and discuss any issue that may arise
14.2.7.6. Environmental and social management framework (ESMF) (30 minutes)

The facilitator presents Environmental and social management framework (ESMF)

Session Guide

- PowerPoint Presentation
- Plenary discussion

Plenary Presentation (20 minutes)

- Objective of ESMF in cotton value chain
- Environmental and social safeguards of cotton
- Safeguard policies triggered by the project

Plenary discussion (10 minutes)

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

14.2.7.7. Module review (30 Minutes)

The facilitator leads the participants in reviewing the module

Session Guide

- Summary of the main points on from the module on a flip chart and display

Summarize the main points of the training and together with the trainees review the main points:

- What is gender mainstreaming and why it is important?
- Youth empowerment in cotton value chain
- Women empowerment in cotton value chain
- Strategies for inclusion of vulnerable and marginalized groups in cotton value chain
- Environmental and Social Management Framework of cotton activities

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

14.2.8 Reference Materials

14.2.8.1 Participants’ Hand-outs

14.2.8.2 References

14. 3.1 Introduction

This module is designed to train Trainers of Trainers (ToTs) to enable them understand the agricultural policy reforms and their levels of support to cotton value chain in Kenya. The module is also designed to equip the ToTs with skills that are useful in participatory validation of agricultural policy to include cotton concerns. Finally, the module facilitates ToTs in understanding the policy cycle for formulating and implementing a cotton policy in Kenya. Cotton (Gossypium hirsutum) is considered as one of the most important fibre crops and a source of income for many people in Kenya. Under the Kenya Government’s policy for addressing poverty ‘Kenya Vision 2030’, cotton has been identified as a key sub-sector with the potential to benefit 8 million people in the drier areas of the country. However, currently, cotton is mainly grown solely by small-scale farmers in Western, Nyanza, Central, Rift Valley, Eastern and Coast regions of Kenya. Farmers grow most of the cotton on holdings of less than one hectare. Currently the production of cotton in farmers’ fields is low compared to research potential depending on the production region. The smallholder production is 500 – 1750 kilograms per hectare while the research potential is 2000 – 2500 per hectare. In Kenya, cotton lacks specific policy. Therefore, there are major policy issues of concern to small scale farmers and other actors in the cotton value chain in Kenya. The main concerns include productivity, markets and marketing, particularly inconsistency in supplying sufficient volumes required for trade, seasonal supply and price fluctuations. To strengthen the cotton value chain therefore it is important to equip farmer facilitators with the skills and knowledge on policy options to supporting cotton value chain.

14. 3.2 Module Learning Outcomes

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

- Outline cotton policy options supported by the national agricultural strategies
- Describe the options in Kenya National Seed Policy 2010 for supporting production and distribution of cotton seed.
- Describe options in mineral fertilizer policy for supporting smallholder access to fertilizer
- Explain options in climate smart agricultural policies to support cotton production concerns
- Describe and acknowledge the options in County Integrated Development Plan (CIDP) for supporting cotton production and marketing
- Describe the elements of policy validation cycle and policy cycle and their uses in the validation/update, formulation and implementation of cotton policy

14. 3.3 Module Target Group

This module targets agricultural extension, service providers and lead farmers.
14. 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 cotton value chain target Counties. The facilitators using this module should thoroughly familiarize themselves with the participants' handouts (training materials).

14. 3.5 Module Duration

The Module is estimated to take 2 hours

14. 3.6. Module Summary

<table>
<thead>
<tr>
<th>Module 14. 3.6.1. Agricultural policy options to support cotton value chain in Kenya</th>
<th>Sessions</th>
<th>Training Methods</th>
<th>Training Materials</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. 3.6.2. Levelling of participants’ expectations about the module</td>
<td>• Personal introduction</td>
<td>• PowerPoint</td>
<td>15 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Discussion</td>
<td>• Flip charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. 3.6.3. Module introduction, Objectives, Expectations</td>
<td>• Personal introduction</td>
<td>• PowerPoint</td>
<td>10 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Presentation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. 3.6.4. Cotton policy options supported by the national agricultural strategies</td>
<td>• Plenary presentations</td>
<td>• Power point</td>
<td>10 minutes</td>
<td></td>
</tr>
<tr>
<td>14. 3.6.5. Options in Kenya National Seed Policy 2010 for supporting production and distribution of cotton seed.</td>
<td>• Plenary presentations</td>
<td>• PowerPoint</td>
<td>10 minutes</td>
<td></td>
</tr>
<tr>
<td>14. 3.6.6. Options in mineral fertilizer policy for supporting smallholder access to fertilizer</td>
<td>• Plenary presentations</td>
<td>• PowerPoint</td>
<td>10 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plenary Discussion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. 3.6.7. Options in climate smart agricultural policies to support cotton production concerns</td>
<td>• Plenary presentations</td>
<td>• PowerPoint</td>
<td>20 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Group Exercise</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>14. 3.6.8. Options in County Integrated Development Plan (CIDP) for supporting cotton production and marketing.</td>
<td>• Plenary presentations</td>
<td>• PowerPoint</td>
<td>15 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plenary Discussion</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
14. 3.6.9. Elements of policy validation cycle and policy cycle and their uses in the validation/update, formulation and implementation of cotton policy

- Plenary presentations
- Plenary Discussion
- PowerPoint

14. 3.6.10. Training review
Facilitator’s summary: Take aways
- Module review
- Power point slides
- Participants’ handouts

TOTAL 2 hours

14. 3.7 Facilitator’s Guidelines

Module 14. 3.7.1. Agricultural policy options to support cotton value chain in Kenya

14. 3.7.2. Levelling participants’ expectations about the module (15 minutes)

14. 3.7.2.1. Module Title
(The facilitator welcomes trainees to the module on agricultural policy options to support cotton value chain in Kenya. The facilitator also introduces him/herself by stating his/her profile and experience.)

