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Farmers' Training Manual

Understanding Structured Trading Systems



This publication was developed by Eastern Africa Grain Institute (EAGI) which is a specialized training division of the Eastern Africa Grain Council (EAGC) and printed for the Farm Trade training organized by Eastern Africa Farmers Federation (EAFF) with the support from USAID

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SESSION 1: ORIENTATION AND LEVELING OF EXPECTATION



Overview:

This orientation is designed to give participants and facilitators a chance to get acquainted and initiate a two-way communication and interactive discussion on governance.

Activity 1: Getting to know one another and leveling of expectations

Step 1: Welcoming of participants.

Step 2: Participants to introduce themselves, their institution and expectations from the workshop.

Step 3: Participants to write down their expectations on a piece of paper.

Activity 2: Review of workshop timetable, participants' goals and objectives

Step 1: Each participant to receive a copy of the timetable, the goals and objectives.

Step 2: Participants together with the facilitator to do a step-by-step review of the workshop schedule, comparing it with their expectation lists.

Farmer Training Schedule

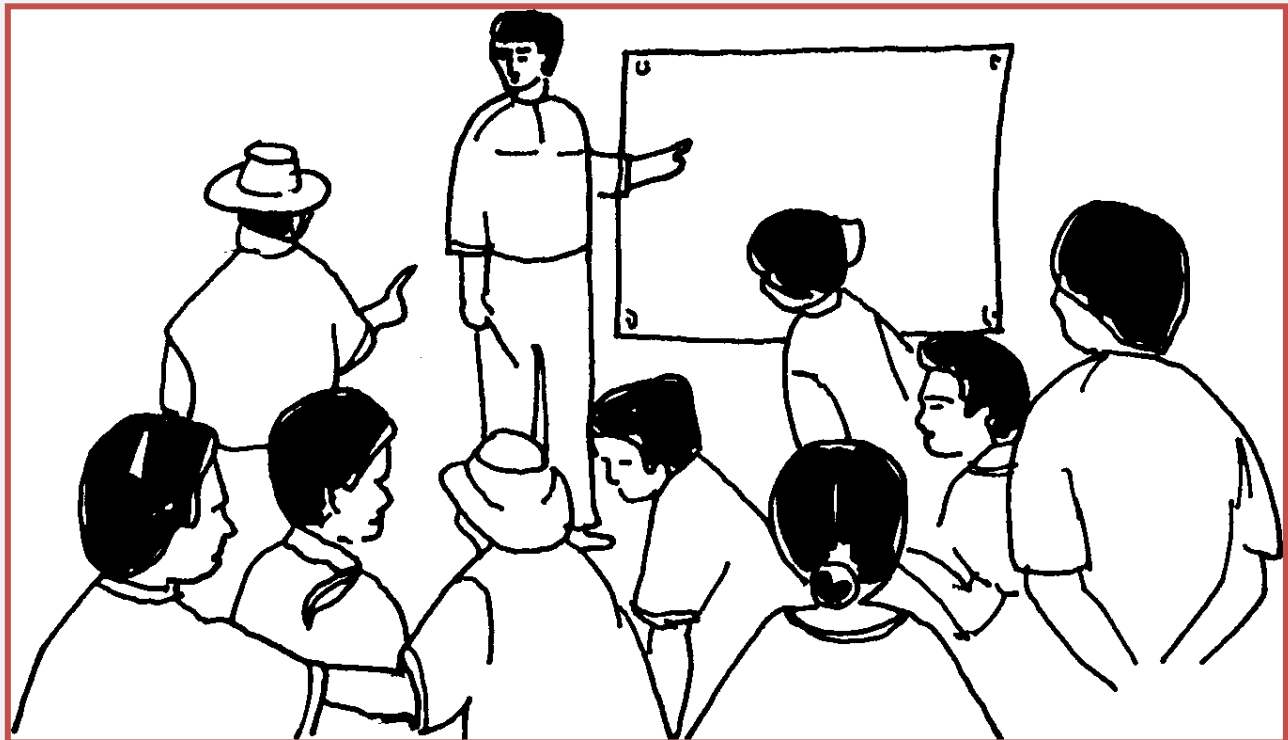
TIME/DAY	DAY 1	DAY 2	DAY 3	DAY 4
(8.30 - 10.30)a.m	Orientation and leveling of expectations Introduction to Farmers training	Storage and Pest Control	Market Information System	Organisational Management, Governance and Aggregation
(10.30 - 11.00)a.m	TEA BREAK	TEA BREAK	TEA BREAK	TEA BREAK
(11.00 - 1.00)p.m	Post-Harvest Management (Part 1)	Grain Quality and Standards Warehouse Receipting System	Trade Contracts Agriculture Commodity Exchange	Gender Lens and Leadership Agriculture Trade Policy
(1.00 - 2.00)p.m	LUNCH BREAK	LUNCH BREAK	LUNCH BREAK	LUNCH BREAK
(2.00 - 3.00)p.m	Post-Harvest Management (Part 2)	Visit to a Warehouse	Visit to Commodity Exchange	Summary,
(3.00 - 4.30)p.m	Practicals and practice	Visit to a Warehouse	Visit to Commodity Exchange	Evaluations and Wrap up

SESSION 2: INTRODUCTION

Why Training For Farmers?

A profiling exercise was executed by Eastern Africa Grain Institute (EAGI), a specialised training and capacity building division of the Eastern Africa Grain Council (EAGC) on behalf of Eastern Africa Farmers Federation (EAFF) which focused on the following specific objectives:

1. To gather specific baseline information on the farmer organizations that will be involved in EAFF's farmers' integration into regional markets through structured trade.
2. To identify specific needs at the farmer organizations level, to inform the capacity building (training) program with regard to structured trade options that will be designed to address these needs.



The following were the conclusions from the profiling exercise;

1. Farmer organizations have little or no experience in structured grain trade as manifested by low volume of grain aggregated, individual storage and marketing, and lack of knowledge on key elements of structured trade.
2. Generally, the farmer organizations though at different levels have weak governance structures incapable of effectively and sustainably handling structured grain trading.
3. All the farmer organizations experience significant post-harvest losses for both maize and rice occasioned by spillage, pest damage and spoilage- rottenness and discolouration.
4. Currently, all farmer organizations trade within their national markets. This leads to the conclusion that they lack awareness on market opportunities and market linkages across borders.
5. A number of issues hindering farmer organizations access to national and regional markets such as lack of standardization in packaging, taxation in the form of cess and other national government taxes, corruption, setting of commodity prices by governments and importation of cheap rice from Pakistan require policy oriented interventions.

The Need to Address the Smallholder Problem

Following the identification of various capacity development needs to smallholder farmers, several recommendations were made;

1. Comprehensive training and mentoring in structured grain trading be offered to the farmer organizations. EAFF may facilitate the general training sessions but the national affiliate organizations will be better placed to undertake mentorship due to their proximity to the farmers' organizations.
2. Given that different organs of the farmer organizations get involved in groups' business activities it is recommended that the farmer organizations make careful selection of training participants to ensure effective representation.
3. To strengthen organizational management capability for structured grain trading the farmer organizations require capacity building in organizational management and governance that improves effectiveness and enhances internal cohesion. The farmer organizations have a

responsibility to undertake reforms of their own governance structures to make them more effective in grain trading.

4. It is recommended that the project builds the necessary capacities in terms of grain handling skills, store management and provide knowledge on appropriate storage materials. However, it will be more sustainable for the farmer organizations to be encouraged to procure post-harvest handling equipment from their own sales proceeds.
5. Cross border trade linkages between buyers across the region require to be established and strengthened. EAFF and affiliate organizations need to focus on exposure, provision of information and facilitating forums that stimulate cross border market linkages. Potential exist for linkages with traders, processors and other institutions within and across national borders.
6. The policy related issues require a multi-agency approach including involvement of respective national governments. EAFF can build alliances with other grain sector stakeholders and facilitate private-public dialogue mechanisms with respective governments to address the issues.

Areas of Training

This manual will seek to provide information on the following areas of training:

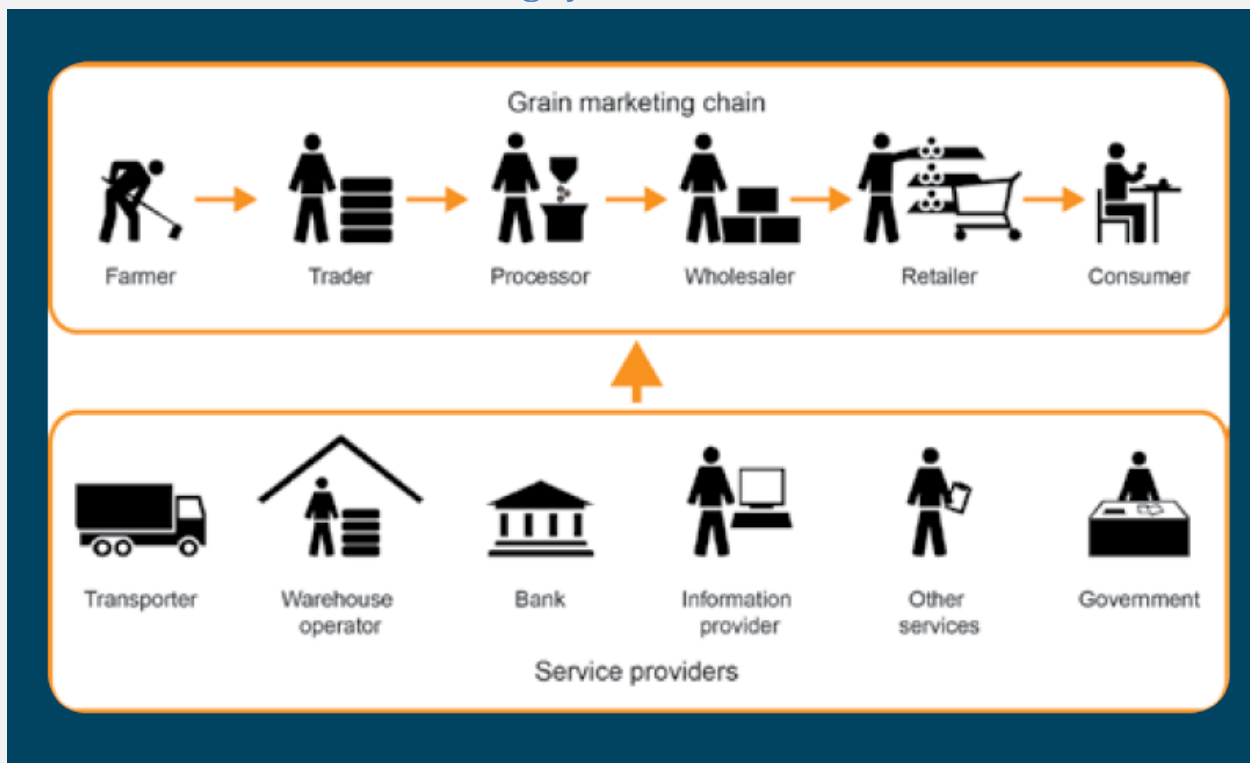
- i. Post-Harvest Management
- ii. Storage and Pest Control
- iii. Grain Quality and Standards
- iv. Warehouse Receipt Systems (WRS)
- v. Marketing Information Systems (MIS)
- vi. Trade Contracts
- vii. Agricultural Commodity Exchange
- viii. Organisational Management and Leadership
- ix. Gender Balance and Women Empowerment