- Handouts
- Program
- Note books
- Felt pens
- Flip chart
- PowerPoint slides

14. 3.7.2.2. Participants expectations (15 minutes)
(The facilitator asks the trainees to state their expectations by listing on a flip chart)

Plenary Discussion

14. 3.7.3. Module introduction, objectives and expectations (10 minutes)
By the end of this module, participants are expected to:

- Outline cotton policy options supported by the national agricultural strategies
- Describe the options in Kenya National Seed Policy 2010 for supporting production and distribution of cotton seed.
- Explain options in mineral fertilizer policy for supporting smallholder access to fertilizer
- Explain options in climate smart agricultural policies to support cotton production concerns
- Describe and acknowledge the options in County Integrated Development Plan (CIDP) for supporting cotton production and marketing
- Describe the elements of policy validation cycle and policy cycle and their uses in the validation/update, formulation and implementation of cotton policy

**14. 3.7.4 Cotton policy options supported by the national agricultural strategies (10 minutes)**

*(The facilitator highlights the types of National agricultural strategies and the options for supporting cotton value chain)*

### Plenary Presentation (5 minutes)

*Make presentation on the National agricultural strategies. Highlight the options available in the strategies for supporting cotton value chain*

Discuss the strengths and failures in the National agricultural strategies to address the stakeholders’ concerns in the cotton value chain *(5 minutes)*

**14. 3.7.5 Options in Kenya National Seed Policy 2010 for supporting production and distribution of cotton seed (10 minutes)**

*(The facilitator highlights the options in the Kenya national seed policy which can support production and distribution of cotton seed)*

### Plenary Discussion (5 minutes)
14. 3.7.6. Options in mineral fertilizer policy for supporting smallholder access to fertilizer (10 minutes)  

Plenary Presentation (5 minutes)  
(The facilitator highlights the options in the mineral fertilizer policy which assist smallholder farmers to access fertilizer under subsidies)  

Plenary Discussion (5 minutes)  

14. 3.7.7. Options in climate smart agricultural policies to support cotton production concerns (20 minutes)  

Plenary Presentation (10 minutes)  
(The facilitator highlights the climate-smart policy concerns and options for supporting cotton production)  

Group Exercise (10)  
• Use power point  
• Handouts  
• Flip charts  
• Felt pens  

14. 3.7.8. Options in County Integrated Development Plan (CIDP) for supporting cotton production and marketing (15 minutes)  

Plenary Presentation (10 minutes)  
(The facilitator highlights the supporting options for cotton value chain in the CIDP. The CIDP being the framework for the county development, the facilitator highlights the un addressed cotton issues)  

Plenary Discussion (5)  

14. 3.7.9. Elements of policy validation cycle and policy cycle and their uses in the validation/update, formulation and implementation of cotton policy (20 minutes)  

(The facilitator highlights the components of policy and participatory validation cycles)  

Plenary Presentation (10 minutes)  

Group Exercise (15 minutes)  
List types of data to be considered in the validation  
• Handouts  
• Flip charts,  
• Manila papers,  
• Pelt pens  

14.3.7.10. Training review (10 minutes)  
(The facilitator leads the trainees in reviewing the module. Conclude by thanking the trainees)  

Plenary Presentation (10 minutes)  
Summary of the main points about the Module.
14.3.7.11 Reference Materials

14.3.7.11.1 Participants Handouts

14.3.7.11.2 References


ANNEX 1: TRAINING PROGRAM

The training program presented here assumes that the trainees report on Sunday evening as the first day and leave 10 days later on Sunday morning.

<table>
<thead>
<tr>
<th>Time</th>
<th>Day 0 (Sunday) Travel to Venue</th>
<th>Duration</th>
<th>Remarks / Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Evening</td>
<td>▪ Arrival of participants and registration – Host</td>
<td>2 Hours</td>
<td>The training venue and materials are ready for use</td>
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<tr>
<td></td>
<td>▪ Setting up and prepare training venue and materials – CTT</td>
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<tr>
<td>Close of Day 0</td>
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<table>
<thead>
<tr>
<th>Time</th>
<th>Day 1 (Monday)</th>
<th>Duration</th>
<th>Remarks / Facilitator</th>
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</thead>
<tbody>
<tr>
<td>8.00 am-9.30 am</td>
<td>Session 1: Introduction, objectives &amp; expectations</td>
<td>10 minutes</td>
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<tr>
<td></td>
<td>• Welcome by host and Prayers</td>
<td>20 minutes</td>
<td>The trainees relax and climate set for the ten-day training</td>
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<td></td>
<td>• Self-introductions –(CTT)</td>
<td>20 minutes</td>
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<td></td>
<td>• Introduction to KCSAP project</td>
<td>20 minutes</td>
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<td></td>
<td>• Official opening Ceremony (CEC)</td>
<td>20 minutes</td>
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<td></td>
<td>• Introduction to the training program (CTT)</td>
<td>20 minutes</td>
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<tr>
<td>9.30 - 10.30 am</td>
<td>Module 1: Climate Change and Climate Smart Agriculture in cotton value chain</td>
<td>30 minutes</td>
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<tr>
<td></td>
<td>1.1. Introductions and objectives</td>
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<td></td>
<td>• Introduction and Levelling of Trainees’ expectations</td>
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<tr>
<td></td>
<td>• Presentation of module objectives:</td>
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<tr>
<td>10.30 - 11.00 am</td>
<td>Tea Break</td>
<td>30 minutes</td>
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<tr>
<td>Time</td>
<td>Session</td>
<td>Presentations on</td>
<td>Duration</td>
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<tr>
<td>11.00-12.00 pm</td>
<td><strong>1.2. Introduction to Climate Change and Climate Variability (1 hour)</strong></td>
<td><strong>Presentations on:</strong>&lt;br&gt;• Basic terminologies used in the module (weather, climate, variability, adaptation, coping)&lt;br&gt;• Climate change, climate variability and causes of climate change&lt;br&gt;• Climate risks impacting agriculture and Proposed adaptation measures</td>
<td>20 minutes</td>
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<tr>
<td>12.00-1.00 pm</td>
<td><strong>1.3. Concept of Climate Smart Agriculture (CSA) (1 hour)</strong></td>
<td><strong>Presentations on:</strong>&lt;br&gt;• Definition of the CSA approach and their characteristics&lt;br&gt;• The three pillars of CSA (productivity, Adaptation and Mitigation)&lt;br&gt;• Why CSA is needed</td>
<td>20 minutes</td>
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<tr>
<td>1.00-2.00 pm</td>
<td><em>Lunch Break</em></td>
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<td>1 Hour</td>
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<tr>
<td>2.00-2.40 pm</td>
<td><strong>1.4. Selected Future Scenarios that will Impact Productivity (1 hour)</strong></td>
<td><strong>Video/Power point presentation</strong>&lt;br&gt;• Short Video or PP showing projections of rainfall and temperature projections&lt;br&gt;<strong>Plenary discussion</strong>&lt;br&gt;• Climate projections impacts on food production and needed adaptation measures for Cotton.</td>
<td>20 minutes</td>
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<tr>
<td>2.40-3.00 pm</td>
<td><strong>1.5. Module Review</strong></td>
<td>Summary of key points in the module</td>
<td>20 minutes</td>
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<td><em>End of Module 1</em></td>
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<tr>
<td>3.00-4.00 pm</td>
<td><strong>Module 2: Farmer Field and Business School Approach</strong></td>
<td><strong>2.1. Introductions and objectives</strong>&lt;br&gt;• Introduction and Levelling of Trainees’ expectations&lt;br&gt;• Presentation of module objectives:</td>
<td>30 minutes</td>
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<tr>
<td></td>
<td><strong>2.2 Overview of FFBS key activities</strong></td>
<td><strong>Presentation on:</strong>&lt;br&gt;• Overview of Farmer Field and Business Schools&lt;br&gt;• Principles of FFBS, Characteristics of FFBS&lt;br&gt;• Cotton curriculum matrix</td>
<td>30 minutes</td>
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<tr>
<td>5.00-6.00 pm</td>
<td><em>Teat Break</em></td>
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<td>1 Hour</td>
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<td><em>Close of Day 1</em></td>
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<tr>
<td>Time</td>
<td>Day 2 (Tuesday)</td>
<td>Duration</td>
<td>Remarks / Facilitator</td>
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<tr>
<td>8.00-9.00am</td>
<td>Registration for second day participation Recap of day 1 activities</td>
<td>30 minutes</td>
<td>CTT</td>
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<tr>
<td>8.00-9.00 am</td>
<td><strong>Continuation of Module 2</strong>&lt;br&gt;<strong>2.3 Designing an FFBS program</strong>&lt;br&gt;Presentation of the classical steps&lt;br&gt;&lt;br&gt;<strong>Group Exercise</strong>&lt;br&gt;design FFBS and presentation</td>
<td>30 minutes</td>
<td>30 minutes</td>
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<tr>
<td>9.00-10.00 am</td>
<td><strong>2.4 Communication skills</strong>&lt;br&gt;<strong>Group work on</strong>&lt;br&gt;• Communication skills</td>
<td>30 minutes</td>
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<tr>
<td><strong>10.00 - 10.30 am</strong></td>
<td><strong>Tea break</strong></td>
<td>30 minutes</td>
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<tr>
<td>10.30 - 11.00 am</td>
<td><strong>2.5 Facilitation skills</strong>&lt;br&gt;Presentation on facilitating of cotton CIGs</td>
<td>30 minutes</td>
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<td>11.00 - 11.30 am</td>
<td><strong>2.6 Organization, management and Leadership of FFBS</strong>&lt;br&gt;Presentation on:&lt;br&gt;• FFBS leadership</td>
<td>30 minutes</td>
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<td>11.30 - 12.00 pm</td>
<td><strong>2.7. Module Review</strong>&lt;br&gt;Review together the main points about FFBS module.</td>
<td>30 minutes</td>
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<td><strong>End of Module 2</strong></td>
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<tr>
<td>11.30 – 12.00 pm</td>
<td><strong>Module 3: GAPS</strong>&lt;br&gt;&lt;br&gt;<strong>3.1. Introductions, climate setting</strong>&lt;br&gt;Facilitator &amp; trainees self-introduction and involvement in dry beans value chains</td>
<td>30 minutes</td>
<td>Facilitator</td>
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<tr>
<td>12.00 – 1.00 pm</td>
<td><strong>3.2 Objectives and expectations</strong>&lt;br&gt;Presentation of module objectives.</td>
<td>30 minutes</td>
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<tr>
<td>1.00 -2.00 pm</td>
<td>Lunch Break</td>
<td>1 hour</td>
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<td>2.00 -3.00 pm</td>
<td><strong>3.3. Agronomic practices for dry beans production (1 hour)</strong>&lt;br&gt;Presentation of all cotton GAPS&lt;br&gt;Discussions: Questions/answers and comments</td>
<td>30 minutes</td>
<td>30 minutes</td>
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<tr>
<td>Time</td>
<td>Activities</td>
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<tr>
<td>3.00 -4.00 pm</td>
<td><strong>3.4. Appropriate inputs for dry beans optimal production and their correct doses</strong>&lt;br&gt;<strong>Group work (30 minutes)</strong>&lt;br&gt;- County groups to provide lists of cotton inputs and the rates used by farmers.&lt;br&gt;<strong>Presentation</strong>&lt;br&gt;Recommended cotton inputs (seeds, fertilizers, manures, etc.) and their rates, time</td>
<td>30 minutes</td>
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<tr>
<td>4.00 -5.00 pm</td>
<td><strong>3. 5. Module review</strong>&lt;br&gt;Summary the main points of the training module</td>
<td>30 minutes</td>
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<td>5.00 – 5.30 pm</td>
<td>Tea Break</td>
<td>30 minutes</td>
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**End of Module 3**