SESSION 3: INTRODUCTION TO STRUCTURED TRADING SYSTEM

What is Structured Trading System?

Structured trading system can be defined as the process of establishing a market where participants in the grain trade have a more open and orderly market. The main components of STS include farmers' aggregation, storage capacity, rules of Trade and Contracts, Warehouse Receipt System and Market Intelligence System. In more particular instances, it includes the efforts to manage the commodities at the point of harvest, ensuring grades and standards are achieved, provides for security to the producers and traders before the eventual trading of the commodity, allows farmers access to financial benefits from the commodity through use of collateral, provides access to market intelligence sharing and market access, and allows for processing and trading at the most viable prices in the continuum.

Illustration of Structured Trading System



Benefits of Structured Trading System

Structured trading is an orderly, organized, trading process where all the players understand the rules and stick to them. It provides transparency, improves efficiency, and reduces transaction costs for all actors in the chain. Structured trading reduces the risk and costs of all those in the chain:

- ❖ **Farmers** want access to a market that will give them the best prices at least cost. Structured trading helps them by giving them control over when they sell their output. That means they can sell when the price is right, rather than immediately after harvest when it is usually lowest. That evens out fluctuations in supplies and prices. It also makes it possible for farmers to get loans using their grain as collateral and for them to obtain higher prices as a result of being able to store their grain in good-quality warehouses.
- ❖ **Traders** want to buy at a low price and sell at a high price. But, more importantly, they also want a reliable supply of grain of the right quality that they can sell to their clients. Structured trading helps them do this by ensuring that the grain conforms to certain standards and is available in large quantities in convenient locations. When traders deposit grain in a warehouse, they can use it as collateral for loans to buy more.
- ❖ **Processors** want a continuous and reliable supply of raw materials of the right quality and at low cost. Structured trading helps ensure this through its system of grades and standards, and because trade is channeled through reliable warehouses and suppliers that ensure grain quality is maintained, rather than through a haphazard network.
- ❖ **Consumers**, at the apex of the chain, want safe and nutritious food of good quality at affordable prices. Structured trading enables them to get this because it ensures quality but reduces costs along the value chain.

Group Discussion Questions

1. Participants to describe the pathway in the trading process of grains in their area from production at the farm level to final access to the consumer. This is because the pathway will differ from one grain to another and from one region to another.
2. Participants to identify and describe the problems that occur in the process of ensuring and facilitating and promoting free trade of grain and market access in their locations.
3. Participants to discuss how the problems affect free trade and market access and how they could be overcome in all areas.

SESSION 4: POSTHARVEST MANAGEMENT

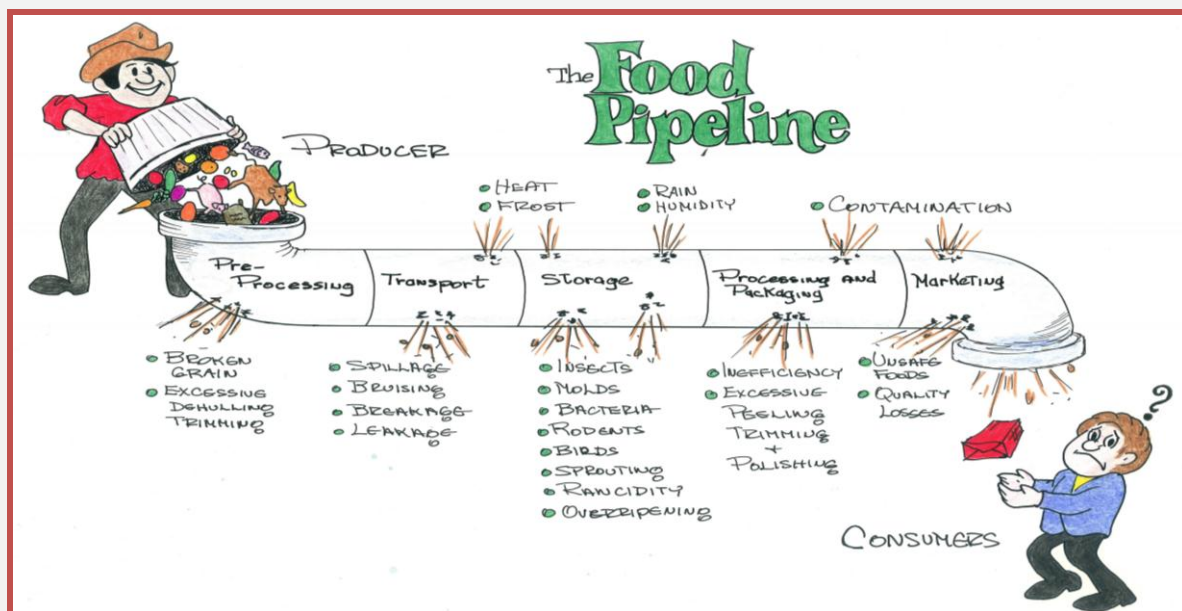


Introduction to Postharvest Losses

This refers to quantitative and qualitative losses that occur to grains after harvesting due to a series of operations the grain undergoes through such as:

- Late harvest, Insufficient drying, Improper threshing, Poor storage
- Poor packaging
- Market prices

The food Pipeline (Source: Bourne, 1977, mimeo)



Requirements of a Good Grain Harvest

- The first step for grain farmers is to ensure that they get a good crop through procuring and planting certified seed varieties, which are best suited to their agro-ecological zones.
- They must have a clean seedbed prepared on time, to facilitate early planting.
- Proper spacing, weeding and pest control are essential for high crop yields.
- Farmers must carry out good agricultural practices to achieve high yields.

Steps in Post-Harvest Management

The steps of post-harvest are as follows:

1	<p>Harvesting</p> <ul style="list-style-type: none"> ➤ Collecting in the crop at the right time ➤ Avoiding bad weather ➤ Avoiding contamination with soil 	4	<p>Cleaning/Winnowing</p> <ul style="list-style-type: none"> ➤ Removing the foreign matter ➤ Increases purity and market value
2	<p>Drying</p> <ul style="list-style-type: none"> ➤ Give value add to the grains ➤ Retain maximum quality of crop ➤ Reduce moisture levels for safe storage 	5	<p>Storage</p> <ul style="list-style-type: none"> ➤ Protecting the grain with different store types ➤ Keeping the grain until a good time for market
3	<p>Threshing/Shelling</p> <ul style="list-style-type: none"> ➤ Reduce required storage capacity ➤ Reduce grain susceptibility to pests 	6	<p>What happens after farm</p> <ul style="list-style-type: none"> ➤ Sale to different buyers ➤ Transport to warehouse

Checking the Moisture Content of Threshed Grain

Experienced farmers use several ways to check whether it is fully dried:

- Bite it to check how hard it is.
- Take a handful and listen as the grains drop (Figure 9).
- For beans that are dried in the pod, shake the pod and listen to the sound.

Salt method

Dry salt will absorb moisture from grain. This principle can be used to determine whether a cereal grain sample has moisture content of above or below 15%. The method uses the following:

- A clean, dry glass bottle of about 750 ml capacity, with a cap that makes it airtight
- A cup of common salt.
- 250–350 g of the grain to be tested

The salt must first be dried by spreading it out on some plastic sheeting in the hot sun and leaving it for at least 3–4 hours until it is hard. It should be turned at intervals during this time. It can also be dried in an oven. The dry salt should be placed in a sealed container until it is ready for use. The grain is tested by putting it into the bottle (which should be about one third full) and adding 2–3 tablespoons (20–30g) of dry salt. The bottle should be closed tightly with the cap, shaken vigorously for 1 minute to mix the salt and grain, then left for 15 minutes. If the salt sticks to the side of the bottle, the moisture content of the grain is above about 15% and is not safe for storage. If the salt does not stick to the bottle, the moisture content is below 15% and the grain is safe for storage.

Moisture meter

Moisture meters (Figure 10) are quick, portable, simple to use and fairly accurate. They may be used routinely, for example, when grain is delivered to a grain store. They cost several hundred dollars, so would normally be used only at warehouses and by farmers' groups that handle a lot of grain.

Postharvest Management for Maize



Harvesting Process

- Harvesting should begin when the ears start to droop and leaves begin to dry.

- Harvest when most of the maize husk turns yellow and leaves slightly yellowish.
- Cobs should be harvested in dry weather.
- On rainy days if cob collection is not possible, break the stem just below the cob and hang it downwards.
- When a black spot appears in the grain, harvest the cobs.