**Close of Day 2**

**Time** | **Day 3 (Wednesday )**
---|---
8.00-9.00 am | **Module 4: Cotton production and appropriate climatic requirements**
<p>| <strong>4.1. Introductions and objectives</strong>&lt;br&gt;- Introduction and Levelling of Trainees’ expectations&lt;br&gt;- Presentation of module objectives: | 30 minutes |
| 10.00-10.30 am | Tea break | 30 minutes |
| 10.30-11.30 am | <strong>4.2 Importance of cotton in Kenya’s economy</strong>&lt;br&gt;<strong>Presentation</strong>&lt;br&gt;Origin, place of cotton production as a major crop in Kenya | 40 minutes |
| Facilitator’s guided discussion | Questions/answers/comments | 20 minutes |
| 11.30-1.00 pm | <strong>4.3cotton production ecological/climatic requirements (1 hour)</strong>&lt;br&gt;<strong>Presentation on:</strong>&lt;br&gt;- Importance of cotton, Agro-ecological zones, Climatic conditions, Soils | 40 minutes |
| Facilitator’s guided discussion | Questions/answers/comments | 20 minutes |
| 1.00 -2.00 pm | Lunch Break | 1 hour |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Day 4 (Thursday)</th>
<th>Duration</th>
<th>Remarks / Facilitator</th>
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</thead>
<tbody>
<tr>
<td>8.00-9.00 am</td>
<td>Registration for third day participation Recap of day 2 activities</td>
<td>30 minutes 30 minutes</td>
<td>CTT</td>
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<td>9.00 – 10.00 am</td>
<td><strong>Module 5: Cotton Variety Selection</strong></td>
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<tr>
<td></td>
<td><strong>5.1. Introduction and levelling of expectations and objectives</strong></td>
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<tr>
<td></td>
<td>• Introduction and Levelling of Trainees’ Expectations</td>
<td>30 minutes 30 minutes</td>
<td>Facilitator</td>
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<td></td>
<td>• Presentation of module objectives</td>
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<tr>
<td>10.00 - 10.30 pm</td>
<td>Tea break</td>
<td>30 minutes</td>
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<tr>
<td>10.30 - 11.00 pm</td>
<td><strong>5.2 Introduction to cotton and the various improved cotton varieties and their uses</strong></td>
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<td></td>
<td><strong>Group work</strong></td>
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<td></td>
<td>Description of some of the cotton varieties they know.</td>
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<td></td>
<td><strong>Presentation (20 minutes)</strong></td>
<td>10 minutes</td>
<td>Facilitator</td>
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<td></td>
<td>Cotton Improved varieties, variety uses by category</td>
<td>20 minutes</td>
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<tr>
<td>Time</td>
<td>Day 5 (Friday)</td>
<td>Duration</td>
<td>Remarks / Facilitator</td>
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<td>11.00 – 1.00 pm</td>
<td>5.3 Recommended cotton varieties for the target counties</td>
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<td></td>
<td>Presentation on Varieties for the target counties</td>
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<td></td>
<td><strong>Group Exercises</strong></td>
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<tr>
<td></td>
<td>Trainees discuss and come up with cotton varieties in their count</td>
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<td></td>
<td><strong>Group Exercises</strong></td>
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<td></td>
<td>• Cotton demo visit</td>
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<tr>
<td>1.00- 2.00 pm</td>
<td>Lunch break</td>
<td>1 hour</td>
<td>All</td>
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<tr>
<td>2.00 - 2.30 pm</td>
<td>5.4 Module review</td>
<td>30 minutes</td>
<td>Facilitator</td>
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<tr>
<td></td>
<td>Summary of the main points of the training</td>
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<td><strong>End of Module 5</strong></td>
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<tr>
<td>2.30 – 3.30 pm</td>
<td>Module 6. Cotton Seed System</td>
<td>Facilitator</td>
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<td></td>
<td>6.1. Introduction and levelling of expectations and objectives</td>
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<tr>
<td></td>
<td>• Introduction and Levelling of Trainees’ Expectations</td>
<td>30 minutes</td>
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<td></td>
<td>• Presentation of module objectives</td>
<td>30 minutes</td>
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<tr>
<td>3.30 - 4.30 pm</td>
<td>6.2. Definition of seed and seed system in Kenya</td>
<td>Facilitator</td>
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<tr>
<td></td>
<td><strong>Group work and presentations:</strong></td>
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<tr>
<td></td>
<td>What is quality seed</td>
<td>30 minutes</td>
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<td></td>
<td><strong>Presentation</strong></td>
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<td></td>
<td>• Seed system and characteristics of main seed systems (formal and informal seed systems)</td>
<td>30 minutes</td>
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<td></td>
<td>• Commodity corridors</td>
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<tr>
<td>4.30 – 5.30 pm</td>
<td>6.3 Formal seed system in Kenya</td>
<td>Facilitator</td>
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<td></td>
<td>Presentations highlighting:</td>
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<tr>
<td></td>
<td>• Formal seed system</td>
<td>30 minutes</td>
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<tr>
<td>5.30 – 6.00 pm</td>
<td>Tea Break</td>
<td>30 minutes</td>
<td>All</td>
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<tr>
<td>Close of day 4</td>
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<tr>
<td>Time</td>
<td>Day 5 (Friday)</td>
<td>Duration</td>
<td>Remarks / Facilitator</td>
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<tr>
<td>8.00-9.00 am</td>
<td>Registration for fourth day participation</td>
<td>30 minutes</td>
<td>CTT</td>
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<tr>
<td></td>
<td>Recap of day 3 activities</td>
<td>30 minutes</td>
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<tr>
<td>Time</td>
<td>Session Description</td>
<td>Duration</td>
<td>Facilitator</td>
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<tr>
<td>9.00-10.00 am</td>
<td><strong>Continuation of Module 5</strong></td>
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<td><strong>6.4. Informal seed system in Kenya</strong></td>
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<td>Presentations: (30 Minutes)</td>
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<td>Informal seed system</td>
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<td></td>
<td><strong>Group work and discussions</strong></td>
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<td></td>
<td>• Calculation of seed requirements for the county/ward/farmer group and presentation</td>
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<tr>
<td>10.00 -10.30 am</td>
<td><strong>Tea Break</strong></td>
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<tr>
<td>10.30 – 11.00 am</td>
<td><strong>6.5. Module review</strong></td>
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<tr>
<td></td>
<td>Summary the main points of the training module</td>
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<td><strong>End of Module 6</strong></td>
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<tr>
<td>11.30 – 12.00 pm</td>
<td><strong>Module 7: Cotton climate smart Agronomic practices</strong></td>
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<td><strong>7.1. Introductions, climate setting</strong></td>
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<td>Facilitator &amp; trainees self-introduction and involvement in cotton value chains</td>
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<tr>
<td>12.00 – 1.00 pm</td>
<td><strong>7.2 Objectives and expectations</strong></td>
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<tr>
<td></td>
<td>Presentation of module objectives.</td>
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<td></td>
<td>Expectations (group work)</td>