Important Tip

In many maize producing areas, it is not possible to leave maize standing in stalks in the field for very long because thieves will steal it. In such cases, instead of leaving the crop to dry in the field, stack the cut stalks in pyramids near your house.



Key Steps after Harvesting

- i. Cut the maize stalks and stack them in pyramid-shaped heaps then leave them in the field to dry for two sunny days.

- ii. After the maize has dried, remove the ears from the stalks. If possible, establish the moisture content by taking one or two cobs to a grain buying centre for testing.
- iii. Husk the ears.
- iv. Transport the husked maize to your home.

Shelling

- Shelling (hand-threshing) can be done with a hand-held sheller.
- A simple hand-held sheller can be made by a carpenter using a small piece of hardwood. The wood should be of good quality to avoid cracks or splits.
- Hold the maize cob with one hand and rotate it against the shelling device held in the other hand. The sheller has teeth that engage and remove the grain from the cob.



Wooden maize thresher

Important Tip: Hand-threshing is cheap, especially if the sheller can be made from local materials.

Drying

- Maize is usually harvested with a moisture content ranging from 18 to 26 per cent, which is considerably higher than the 13.5 per cent maximum commercial standard for East Africa. Thus, drying is required.
- Grain harvested with high moisture content must be dried immediately.
- Maize grain can be dried either on the cob or after it is shelled.
- After threshing, the maize kernels are dried in the sun either on plastic tarpaulins, concrete slabs, or in commercial dryers if available.

- Do not dry your maize directly on the ground to avoid contaminating it with dirt, insects, or other pollutants. Maize laid on the ground could pick fungi spores that may lead to aflatoxin contamination.

Drying on Plastic Sheets

- You can dry your maize on plastic sheets as either maize cobs or shelled kernels.
- The maximum depth of the maize on the sheet should be up to your ankle bone; any higher means the grain at the bottom of the pile will not dry quickly.
- Heavy-duty polythene sheeting or sheets made from cut-open nylon sacks can also be used.
- If you turn the grain over several times a day, it will dry more quickly.
- Be careful to avoid contamination by dust or soil. Grain stained by soil will fetch a lower price.
- Do not allow farm animals like chickens, goats, or cows to walk through the maize drying area because they will damage or eat the grain.



Solar drying on a plastic sheet

Drying on Concrete Slabs

- Maize grain can also be dried on a layer of concrete on the ground, which keeps the grain clean. Concrete also heats up quickly, which speeds up drying.
- Concrete slabs are easy and cost-effective to build. They are usually 5m×5m or 10m×10m and can be enlarged depending on requirements. As they use only solar energy for drying, they are environmentally friendly and low-maintenance.
- Remember to sweep the concrete clean before drying the maize on it.
- The maximum depth of maize should be up to your ankle bone; any higher means the grain at the bottom of the pile will not dry quickly.

- In clear, sunny weather, a 5m×5m slab can dry 1,000kg of maize in a day and a 10m×10m slab can dry up to 4,000kg of grain.

Pest and Disease Control

In East Africa, stem and stalk borers are among the major pests attacking maize in the field. At storage level, the black maize weevil (see picture), the Angoumois grain moth, and the grain borer are among the most prominent pests.

Causes of Insect Infestation in Maize

The main causes of insect infestation are:

- Late harvesting
- Introduction of infested lots
- Migration from rubbish dumps
- Cracks and crevices in storage places that give the insects a home to lay their eggs, which can remain from one season to another.
- Lack of cleaning in storage
- Use of infested bags

Pest Control Measures

- Exercise good storage hygiene and use crop protection products.
- Identify the pest causing the damage and apply the appropriate product in the right dose.
- Only pesticides on the official government-approved list should be applied.
- Follow instructions before applying pest control treatments and keep the instructions in a safe place to be re-read before future uses.
- Keep all pest control chemicals out of the reach of children.

Bagging and Packaging

There are four main types of bag materials used for storing and transporting maize grain in East Africa:

1. Plastic
2. jute
3. Polypropylene
4. Sisal

Plastic

- Only use plastic for handling and transporting small quantities of maize for a short distance.
- Plastic is not well-aerated and will result in deterioration of maize within a short time, unless you are using the specially designed hermetically sealed (airtight) plastic bags.

Polypropylene

- Polypropylene bags are made from woven fiber based on petroleum products.
- It is advisable to use these bags with UV stabiliser because they last longer without getting brittle.
- Polypropylene has gained in usage in East Africa due to its low cost.
- Polypropylene does not allow for circulation of air.



Putting more than the recommended amount of grain in a polypropylene bag may cause it to split along the weave at pressure points. This increases postharvest losses and raises the potential for infestation and rodent problems.

Jute and Sisal

- Sisal and jute bags are of plant origin and are biodegradable, which makes them good for the environment.
- They are well-aerating, and easier than plastic and polypropylene to fumigate in pest control.
- It is possible to stack jute bags higher than polypropylene bags because the coarser fibers do not slip as easily.
- The main disadvantage of sisal and jute is cost. Otherwise, they are the best longer-term storage solution for maize.



Maize bagged in a sisal sack

Bag Cleaning

- Disinfect any packaging material used to store grain. Wash and disinfect bags by boiling them in water for 5 minutes.
- When disinfecting a polythene sack, ensure that it does not touch the outside of the pot – the heat may damage it.
- Dry all sacks and containers before using them to store grains.

Mould and Aflatoxin Control

- Moulds are spread by spores which cannot be seen by the human eye. They are in the soil, on plants, in the air, left on old bags, or in poor storage spaces. When these spores fall on moist grains under warm, humid conditions, they start growing.
- As these fungi grow, they release poisons called mycotoxins. There are over 500 types of mycotoxins, but the most important in maize are produced by *Aspergillus*, *Fusarium*, and *Pencillium* species.
- Sometimes you can see the result – black moulds on grains. However, the most dangerous mycotoxin, aflatoxin, which can cause death or long-term health problems in humans and animals, cannot be seen by the human eye; only special tests will show its presence. Once aflatoxin is produced on the grain, it cannot be destroyed by cooking or heating.
- The only way to prevent it from growing and spreading is to dry grain quickly at harvest to moisture levels of less than 13.5 per cent, and to keep them in clean bags, dry conditions and off the ground in storage.

- Control and check your maize regularly, to ensure that moisture levels do not increase and allow fungus and mould to grow on it.

To control moulds and aflatoxin farmers should:

- i. Dry maize quickly to 13.5 per cent or below before storage.
- ii. Protect grains from pest and rodent infestation, since they will damage maize by offering easy access to fungus and mould.
- iii. Ensure that grain stores are leak-proof and well ventilated to avoid entrance of water in the grain, and to allow for aeration to take out moisture and heat.
- iv. While removing grains with mould will improve the quality, this does not mean that those with aflatoxin have been removed.

Environments that Encourage Aflatoxin Development

- Moisture content of 14-30 per cent in grains
- Temperature range of 10-40 degrees Celsius.
- Relative humidity above 70 per cent.
- Unclean environment.
- Prolonged rain after crop has matured, preventing harvest.
- Periods of drought while the plant has been growing.

Steps to Prevent Aflatoxin

- Dry your maize quickly at harvest and very well before storage. Keep it in a dry, clean, and well ventilated storage area.
- Avoid insect and rodent damage, which can open up the grain by offering easy access to fungus and mould.
- Prevent any contact of maize with soil.
- Do not add water to maize hoping to increase its weight before sale.
- Handle the maize carefully when harvesting and moving.
- Store grains in clean sacks and place on pallets.
- Ensure sacks are in good condition, full and well-sealed to prevent falling out of grain.



Stacked maize sacks on pallets

Post-Harvest Management for Rice



Harvesting

- Paddy is the rice grain enclosed in the husk before it is milled.
- Timeliness in harvesting paddy rice is important in determining grain quality and yield.
- Harvesting should begin when 90 per cent of the grains (or nine out of 10 grains) in the main panicles of plants are clear, firm, and straw-coloured; the rest should be hard.
- Harvest when paddy rice moisture is less than 20 per cent, about 30-32 days after flowering.
- If harvesting by hand, grasp the plant about 15cm-20cm from the soil or ground level then cut with a sickle 15cm from ground level.
- If harvested too early, there will be many immature grains which will reduce head rice yield and quality.

- Immature rice kernels are very slender and chalky, and will result in excessive amounts of bran and broken grains.
- If harvesting is too late, many grains will be lost due to shattering or drying out and cracking during threshing.
- Cracked grains break during milling.
- If moisture content is allowed to vary, grain fissuring (cracking), spoilage through yellowing, and development of odours can occur.

Threshing and Winnowing

- Thresh paddy rice immediately after cutting. The longer cut panicles remain in a stack, the higher their chances of turning yellow and discolouring during milling.
- Thresh using a drum or a wooden surface to reduce discolouration. Hit the rice panicle on the drum or wood.
- To avoid contamination, never thresh rice on the ground. Thresh on tarpaulin or canvas.
- Remove all kinds of dockage (impurities) from threshed grain such as insects, rice straws, and leaves as soon as possible after harvesting, and before storage. Clean grain has a higher value than grain contaminated with straws, chaff, weed seeds, soil, rubbish, stones and other non-grain materials.
- Winnow (remove light and chaffy material) at threshing to avoid contamination and black rice. Modern rice mills with destoners reduce the burden of winnowing. However, winnowing is still essential as it will increase the value of the paddy.
- Maintain clean grain to improve storability, milling output and quality, and to reduce price penalties when selling.