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<td>1.00 -2.00 pm</td>
<td><strong>Lunch Break</strong></td>
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<td>2.00 -3.00 pm</td>
<td><strong>7.3 Agronomic practices for dry beans production (1 hour)</strong></td>
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<td></td>
<td>Presentation of all cotton GAPS</td>
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<td>Discussions: Questions/answers and comments</td>
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<tr>
<td>3.00 -4.00 pm</td>
<td><strong>7.4. Appropriate inputs for cotton optimal production and their correct doses</strong></td>
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<td></td>
<td><strong>Group work (30 minutes)</strong></td>
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<td>• County groups to provide lists of cotton inputs and the rates used by farmers.</td>
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<td><strong>Presentation</strong></td>
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<td></td>
<td>Recommended cotton inputs (seeds, fertilizers, manures, etc.) and their rates, time</td>
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<tr>
<td>4.00 -5.00 pm</td>
<td><strong>7. 5. Module review</strong></td>
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<td></td>
<td>Summary the main points of the training module</td>
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<tr>
<td>5.00 – 5.30 pm</td>
<td><strong>Tea Break</strong></td>
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<td><strong>End of Module 7</strong></td>
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**Close of day 5**
<table>
<thead>
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<th>Time</th>
<th>Day 6 (Saturday)</th>
<th>Duration</th>
<th>Remarks / Facilitator</th>
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<tbody>
<tr>
<td>8.00-9.00 am</td>
<td>Registration day five participation Recap of day 4 activities</td>
<td>30 minutes 30 minutes</td>
<td>CTT</td>
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<tr>
<td>9.00-10.00 am</td>
<td><strong>Module 8: Integrated soil and water management practices for cotton production</strong></td>
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<tr>
<td></td>
<td><strong>8.1. Introduction, Objectives and Expectations</strong></td>
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<td></td>
<td>• Introduction and Levelling of Trainees’ Expectations</td>
<td>30 minutes</td>
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<tr>
<td></td>
<td>• Presentation of module objectives</td>
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<tr>
<td>10.00 -10.30 am</td>
<td><strong>Tea Break</strong></td>
<td>30 minutes</td>
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<tr>
<td>10.30 – 11.00 am</td>
<td><strong>8.2. Soil composition, properties and health</strong></td>
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<td><strong>Presentation</strong></td>
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<td>• Soil composition, properties and health</td>
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<td><strong>Discussion</strong></td>
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<td>• Discussion of issues that may arise</td>
<td>10 minutes</td>
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<td>11.00 – 12.00 pm</td>
<td><strong>8.3. Soil and plant tissue sampling and analysis (1 hours)</strong></td>
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<td><strong>Presentation</strong></td>
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<td></td>
<td>• Soil sampling and analysis methods</td>
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<td><strong>Practical exercise on soil sampling (30 minutes)</strong></td>
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<td>• Demonstration on soil sampling method</td>
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<td>12.00-1.00 pm</td>
<td><strong>Lunch Break</strong></td>
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<td>1.00 – 1.30 pm</td>
<td><strong>8.4. Soil fertility and plant nutrition</strong></td>
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<td><strong>Presentation</strong></td>
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<td></td>
<td>• Potential role of different soil managements techniques in addressing soil fertility challenges in cotton smallholder farming systems</td>
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<td>1.30 – 2.00 pm</td>
<td><strong>8.5 Soil health and (ISFM) for climate resilient cropping systems</strong></td>
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<td>• Presentation of ISFM</td>
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<td><strong>Discussion</strong></td>
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<td>Discussion of issues that may arise</td>
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<td>8.00 - 9.00 am</td>
<td>Registration day six participation Recap of day 5 activities</td>
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<tr>
<td>9.00 - 10.00 am</td>
<td><strong>9.2. Major cotton pests that cause economic losses and their control</strong>&lt;br&gt;<strong>Group work</strong>&lt;br&gt;• Trainees avail cotton pest information from their counties&lt;br&gt;<strong>Plenary Presentation</strong>&lt;br&gt;• Pests descriptions, damage and crop losses&lt;br&gt;<strong>Practical session</strong>&lt;br&gt;• Identification of cotton pests from provided specimens&lt;br&gt;• Practical: show photographs of major weeds&lt;br&gt;<strong>Discussion</strong>&lt;br&gt;15 minutes</td>
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<td>10.30 -10.30 am</td>
<td>Tea Break</td>
<td>30 minutes</td>
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<td>10.30 – 11.00 am</td>
<td><strong>9.3. Sustainable Integrated cotton pests management practices; scouting, post-harvest pests and threshold determination</strong>&lt;br&gt;<strong>Presentation</strong>&lt;br&gt;• IPM principles;&lt;br&gt;• Scouting&lt;br&gt;• post-harvest pests on cereals&lt;br&gt;<strong>Discussion</strong>&lt;br&gt;20 minutes</td>
<td>20 minutes</td>
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<td>11.00 – 12.00 pm</td>
<td><strong>9.4. Major cotton diseases that cause economic losses, conditions that favour their development and their control methods</strong>&lt;br&gt;<strong>Group work (15 minutes)</strong>&lt;br&gt;• Determine cotton diseases in specific counties&lt;br&gt;<strong>Presentation (15 Minutes)</strong>&lt;br&gt;• cotton diseases&lt;br&gt;<strong>Practical Exercise (30 Minutes)</strong>&lt;br&gt;• Identification of major disease based on samples presented&lt;br&gt;<strong>Discussion</strong>&lt;br&gt;15 minutes</td>
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<td>12.00 – 1.00 pm</td>
<td><strong>9.5. Sustainable Integrated Diseases Management (IDM); scouting and threshold determination</strong>&lt;br&gt;<strong>Presentation (30 minutes)</strong>&lt;br&gt;• Scouting, control measures&lt;br&gt;• Integrated Disease Management (IDM)&lt;br&gt;<strong>Field Visit</strong>&lt;br&gt;• Identification of diseases&lt;br&gt;<strong>Discussion</strong>&lt;br&gt;10 minutes</td>
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<td>1.00 - 2.00 pm</td>
<td>Lunch Break</td>
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| 10.30 – 11.00 am | **Module 10. Cotton harvesting and post-harvest management**  
10.1 Introduction and levelling of expectations and objectives  
- Introduction and Levelling of Trainees expectations  
- Presentation of module objectives | 30 minutes |
| 11.00 am-11.30 pm | **10.2 Cotton harvesting and drying to maintain quality (1 hour)**  
Presentation  
- quality standards for cotton in Kenya and harvesting and drying  
**Dissuasion**  
Issues on harvesting | 10 minutes |
| 11.30 am – 12.00 pm | **10.3 Proper cotton threshing, cleaning and drying**  
**Presentation**  
The processes of threshing cottons, cleaning and drying  
**Dissuasion**  
issues on harvesting | 20 minutes |
| 12.00-1.00 pm | **10.4 Cotton storage techniques**  
**Field Trip:** Travel to a nearby cotton ginnery  
**Cotton storage methods**  
**On-farm practical demonstration**  
- The salt method and moisture meter testing of cotton moisture content  
- Use of jute bags for storage | 30 minutes |
| 1.00-2.00 pm | Lunch  
1 hour |
| 2.00 – 2.30 pm | **10.5 Training review**  
Summary of the main points of the training | 30 minutes |