Threshing rice over a drum

Drying

- Dry the paddy rice immediately after threshing.
- Sun-dry for four hours a day, for two to three days.
- Dry on tarpaulin to reduce stones and dirt. You may dry paddy directly on concrete only if it has been swept thoroughly.
- Spread grain in thin layers (5cm–10cm deep) on the tarpaulin or floor, and then turn and stir seven to eight times a day. This distributes moisture more evenly and increases the rate of drying (the paddy exhibits better milling quality when dried to a moisture content of 14 Per cent).
- Bite between teeth to test moisture content. If it is soft, continue drying. When it breaks into two, moisture content is around 14–15 per cent.
- Do not over-dry the paddy since it increases breakage in the rice grain during milling, and reduces quality, and the price you will receive.

Bagging and Packaging

- Paddy rice should be stored in bags and placed on a raised floor to avoid moisture accumulation.
- It must be stored in an environment of 13–14 per cent moisture and protected from insects and rodents.
- Storing rice as paddy has two advantages: (a) rodents and insects struggle to gnaw through the outer covering (husk); and (b) most customers prefer freshly milled rice.
- Store paddy in 50kg to 100kg sacks made from jute, polypropylene or woven plastic, stacked under a roof or in a shed.
- Periodically fumigate to control insects.
- For extended periods of time while maintaining its quality (13-14 per cent moisture content) protect paddy rice from insects and rodents using environmentally recommended fumigants and putting it in bags even when using granaries (made of timber, mud or cement) or large woven baskets; and from absorbing moisture from rainfall or the surrounding moist air.

Pest and Disease Control

- Most control methods apply mainly to the crop when still in the field and before harvesting.
- However, disinfect any used bags using the following steps:

- a. Turn them inside out and shake thoroughly to ensure that no grains stick inside.
- b. Soak the bags for 10 minutes in hot water.
- c. Dry them under shade before filling them with paddy.
- d. Do not pack your paddy rice if the moisture content is more than 14 per cent; the grain could spoil during storage.

Shelling and Husking

- This is done mostly in rice mills. Some traditional methods such as pounding in wooden mortars produce many broken grains.
- Remove any stones and as much foreign material as possible, as they spoil and damage rice mills.
- Ensure that the paddy is properly dried (but not over-dried) before delivering to the rice mill to avoid too many broken rice grains.

Cleaning and Sorting/Grading

The purpose of cleaning the grains is to:

- Remove impurities such as leaves, broken grains, sand or grit, etc.
- Remove immature, shriveled, unfilled and empty spikelets.

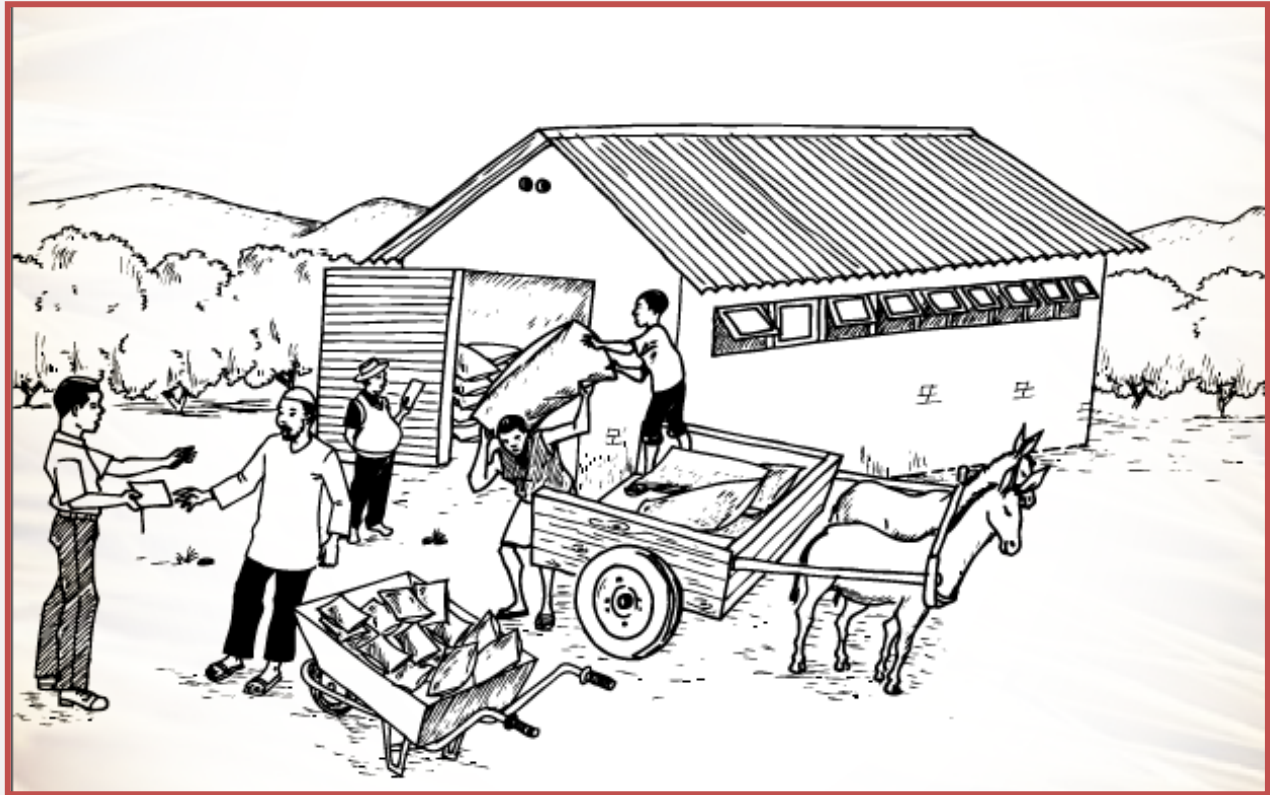
Grain can be cleaned manually through winnowing, which removes only light, chaffy material.

Group Discussion Questions

1. What do you understand by postharvest losses?
2. How long does it take to harvest your crop?
3. What are the components of postharvest management? Emphasis on the postharvest management pipeline.
4. How should maize be harvested? Shelled? Dried?
5. What are the causes of insect infestation in maize?

6. What is the best way to bag and package maize for storage or transport to market?
7. What are the environmental conditions conducive for aflatoxin development in grains?
8. What steps can farmers take to prevent aflatoxin infestation on grains?
9. How is rice harvested (when), threshed and winnowed, dried and bagged?
10. What is the recommended moisture content for maize and rice? How is the moisture content measured (use of traditional or modern method)?
11. What are some tips of using a moisture meter? Demonstrate the use of moisture meter.

SESSION 5: STORAGE AND PEST CONTROL



Factors responsible for poor grain storage

- i. Poor storage structures (stores) or location.
- ii. Inadequate drying resulting in moisture levels that are too high for safe storage.
- iii. Pests.
- iv. Inadequate knowledge on good storage practices.
- v. Poor store management.
- vi. Weather and other natural causes. Environmental conditions can become unfavourable.

Basic Requirements and Recommendations for good storage

The four pillars of good storage practice include:

- i. Ensuring that the crop going into store is in good condition**
 - Good quality whole grain is less likely to suffer from insect attacks than poor quality damaged grain.
 - The grain should be checked after maturity while the crop is still standing in the field and immediately before harvest.

- Grain that shows signs of infestation or damage should be separated out before harvest and either discarded, reserved for animal feed or, depending on the type and extent of damage, kept for immediate consumption.
- The grain should be cleaned well and any that is damaged removed.
- Careful winnowing will remove many live adult insects. Straw, chaff, weed seeds, stones and dirt must be removed. These materials will hold water and their removal will allow grain to dry faster. Any rubbish should be burnt.
- The grain should be well-dried. Good drying is essential. Damp grain will become mouldy. Insects are less likely to attack well-dried grain. If the crop is to be dried in the field, it should not be heaped directly on the ground, to prevent moisture from being taken up. Similarly, when grain is dried at the homestead, it must be kept off the soil.

ii. Keeping the store in good condition

- A good store will keep grain dry and cool.
- It should provide protection against rodents, birds and browsing domestic animals like poultry.
- It should be theft proof.
- Stores should be sited in areas that are not prone to flooding and should allow water to drain off readily.
- They should not be placed where high winds can damage the structure or near trees, which might provide access points from which rodents can jump onto the store roof or platform.
- The store should have a roof to keep rain off the structure and provide shade during the heat of the day.
- Without shade, changes in temperature inside the store between day and night may be so great that as the store cools at night condensation occurs and wets the grain, which in turn may lead to the development of moulds.



iii. Practicing good store hygiene

- This means keeping everything as clean as possible.
- Store surroundings should be tidied so that there is no vegetation or rubbish to hinder inspection or to provide breeding grounds for insects and rodents. Clearing the ground around the store will make it easy to spot termite trails.
- Livestock should be kept away from the store; they should not be allowed to browse or sleep under it. Droppings should be cleared up as they attract rodents.
- Whenever storage containers are empty, they should be cleaned. Secondhand sacks should be dipped into boiling water to kill any insects and then dried in the sun.
- Grain residues should be removed from sacks by turning them inside out and thoroughly brushing. Holes should be stitched.
- Grass should be burnt inside solid walled bins and mud plastered baskets to kill off insects and mould spores. It is good practice to sprinkle the inside walls and floor of the structure with insecticide to kill remaining insect pests.
- Old grain should be stored separately from the new crop and should be used first.

iv. Maintaining the condition of the crop and store throughout the storage season

- Pests can attack the store at any time, so it is important to inspect it and the produce regularly. The earlier a problem is spotted the sooner action can be taken to control it. Early action will prevent damage from becoming severe.
- If insect pests occur regularly, treat the grain with insecticide as soon as possible. Maize cobs can be sprayed with insecticide but it is more effective to shell the cobs and mix with insecticide dust.
- It is important to shell and treat pulses, especially beans and cowpeas, which become infested very quickly.
- Store inspections should start as soon as grain is stored and then conducted weekly. This is because insects may be brought in with the produce, which might have become infested in the field during harvesting or drying. The store may also have harboured an infestation from the previous season.

Requirements of Good Store Management

There is need for good storage management practice among farmers, if grain is to remain in suitable and marketable condition throughout the storage period. Good storage management requires:

- i. A good storage site;
- ii. Produce in a suitable condition;
- iii. Intake of grain orderly and controlled;
- iv. Storage period controlled;
- v. Quality maintenance ensured;
- vi. Security against theft and loss;
- vii. Any loss identifiable and accountable;
- viii. End use requirement is satisfied.

Consistent adherence to these requirements will help achieve the following:

- i. Know the quantity in store at any given time;

- ii. Reduce grain loss in storage;
- iii. Quickly recognise causal agents of losses;
- iv. Control agents of losses.

Pest Control

Common Pests during Storage

The main grain pest categories due to poor storage practices are insects including termites, rodents and moulds. Other pests that cause storage losses are birds and human beings who steal and contaminate the grain.

1. Primary Pests

Primary insects are those that attack grain that has not been damaged, although they still feed on damaged grain.

Common primary insects are:

Rhyzopertha dominica (Lesser grain borer)



Sitophilus spp (weevil),



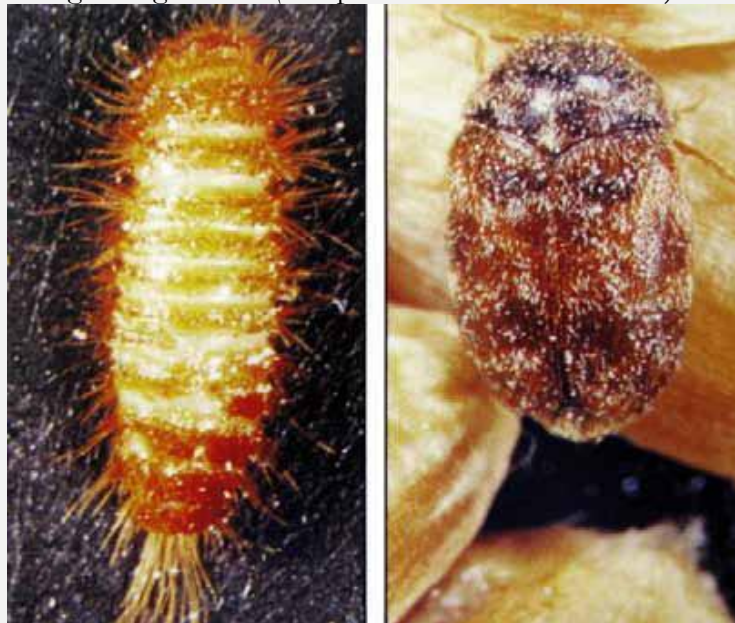
Prostephanus truncatus (Larger grain borer)



Sitotroga cerealella (Anjoumis maize moth)



Trogodema granarium (Khapra beetle - larva and adult)



2. Secondary Pests

These are predominately associated with commodities that have suffered previous physical damage caused by a primary infestation or a milling or handling process.

TRIBOLIUM CASTANEUM (Red rust flour beetle)



EPHESTIA CAUTELLA (Tropical warehouse moth)



Termites, Rodents and Birds

- A common name for numerous species of social insects that can damage stored grain and wooden structures such as furniture or houses.
- Rats and mice are responsible for a considerable percentage of losses throughout the postharvest period.
- Rodents are also of particular interest because not only can they cause severe damage to the commodity but also to bagging materials, electrical wiring and store structures.
- The common grain pests among birds are feral pigeons, house sparrows and starlings. Birds are attracted to easily found loose grains. They contaminate grains with their droppings and urine and can spread salmonella.

Moulds

- Moulds are a group of fungi, which propagate by producing spores.
- Once mould growth has started, each colony (mycelium) produces millions of microscopic spores within a few days.

- The spores require moisture to germinate and will grow only when the equilibrium relative humidity of the grain is favourable.
- Mould growth occurs on staple agricultural products both in the field and during storage.

Pest Control

- Pest control involves the use of chemicals and other non-chemical pest control methods (hygiene in warehouse, store management and rodent proofing).
- **Integrated Pest Management (IPM)** involves the use of chemical and non-chemical methods of pest control. All can be applied in storage management.
- IPM gives priority to non-chemical control measures, use of traditional methods and only defaults to use of chemical controls when other options are unlikely to offer sufficient protection.
- An IPM system would, therefore, supplement sanitation and good warehouse keeping with a combination of one or more of the following practices:
 - a. Improved harvesting and threshing techniques.
 - b. Judicious use of residual insecticides.
 - c. Use of fumigants.
 - d. Use of ambient aeration, and refrigerated aeration.
 - e. Atmospheric gas modification (hermetic, CO₂, N₂).
 - f. Biological control (parasites, predators (such as cats) and entomopathogens, pheromones).
 - g. Use of resistant varieties if possible.
 - h. Storage management (FIFO).
 - i. Adequate grain cleaning prior to storage.
 - j. Storage design (for pest (rodent and bird) exclusion).
 - k. Adequate grain cleaning prior to storage.
 - l. Monitoring, evaluation and inspection of stored commodities, storage structures and their immediate surroundings.
 - m. Thermal disinfestations.
 - n. Irradiation techniques.
 - o. Insect-resistant packaging.

Group Discussion Questions

1. How long should a farmer store grain?
2. What are some of the losses incurred by farmers during storage?
3. What are the factors that lead to poor storage?
4. How does poor storage affect grain quality?
5. What are some of the common pests that affect grain during storage?

6. What integrated pest management measures can be used to ensure stored grain is safe from pests, rodents, aflatoxin etc?
7. What are the requirements for good stores?
8. What the requirements of good storage management?
9. What are some of the equipment that a farmer will use in storage?

SESSION 6: GRAIN QUALITY AND STANDARDS

General Quality Parameters

All produce intended for human consumption should be free from:

- Foreign odours
- Moulds and live pests
- Rat droppings
- Toxic or noxious weed seed
- Other injurious contaminants

KEY STEPS TO ATTAIN DESIRED QUALITY

Quality Specification	Description	How do you achieve this?
Foreign matter		Removal of all organic materials weed seeds, broken kernels and other grains-beans, green grams e.t.c
Inorganic matter		Cleaning to remove sand, soil, glass, fibre e.t.c
Broken grains		Use a calibrated maize sheller or rice thresher. Pass the grain through a sieve to remove broken kernels
Pest damaged grains		Frequent fumigation especially during early stages
Rotten & Diseased grains		Sorting rotten maize cobs after harvest Storing shelled grain at the right moisture level
Discoloured grains		Selecting the right seed Using appropriate drying techniques
Moisture		Drying

Immature/Shriveled grains		Good Agronomic Practises
Filth		Clean grains-remove grass, cobs, dead skins, animal waste, insect wings, dead worms and other grains.
Aflatoxin		Avoid the growth of fungi and molds which produce mycotoxin Maintain dry and clean and well ventilated storage area. Avoid insect and rodent damage which can open up the grain by offering easy access to grain by fungus and molds. Avoid contact of grain with soil.

Analytical Procedure

- i. Take a representative sample of the produce under consideration in a convenient container.
- ii. Move the container with sample close to your nose.
- iii. Smell the sample. The smell of the produce should be typical. Other smells e.g. of chemicals, mouldiness, rot etc should not be detectable.
- iv. Spread the grain on a bench or table.
- v. Sort and pick them.
- vi. Examine the remains, which may include live pests. No live pests or rat droppings should be observed.

The intended produce should be uniform in colour according to type, be whole and clean. Thus observe:

- No dirt
 - Uniformity in shape, size and colour
 - Wholesomeness
- a. Pick 10 grains at random
 - b. Crush each between the teeth
 - A reasonably dry grain will crush without leaving a pasty feeling in the mouth.
 - With experience, it is possible to tell when the MC is below 13.5 per cent.
 - Proper grade of produce should have MC not exceeding 13.5 per cent.
 - c. MC can also be determined using dried salt in a dry glass and produce sample.

Grades

These are arrived at after considering the degrees of the following grain characteristics:

- i. Foreign matter
 - o Biological origin
 - o Non-biological e.g. metals, stones, plastics, glass etc
- ii. Broken grain and pest damaged
- iii. Rotten and diseased
- iv. Discoloured
- v. Immature or shriveled
- vi. Filth or trash
- vii. Mouldiness
- viii. Other contaminants including toxic and noxious weeds

Some of these grain characteristics can be defined as follows:

- i. Moisture Content: Amount of moisture contained in grain expressed as a percentage of the weight of the grain.
- ii. Foreign Matter: Substances that are not the actual commodity, which can include straw, husks, stones, pieces of cob, dust, and other rubbish. Foreign matter can also be referred to as extraneous matter.
- iii. Trash: Any vegetable matter other than grain, which will not pass through a grading sieve.
- iv. Defective grain: Grain that is discoloured by heat, fermentation, germinated, weather-damaged, visibly infected with fungus or virus, immature or insect damaged.
- v. Discoloured: Grains which are markedly discoloured by weathering or by heating caused by fermentation, but does not include other coloured varieties.
- vi. Insect damaged grain: Grain that has been attacked and damaged by insect or animal pests
- vii. Diseased: Grain visibly infected by fungus or other agents.
- viii. Chipped grain: Grain which has been chipped or cracked.
- ix. Broken grain: Grain and pieces of grain which will pass through the grading sieve with thorough shaking.
- x. Germinated grain: Sprouted grain in which the process of germination is visible within the embryo.
- xi. Shriveled grain: Grain which is shriveled over its entire surface and embryo area.
- xii. Stained grain: Grain which is stained by soil or any foreign agent but does not include discoloured grain.
- xiii. Other coloured grain: Grain of a colour or partly coloured grain present in grain other than the grain being analysed.
- xiv. Undeveloped grain: Grain which is thin and papery in appearance, which is small and wrinkled.
- xv. Stones: Any mineral material, which will not readily disintegrate or dissolve in water.
- xvi. Contaminant: Foreign substances or chemicals in the grain. This includes soluble elements which cannot be removed like excretions of pests and other animal, plant material, pesticides, oils, pathogenic organisms and toxins from fungal infections.