**End of Module 10**

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<th>Time</th>
<th>Session</th>
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| 2.30-3.00 pm | **Module 11. Cotton value addition**  
11.1 Introduction and levelling of expectations and objective  
**Module Objectives**  
- What to be covered  
**Expectations**  
- trainees expectations based on the objections | 30 minutes |
|              | Lunch Break  
1 hour |
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<tbody>
<tr>
<td>3.00pm-4.00pm</td>
<td><strong>11.2 Introduction to recipes for cotton value added products</strong></td>
<td>30 minutes</td>
<td>Facilitator</td>
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<td><strong>Presentation</strong></td>
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<td></td>
<td>• Nutritive value</td>
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<td>• Cottons by products</td>
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<td><strong>Group Exercises</strong></td>
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<td></td>
<td>Discuss and raise issues</td>
<td>30 minutes</td>
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<td>4.00-5.00 pm</td>
<td><strong>11.3. Making of different cotton value added products</strong></td>
<td>1 hour</td>
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<td><strong>Practical’s</strong></td>
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<td>Groups make the various products using the products introduced and analysis</td>
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<td>5.00 – 5.30 pm</td>
<td>Tea Break</td>
<td>30 minutes</td>
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<td><strong>Close of day 8</strong></td>
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<td>Recap of day 8 activities</td>
<td>30 minutes</td>
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<td>9.00 - 10.00 am</td>
<td><strong>11.4 Prioritizing opportunities in cotton value addition</strong></td>
<td>30 minutes</td>
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<td></td>
<td><strong>Group exercise</strong></td>
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<td></td>
<td>• pairwise ranking of cotton products according to quality and market opportunity</td>
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<td><strong>Discussion</strong></td>
<td>30 minutes</td>
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<td>• Ranked recipes.</td>
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<td>10.00 - 10.30 am</td>
<td>Tea Break</td>
<td>30 minutes</td>
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<td>10.30 - 12.00 pm</td>
<td><strong>11.5 Value addition strategy development</strong></td>
<td>1 hour</td>
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<td><strong>Focused group discussion</strong></td>
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<td>• To come up with market strategies for the ranked products.</td>
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<td>• Presentation of strategies</td>
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<td></td>
<td><strong>Presentation</strong></td>
<td>30 minutes</td>
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<td>Summary of market strategies for the products</td>
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<td>12.00 - 12.30 pm</td>
<td><strong>11.6 Training review</strong></td>
<td>30 minutes</td>
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<td></td>
<td>Review the main points about cotton Value addition</td>
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<td><strong>End of Module 11</strong></td>
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<td>1.00 - 2.00 pm</td>
<td>Lunch break</td>
<td>1 hour</td>
<td>All</td>
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<tr>
<td>Time</td>
<td>Module 12: Mechanization of cotton production activities</td>
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<td>2.00 – 2.30 pm</td>
<td>12.1 Introduction, Objectives and Expectations</td>
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<td>Module Objectives</td>
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<td>• What to be covered</td>
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<td>Expectations</td>
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<td>• trainees expectations based on the objections</td>
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<td>2.30 – 3.00 pm</td>
<td>12.2. Cotton climate smart land preparation tools</td>
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<td>Presentation</td>
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<td></td>
<td>• Overview of the cotton mechanization activities</td>
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<td>• Climate smart tillage options</td>
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<td>Discussion</td>
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<td>• discuss any issue that may arise</td>
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<td>3.00 – 3.30 pm</td>
<td>12.3. Cotton calibration of fertilizer and seed rate for planters (1 hour)</td>
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<td>Presentation:</td>
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<td>• planter seed and fertilizer rate determination</td>
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<td>Discussion (30 Minutes)</td>
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<td>• Discuss any issue that may arise.</td>
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<td>3.30 – 4.00 pm</td>
<td>12.4. Cotton chemical implements and tools operations</td>
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<td>Presentation:</td>
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<td>• Cottons pest control equipment;</td>
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<td>• discuss any issues that may arise</td>
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<td>4.00 – 5.00 pm</td>
<td>12.5. Cotton harvesting machine operating principles</td>
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<td>Presentation:</td>
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<td>• Harvesting machines, Harvest timing and estimation of Machine harvest yield losses</td>
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<td>• discuss any issues that may arise</td>
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<td>5.00 – 5.30 pm</td>
<td>Tea Break</td>
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<td>Close of Day 9</td>
<td>Recap of day 8 activities</td>
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<td>8.00 - 9.00 am</td>
<td>Registration day 9 participation</td>
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<td>9.00 – 9.30 am</td>
<td><strong>12.6 Machine and procedure for cotton grading</strong>&lt;br&gt;  <strong>Presentation</strong>&lt;br&gt;  • PowerPoint on cotton grading machine procedure&lt;br&gt;  <strong>Practical exercise</strong>&lt;br&gt;  • Demonstrations on management options</td>
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<td>9.30 -10.00 am</td>
<td><strong>12.7 Module review</strong>&lt;br&gt;  Review the main points about cotton mechanization</td>
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<td>10.00 -10.30 am</td>
<td>Tea Break</td>
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<td>10.30 -11.30 am</td>
<td><strong>Module 13. Cotton Business and Marketing</strong>&lt;br&gt;  <strong>13.1 Introduction and leveling of expectations and objectives (1 hour)</strong>&lt;br&gt;  <strong>Expectations (30 minutes)</strong>&lt;br&gt;  • Trainees to state their expectations&lt;br&gt;  <strong>Objectives (30 minutes)</strong>&lt;br&gt;  • Present objectives</td>
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<td>11.30 -12.00 pm</td>
<td><strong>13.7.2 Introduction to marketing channels and strategies</strong>&lt;br&gt;  <strong>Presentation</strong>&lt;br&gt;  • Cotton markets&lt;br&gt;  <strong>Discussion</strong>&lt;br&gt;  • Issues on markets</td>
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<td>12.00 -1.30 pm</td>
<td><strong>13.3 Identification and prioritization of market opportunities in cotton value chain</strong>&lt;br&gt;  <strong>Group exercise and presentations</strong>&lt;br&gt;  • Prioritization of markets by pairwise ranking and presentation&lt;br&gt;  <strong>Group discussion</strong>&lt;br&gt;  • Trainees raise issues and discuss them.</td>
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<td>1.30 - 2.30 pm</td>
<td>Lunch break</td>
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| 2.30 – 3.30 pm | **13.4 Cotton community production, aggregation and marketing models (COPMAS)**  
Presentation  
- Introduce community production and marketing system | 40 minutes |                       |
|              | **Group Exercise**  
- Discussion issues on cotton community marketing | 20 minutes |                       |
| 3.30 – 4.30 pm | **13.5 Training review**  
Summary and discussion of the main points of the training | 30 minutes |                       |