East African Standards for Maize

S/N	Characteristics	Maximum limits			Method of test
		Grade 1	Grade 2	Grade 3	
i)	Foreign matter, % m/m	0.5	1.0	1.5	ISO 605
ii)	Inorganic matter, % m/m	0.25	0.5	0.75	
iii)	Broken kernels, % m/m	2.0	4.0	6.0	
iv)	Pest damaged grains, % m/m	1.0	3.0	5.0	
v)	Rotten and diseased grains, % m/m	2.0	4.0	5.0	
vi)	Discoloured grains, % m/m	0.5	1.0	1.5	
vii)	Moisture, % m/m	13.5			ISO 711/712
viii)	Immature/shrivelled grains, % m/m	1.0	2.0	3.0	ISO 605
ix)	Filth, % m/m	0.1			
x)	Total defective grains, % m/m	3.2	7.0	8.5	ISO 605
xi)	Total aflatoxin (AFB ₁ +AFB ₂ +AFG ₁ +AFG ₂), ppb	10			ISO 16050
xii)	Aflatoxin B ₁ , ppb	5			
xiii)	Fumonisin, ppm	2			AOAC 2001.04
<p>NOTE The parameter, Total defective grains is not the sum total of the individual defects. It is limited to 70 % of the sum total of individual defects.</p>					

East African Standards for Milled Rice

S/N	Characteristics	Maximum limits			Method of test
		Grade 1	Grade 2	Grade 3	
	Broken, %	5	15	25	ISO 605
	Heat damaged rice, %	1	1.5	2.0	
	Damaged rice, %	1.5	2	3.0	
	Chalky %	2	4	10	
	Red or red streaked, %	2	6	12	
	Immature grains, %	1	1.5	2	
	Other contrasting varieties, %	1	2	3	
	Organic matter, %	0.1	0.2	0.5	
	Inorganic matter, %	0.1			
	Paddy grains, %	0.3			
	Live weevils in kg	Nil			
	Filth, %	0.1			
	Moisture content, %	14			ISO 711/ISO 712
	Total aflatoxin (AFB ₁ +AFB ₂ +AFG ₁ +AFG ₂), ppb	10			ISO 16050
	Aflatoxin B ₁ , ppb	5			
	Fumonisin, ppm	2			AOAC 2001.04
<p>NOTE The parameter, Total defective grains is not the sum total of the individual defects. It is limited to 70 % of the sum total of individual defects.</p>					

East African Standards for Brown Rice

S/N	Characteristics	Maximum limits			Method of test
		Grade 1	Grade 2	Grade 3	
i)	Broken, %	2	5	7	ISO 605
ii)	Heat damaged rice, %	1.5	1.5	2.0	
iii)	Damaged rice, %	1.0	2	4.0	
iv)	Chalky, %	2	4	6	
v)	Red or red streaked, %	1.0	4	12	
vi)	Immature grains, %	2	6	12	
vii)	Other contrasting varieties, %	1	2	5	
viii)	Organic matters, %	0.1	0.5	1	
ix)	Inorganic matters, %	0.1	0.1	0.1	
x)	Live weevils/kg	Nil	Nil	Nil	
xi)	Filth, %	0.1			
xii)	Paddy grains, %	1	2	2.5	
xiii)	Moisture contents, %	14			
xiv)	Total aflatoxin (AFB ₁ +AFB ₂ +AFG ₁ +AFG ₂), ppb	10			ISO 16050
xv)	Aflatoxin B ₁ , ppb	5			
xvi)	Fumonisin, ppm	2			AOAC 2001.04

NOTE The parameter, Total defective grains is not the sum total of the individual defects. It is limited to 70 % of the sum total of individual defects.

East African Standards for Rough Rice

S/N	Characteristics		Maximum limits			Method of test
			Grade 1	Grade 2	Grade 3	
i)	Foreign matter, % m/m	Organic	1.0	1.5	2.0	ISO 605
		Inorganic	0.25	0.25	0.5	
ii)	Pest damaged grains, % m/m		0.5	0.75	1.0	
iii)	Discoloured grains, % m/m		0.1	0.5	1.0	
iv)	Moisture, % m/m		14			ISO 711/ISO 712
v)	Immature/shrivelled grains, % m/m		1	3	5	ISO 605
vi)	Total aflatoxin (AFB ₁ +AFB ₂ +AFG ₁ +AFG ₂), ppb		10			ISO 16050
vii)	Aflatoxin B ₁ , ppb		5			
viii)	Fumonisin ppm		2			AOAC 2001.04
NOTE 1 The parameter, Total defective grains is not the sum total of the individual defects. It is limited to 70 % of the sum total of individual defects.						
NOTE 2 Broken percentage in brown and milled rice is used to evaluate the paddy grades						

Tips on Conditions of Good Quality Grain

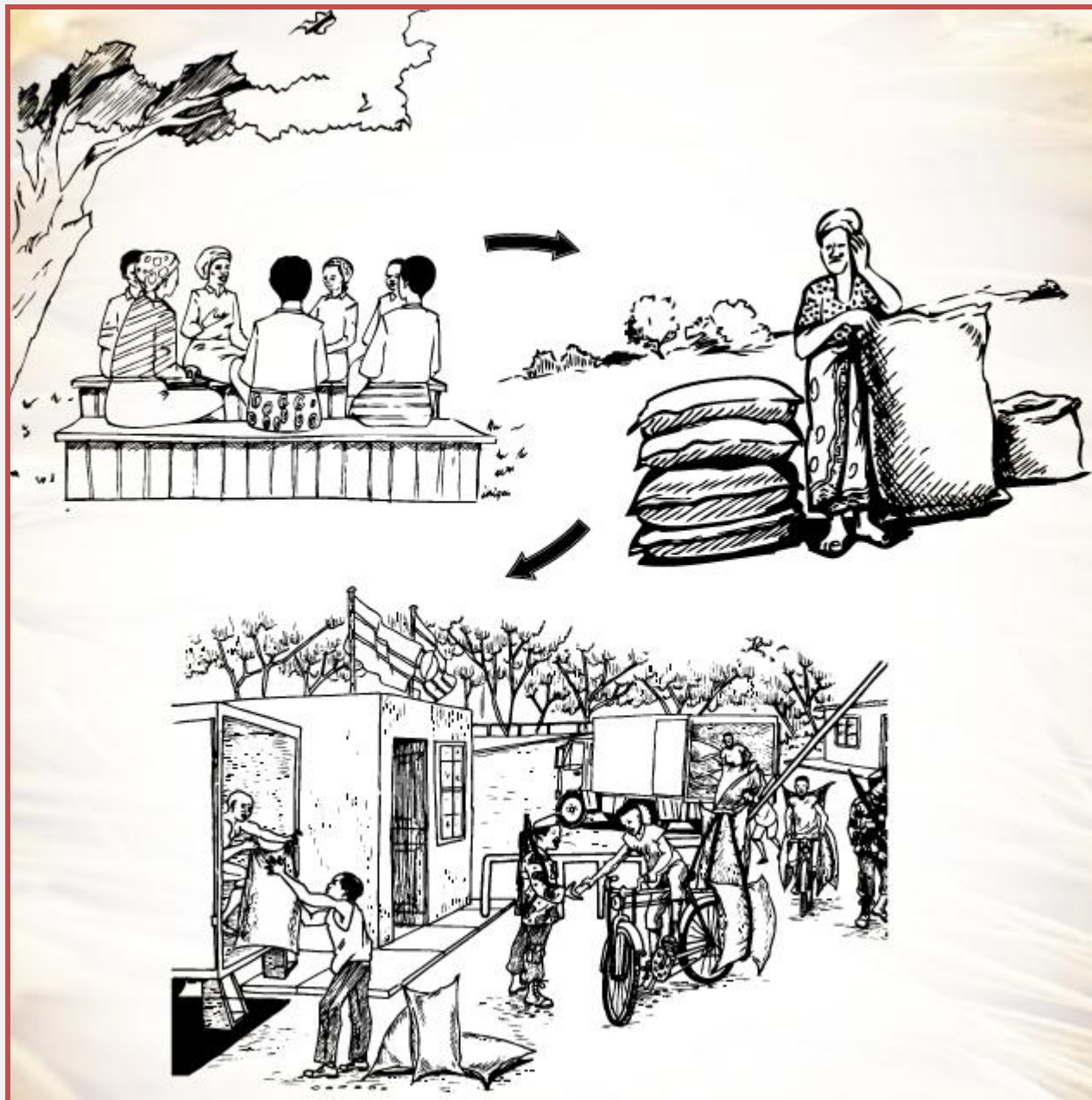
To reduce the incidence of spoilage and deterioration, the grain must satisfy the following storage conditions:

- Be **dry** and at safe moisture levels for storage, since high-moisture grain is easily attacked by moulds.
- Be **healthy** with a minimum of broken or bruised kernels, since damaged grain is readily attacked by insect pests and moulds
- Be **clean** and free from contamination by foreign matter, mammalian and insect excrements and grass, since these conditions facilitate infestation by grain spoiling moulds.
- Be **free** from all stages of insect pests since these eat and quickly destroy grain.
- Be **cool** and with temperatures within range of those of the storage environment, since temperature determines optimum conditions for insect pests, rodents and moulds, and uneven temperatures cause moisture migration in storage.

Group Discussion Questions

1. What is quality in reference to grains?
2. What are the general parameters of quality?
3. How do you carry out a rapid quality test for grains?
4. What characteristics affect the grade and quality of grains?
5. What are some of the conditions of good quality grain?
6. Why is quality an important factor in improving farmer incomes and access to better markets?

SESSION 7: WAREHOUSE RECEIPTS SYSTEMS



Introduction to Warehouse Receipt Systems

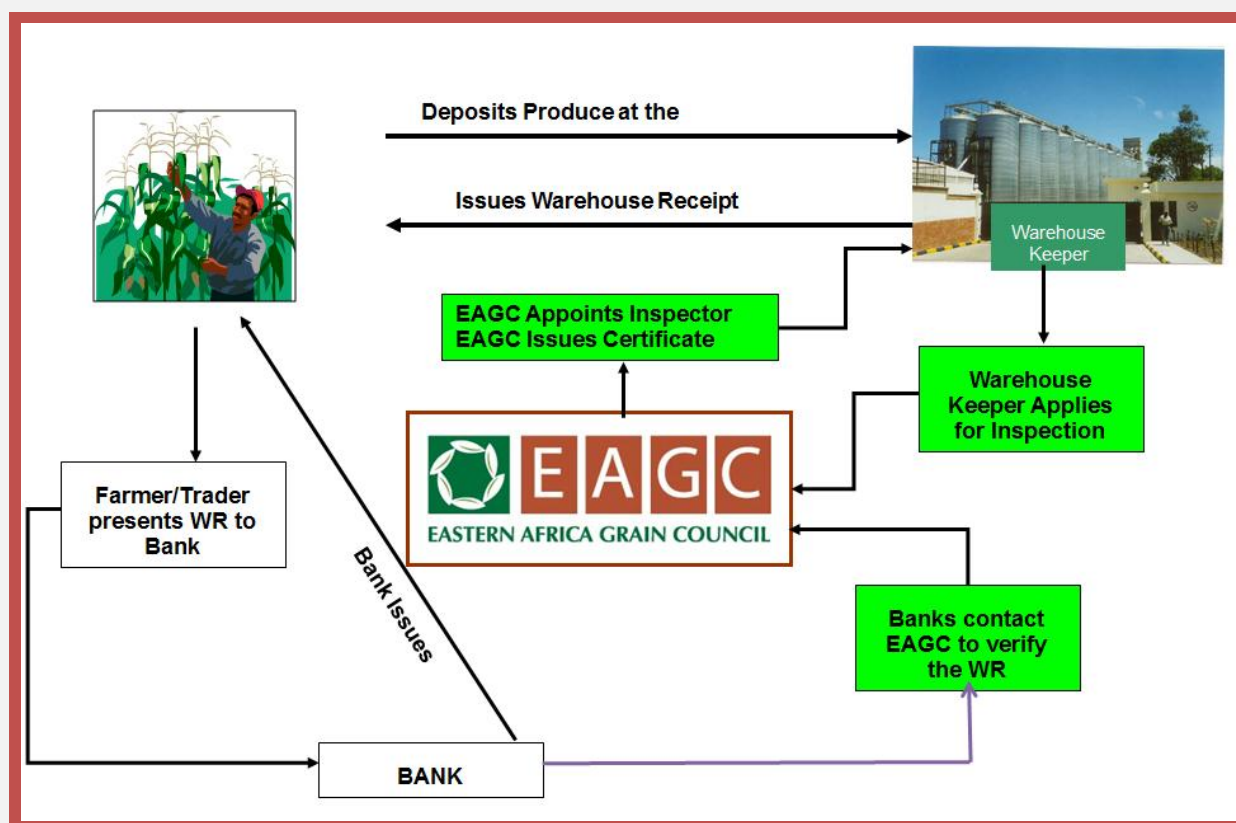
WRS is a method of trading with grain, which allows the commodity to be deposited in a certified warehouse. The depositor can then decide to immediately sell the grain or store it while awaiting a better price.

The WRS involves issuing of warehouse receipts, which guarantee the existence and availability of a commodity of a particular quantity, type and quality in a named storage facility.

The authorised issuer of the warehouse receipt holds the stored commodity by way of safe custody; implying that the issuer is legally liable to make good any value lost through theft or damage by fire.

The depositor can access financing from the banking sector, which would be essential in land preparation, purchasing of agro-inputs or purchasing more stock in the case of millers as he or she awaits a better price for the grain.

Illustration of WRS System

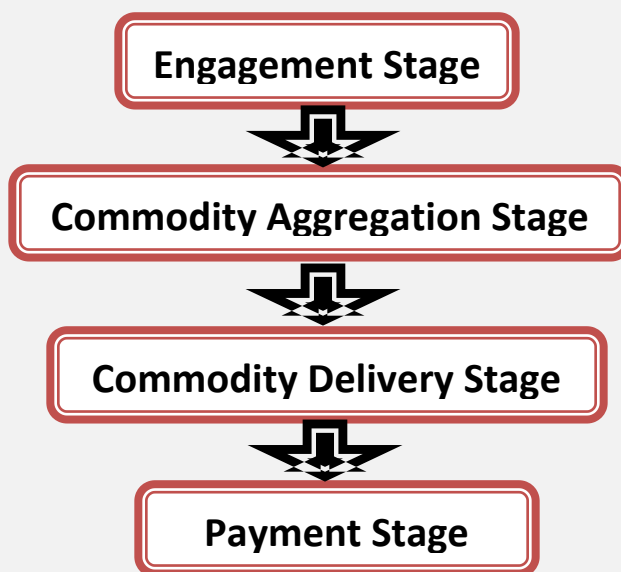


Issuing EAGC Warehouse Receipts

- i. The minimum tonnage for an EAGC warehouse receipt shall be ten (10 metric tonnes). There is no maximum tonnage for a warehouse receipt.
- ii. A warehouse operator shall only issue warehouse receipts upon actual delivery of grain into storage and against the issued GRNs.
- iii. The warehouse receipt must be issued from the warehouse of storage.
- iv. Upon deposit of the required tonnage, the depositor shall take the GRNs to the warehouse keeper and have them converted to a warehouse receipt.
- v. The depositor will be required to give personal details including contact details, which are transferred to the warehouse receipt and the original copy given to the depositor.
- vi. The warehouse keeper will then register the warehouse receipts with the regulator.
- vii. The following details shall be included on each warehouse receipt:

- ❖ Name of depositor
- ❖ ID of depositor
- ❖ Contact details of depositor
- ❖ Warehouse name, location and EAGC warehouse certification number (pre-printed)
- ❖ Date of deposit
- ❖ Commodity deposited
- ❖ Grade deposited
- ❖ Quantity – net and gross weight
- ❖ Date until which storage has been paid

WRS Process Map



WRS Benefits

- i. Aggregation of tradable volumes, especially from small-scale producers.
- ii. Being able to engage professional management of the commodity while in storage to ensure good condition. This reduces postharvest losses and quality problems.
- iii. Delaying sale of the commodity when prices are low while accessing finance to pay for outstanding loans and costs.
- iv. Receiving loans from banks at affordable interest rates, while using the commodity as collateral.
- v. Access to a larger and more formal market and ability to sell to anyone in the market.
- vi. Being able to transfer the commodity from one owner to another without the added cost of transporting the commodity from one store to another.

Tool: Warehouse Receipt sample







Group Discussion Questions

1. What is a warehouse receipt system (WRS)?
2. How does the warehouse grain intake process work?
3. How is the EAGC warehouse receipt issued?
4. What are the contents of the EAGC warehouse receipt?
5. How can a warehouse receipt be divided or transferred?
6. How is the security of a warehouse receipt ensured?
7. What are the benefits of using warehouse receipts?

Warehouse Receipt System Process Flow



WAREHOUSE RECEIPT SYSTEM PROCESS FLOW

Steps	Mobilizing & awareness creating	Pre-deposit training	Aggregation	Warehousing	Marketing	Financing	Selling	Next Season planning
								
Purpose	Provide top-line information to the farmers & other stakeholders about Warehouse Receipt Systems (WRS) post harvest handling, grain quality standards and marketing	Inform the farmers the step by step of the EAGC WRS process, introduce the partners & their roles; inform the farmers/traders their role in the WRS process and gain commitment	Clarify the role of aggregation centers and the aggregation process i.e. the, why, where, when, which & How of the aggregation process including documentation using GRNS	Clarify the role of warehouse operator and the warehousing process i.e. the why, where, when, which & how of the warehousing process and documentation	Inform the depositors the marketing process; their roles in marketing deposited produce; and available market information services and support offered by EAGC	Inform the farmers how to access credit under WRS; Participating institutions, the requirements & the process.	Inform depositors the selling process of the stored commodity; Roles of the various partners; & payments processes.	Encourage partners to review last seasons performance; evaluate market expectations and plan production in subsequent season
Responsibility	EAGC Field Officer & Stakeholders	EAGC Field Officer, Warehouse operator & Financial Institutions	EAGC Field Officer & Farmer group leaders	EAGC Field Officer & warehouse operator	EAGC Field Officer & Farmer group leaders	EAGC Field Officer & Financial Institutions	EAGC Field Officer, Warehouse Operator & Farmers	EAGC Field Officer & Stakeholders

SESSION 8: MARKETING INFORMATION SYSTEMS



Importance of MIS

- i. Provides information to smallholder farmers or traders who have limited experience in marketing.

- ii. Allows for more informed decision-making by smallholder farmers and other agricultural stakeholders.
- iii. Provides daily highlights, trends and forecasts of the market.
- iv. Advices on grades and standards required for trade of grains.
- v. Informs on the areas of surplus and deficit for specific crops.
- vi. Keeps users abreast with the news and changes in the agricultural sector.
- vii. Improves negotiations at all levels of the marketing chain.
- viii. Provides early warning on various aspects of the market and possible solution.
- ix. Creates market opportunities.
- x. Enables monitoring of cross-border trade flow.

Uses of Marketing Information

- i. Provides prices in different markets border points.
- ii. Provides early warning on various aspects of grain trade.
- iii. Helps to determine the break-even point for production, trading and processing.
- iv. Allows farmers to evaluate the alternative modes of transport across various markets.
- v. Helps to locate new grain market opportunities.
- vi. Helps to assess opportunities to improve production efficiency, grading, quality and packaging.