| 4.30 – 5.00 pm | **Tea Break** | 30 minutes | All                   |
| **Close of day 10** |                                               |          |                       |
| **Day 11 (Friday)** |                                               |          |                       |
| 8.00 - 9.00 am | Registration day 10 participation  
Recap of day 9 activities | 30 minutes | CTT                   |
|              |                                               | 30 minutes |                       |
| 9.00 - 9.30 am | **Sub-Module 14.1 Agricultural Innovation Platforms (AIP)**  
**14.1.1 Introduction, Objectives and Expectations**  
**Module Objectives**  
- What to be covered  
**Expectations**  
- Trainees expectations based on the objections | 30 minutes |                       |
| 9.30 - 10.30 am | **14.1.2 The characteristics of an innovation platform**  
Presentation  
Discussion | 30 minutes |                       |
| 10.30 - 11.00 am | **Tea break** | 30 minutes | All                   |
| 11.00 - 12.00 pm | **14.1.3 Preformation and formation phases of the cotton AIP**  
**Presentation on:**  
Initiation or preformation phase, Establishment, Management, Sustainability  
**Discussion (10 minutes)**  
On any issues arising | 50 Minutes |                       |
| 12.00 - 12.30 pm | **14.1.4 Module review**  
Summary of main points | 30 minutes |                       |
<p>| 1.00 - 2.00 pm | Lunch break | 1 hour | All                   |</p>
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| 1.00 - 1.30 pm | **Sub-Module 14.2: Gender mainstreaming and social inclusions in the cotton value chain**  
  **14.2.1 Introduction, Objectives and Expectations**  
  **Module Objectives**  
  • What to be covered  
  **Expectations**  
  • Trainees expectations based on the objections |
| 1.30 - 2.00 pm | **14.2.2 Gender mainstreaming and social inclusion in cotton value chain (30 minutes)**  
  Presentation Gender issues  
  Group exercise and discussion (10 Minutes)  
  Let the trainees recall what they learned and discuss any issue that may arise |
| 2.00 - 2.30 pm | **14.2.3 Youth empowerment in cotton value chain s (30 minutes)**  
  **PowerPoint presentation**  
  • Strategies to empower youth in cotton value chain  
  **Group work and Discussion** |
| 2.30 - 3.00 pm | **14.2.4 Women empowerment in cotton value chain**  
  **PowerPoint presentation**  
  • Strategies to empower women in cotton value chain  
  **Group work and Discussion** |
| 3.00 - 3.30 pm | **14.2.5. Strategies for inclusion of vulnerable and marginalized groups in cotton value chain**  
  **PowerPoint presentation**  
  • Strategies to empower VMGs in cotton value chain  
  **Group work and Discussion** |
| 3.30 - 4.00 pm | **14.2.7.6. Environmental and social management framework (ESMF)**  
  **Presentation**  
  • Environmental and socioeconomic impacts of cotton value chain activities.  
  **Plenary discussion (10 minutes)** |
| 4.00 - 4.30 pm | **14.2.7. Module review (30 Minutes)**  
  Plenary summary of the module |
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<td><strong>Tea Break</strong></td>
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<td><strong>End of module 14.2</strong></td>
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<tr>
<th>Time</th>
<th>Day 12 (Saturday)</th>
<th>Duration</th>
<th>Remarks / Facilitator</th>
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<tr>
<td>8.00 – 8.30 am</td>
<td>Registration day 12 participation Recap of day 11 activities</td>
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<tr>
<td>8.30-9.00 am</td>
<td><strong>Sub-Module 14.3: Climate-Smart Agricultural Policy Options</strong></td>
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<tr>
<td></td>
<td><strong>14.3.1 Introduction, Objectives and Expectations</strong></td>
<td>30 minutes</td>
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<tr>
<td></td>
<td><strong>Module Objectives</strong></td>
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<tr>
<td></td>
<td>• What to be covered</td>
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<td></td>
<td><strong>Expectations</strong></td>
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<td></td>
<td>trainees expectations based on the objections</td>
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<tr>
<td>9.00 – 9.30 am</td>
<td><strong>14.3.2 Agricultural Policy Frameworks in Kenya</strong></td>
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<tr>
<td></td>
<td><strong>Presentation highlighting:</strong></td>
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<tr>
<td></td>
<td>• The role of agricultural policy frameworks in Kenya</td>
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<tr>
<td></td>
<td><strong>Practical Exercise (10 minutes)</strong></td>
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<tr>
<td></td>
<td>Identification of gaps</td>
<td>10 minutes</td>
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<tr>
<td>9.30- 9.50 am</td>
<td><strong>Tea break</strong></td>
<td>20 minutes</td>
<td>All</td>
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<tr>
<td>9.50 – 10.30 am</td>
<td><strong>14.3.3 Climate-smart agriculture practices, policy options and approaches</strong></td>
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<tr>
<td></td>
<td><strong>Presentation highlighting:</strong></td>
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<tr>
<td></td>
<td>• Policy on CSA</td>
<td>20 minutes</td>
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<tr>
<td></td>
<td><strong>Practical Exercise and plenary Discussions</strong></td>
<td></td>
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<tr>
<td></td>
<td>• existing climate-smart agriculture practices and the relevant policy options for implementation</td>
<td>20 minutes</td>
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<tr>
<td>10.30-10.50 am</td>
<td><strong>14.3.7.4 Climate-smart-sensitive policy cycle</strong></td>
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<tr>
<td></td>
<td>Plenary Presentation</td>
<td>10 minutes</td>
<td>All</td>
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<td></td>
<td>Plenary Discussions</td>
<td>10 minutes</td>
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<tr>
<td>10.50 – 11.40 am</td>
<td><strong>14.3.7.5 Implementation of the climate-smart-sensitive policy at the county level</strong></td>
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<td></td>
<td><strong>Plenary Presentation (20 minutes)</strong></td>
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<tr>
<td></td>
<td>• Phases in the implementation of the climate-smart-sensitive policy at the county level</td>
<td>20 minutes</td>
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<td></td>
<td><strong>Practical exercise (30 minutes)</strong></td>
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<td></td>
<td>Develop a programme showing steps, activities and stakeholders for the implementation of climate-smart policies</td>
<td>30 minutes</td>
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<td>Time</td>
<td>Session</td>
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<tr>
<td>11.40 – 12.20 pm</td>
<td><strong>14.3.6 Policy financing and investments for Climate-smart Agriculture</strong></td>
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<td></td>
<td><strong>Presentation (20 minutes)</strong></td>
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<td></td>
<td>• Policy financing of CSA</td>
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<td></td>
<td><strong>Group exercises (20 minutes)</strong></td>
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<td></td>
<td>• identify potential sources of financing, financing mechanisms and connecting action to financing</td>
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<tr>
<td>12.20 – 12.40 pm</td>
<td><strong>14.3.7 Need of Technology Policy</strong></td>
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<td><strong>Presentation</strong></td>
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<td></td>
<td>• Technology policy</td>
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<td><strong>Plenary Discussions</strong></td>
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<td>12.40 – 1.00 pm</td>
<td><strong>14.3.8 Module review</strong></td>
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<td></td>
<td>Summary of module main points</td>
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<td>1.00 – 1.20 pm</td>
<td><strong>Course Evaluation</strong></td>
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<td>1.20 – 1.50 pm</td>
<td><strong>Announcements</strong></td>
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<td>Way Forward</td>
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<td>Closing remarks</td>
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<td>2.00 pm</td>
<td><strong>Departure to various destinations</strong></td>
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## ANNEX 2: REFERENCES

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<thead>
<tr>
<th>Category / Modules</th>
<th>Publication title</th>
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<th>No Pages</th>
<th>Farmer Category</th>
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<tr>
<td>Category / Modules</td>
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<td>A= New entrant/ Cotton farmer</td>
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<td>1 Climate change and Smart Agriculture</td>
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<td>Cotton Handbook (A guide for farmers and extension officer), 2013 CODA</td>
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<td>6</td>
<td>Cotton Seed System</td>
<td>Cotton (Tropical Agriculture Series), J.M. Munro, 1987</td>
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<td>Cotton Climate Smart Agronomic Practices</td>
<td>Cotton Handbook (A guide for farmers and extension officer), 2013 CODA</td>
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<td>Integrated Soil &amp; Water Management</td>
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<td>Cotton Crop Health</td>
<td>Cotton (Tropical Agriculture Series), J.M. Munro, 1987</td>
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<td>Cotton Harvest and Post Harvest</td>
<td>Adaptation and dissemination of available technologies for Smallholder’s adoption. Macharia et al. 2016</td>
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<td>15.2</td>
<td>Gender Mainstreaming in Cotton Production</td>
<td>Gender mainstreaming in agriculture and rural development: a reference manual for governments and other stakeholders 2001 pp.46 pp. ref.36</td>
<td>Book</td>
<td>46</td>
<td>AB</td>
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</table>
ANNEX 3: FFBS LEARNING MATERIALS

PARTICIPATORY TECHNOLOGY DEVELOPMENT (PTD) AND CURRICULUM ON COTTON CROP SPACING MANAGEMENT:

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

Factors to consider:

- Land topography
- Runs (blocks should face East to West)
- Certified seeds of preferred cotton variety

Setting the P.T.D blocks:

- Plots to be laid (10 x10) M, arranged three in a row with a footpath of 1M apart.
- Improved Cotton varieties
- The blocks must be right angled.
• The recommended spacing and farmers practice
• 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 cotton bolls per plant
• Yield /unit area

Setting of Blocks

<table>
<thead>
<tr>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
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<tbody>
<tr>
<td>Spacing at 90 cm x 60 cm</td>
<td>Farmer practice</td>
<td>Spacing 100 cm x 30 cm</td>
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</tbody>
</table>

AGRO ECOSYSTEMS ANALYSIS (AESA) ON COTTON.

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

General information

- Variety ..............
- Fertilizer ..............
- Planting date ..............

Agronomic data

- Average leaf length ..............
- Average plant height ..............
- Average leaf width ..............
- Number of leaves/plant ..............
- No of bolls/plant ..............
- Cotton seeds/boll ..............
- Yield in kg per plot ..............
Weather: ........................................

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

Diagram of natural enemies of pests observed

<table>
<thead>
<tr>
<th>Natural enemies</th>
<th>Insects observed</th>
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<td>1</td>
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<td>2.</td>
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<tbody>
<tr>
<td>Weeds</td>
<td>Weeding after 2 weeks</td>
</tr>
<tr>
<td>Holes on leaves</td>
<td>Pest and disease scouting</td>
</tr>
<tr>
<td>Yellow leaves</td>
<td>Pest/disease control</td>
</tr>
<tr>
<td></td>
<td>Foliar feed application</td>
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</table>
Kenya Climate Smart Agriculture Project (KCSAP)
P.O. Box 57811, City Square, Nairobi, 00200, Kenya