Understanding of Price

Setting prices for their products is a strange concept among smallholder farmers. They are used to producing agricultural commodities where prices are dictated to them (they are price takers). Profit is determined by being able to produce these commodities for less than that price.

An important consideration is the cost of producing and marketing agricultural produce. Being sure that the ultimate price will cover all costs is important.

The cost of production provides the smallholder with a minimum or floor price for his or her agricultural commodity. If all production and related costs cannot be covered, in essence, it means that the commodity should not be produced.

The clearest question is: *Do smallholder farmers understand how to price their agricultural produce?*

Examples of Market Information systems

- SAGIS (South African Information Service) for South Africa

This covers maize (white and yellow separately), Oilseeds (Sunflower, soyabeans, canola and groundnuts), Winter cereals (Wheat, barley and oats) and Sorghum

- EAGC RATIN (Regional Agriculture Trade Intelligence Network) East Africa

This is developed and hosted by EAGC. Information here is collected by enumerators based at the main markets, border points, warehouses and at food balance sheet committees and transmit the data to a central database, where it is processed, analysed and disseminated through the RATIN web portal, SMS service, email and newspapers.

Obtaining Price Information (How to use the SMS Platform)

- i. EAGC hosts the Regional Agricultural Trade Intelligence Network (RATIN) service, to supply traders with improved early warning market and trade information, which would lead to more efficient and competitive transactions in food trade between surplus and deficit regions in East Africa.
- ii. Small and medium scale cross-border traders account for over 80 per cent of regional trade in maize, beans and rice in East Africa.
- iii. Through the RATIN SMS Platform, smallholder farmers can access market information using their mobile phones.

Regional Agricultural Trade Intelligence Network (RATIN)

EAGC's Regional Agricultural Intelligence Network is designed to help small and large scale farmers know the prevailing wholesale and retail prices in various internal markets and strategic border points, not only in Kenya but within the region.

Smallholder farmers can access market information and prices using their mobile phones through normal SMS costs and SMS subscription to the RATIN numbers provided below. The numbers are designed for all users in the various countries and farmers should use the numbers in their respective countries.

Kenya	0705606666
Tanzania	255 757 100 992
Rwanda	250 784 699 996
Burundi	257 716 888 88
Uganda	256 794 220 000

RATIN SMS Alerts

To be able to receive the grain related news alerts, users (Farmers) should subscribe by sending the word RATIN to the number **0705606666**. The following reply will be received upon successful subscription: Thank you for Your Subscription to RATIN Market information! You will now be able to receive alerts on market information through SMS. Service by EAGC

Farmer Trainees Registration

Farmers can also register their details after attending training sessions by sending their details to the number **0705606666** using the format provided below:

RATIN#Name,Location for example RATIN#Jane Wanza,Nairobi West

To stop receiving any information alerts from RATIN, users or farmers will send the word 'STOP' to the RATIN number **0705606666**. The users will receive the response shown below:

You have been unsubscribed from RATIN SMS alerts. Thank you for the period you have been enjoying our Service. Service by EAGC

Market Queries

Farmers or users can query and obtain the prevailing wholesale and retail prices of any specified RATIN product (grain commodities) in various markets by sending SMS to RATIN number **0705606666** using the format below:

#Product Name,Market Name for example #maize,Nairobi

The farmer will receive the following reply:

Reply:-Prevailing RATIN Market prices (KShs/Kg) for Maize in Nairobi: Wholesale Price=30, Retail Price=30. Service by EAGC

The farmer may also query the prices of a particular commodity on a past specific date using the format:

Price#market,YYYY-MM-DD for example Price#Nairobi,2011-11-07

The reply will be as shown below:

Average Ratin Market Prices (KShs/Kg) as at 2011-11-07 in Nairobi market: WHEAT=36, SORGHUM=34, MAIZE=30, MILLET=44, BEANS=52, RICE=62. Service by EAGC

Warehouse Queries

- ✓ The farmers, traders and other users may also want to know the existence of any warehouse facility in the region. The user will send an SMS to the RATIN number **0705606666** using the format below to get information on warehouses in the specified location or area.

Warehouse#location/Town for example Warehouse#Thika

The farmer will receive the response shown below:

Warehouses in Thika town: Bakex Millers: Private (General), Brock/Capwell industries: Private (General), Chania Millers: Private (General), Kenblest millers: Private (General). Service by EAGC

- ✓ A trader or farmer may also want to know the volume or capacity of an existing warehouse. This can be done by sending an SMS with the format below:

Volume#warehouse for example Volume#Lesiolo

- ✓ A farmer can also query the current volume of various products in a particular warehouse by sending an SMS using the format below:

Warehouse#Stock for example Lesiolo#Stock

The user will receive a response as shown below:

Prevailing Lesiolo Warehouse Stock in Kgs: MAIZE=3250.Service by EAGC

Border Point Queries

This feature will enable RATIN users to query information on cross border trade. The following information can be queried through the SMS:

Most recent Cross-border Trades

Send an SMS to **0705606666** with the format below to get the most recent information on the cross border trade flow:

BORDER#Border Name,Flow/Trade Type for example: BORDER#Busia,Import

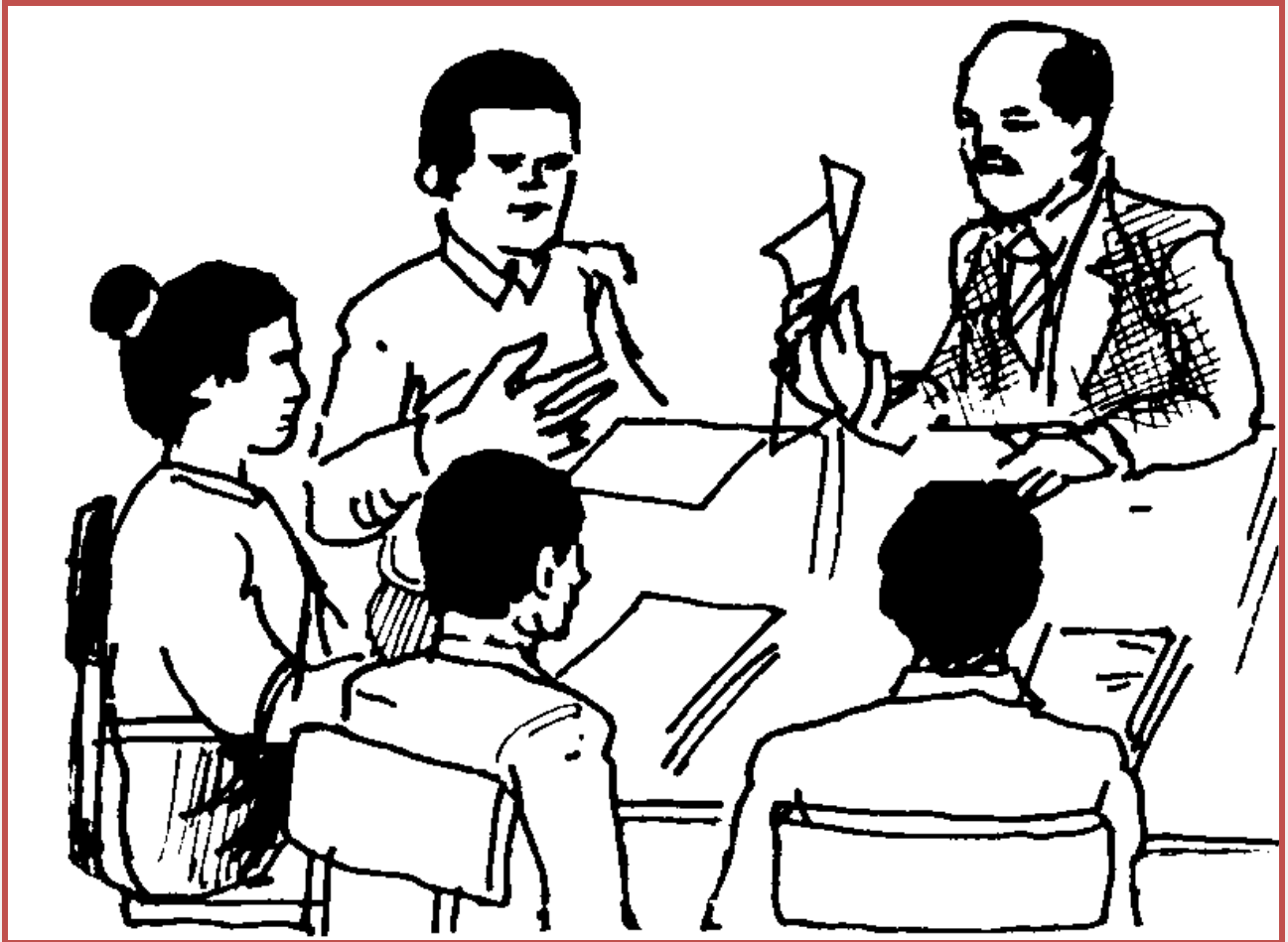
The user will receive a response as shown below:

RATIN import updates on the Busia Border as at 2012-04-11 in MT: MAIZE=120, SORGHUM=200. Service by EAGC

Group Discussion Questions

1. What is a marketing information system?
2. Why are marketing information systems important to smallholder farmers?
3. How can smallholder farmers use marketing information to their benefit?
4. What is a market and what are the types of the markets where smallholders sell their agricultural harvest?
5. What are the benefits of aggregation and group marketing among smallholder farmers?
6. What is price and how is calculated for agricultural commodities?
7. How can smallholder farmers' access market information through the EAGC RATIN platform?

SESSION 9: TRADE CONTRACTS



Definition of trade contracts

Trade contracts are becoming increasingly popular between farmers and the private sector for a number of reasons: avoiding risks, securing supply and markets, accessing finance and sharing information.

Key Elements of Grain Contracts

Details of grain sale or purchase contracts vary but a number of them are common to most trade contracts including:

- i. Quality or grade of grain delivery or to be delivered;
- ii. Location of delivery;
- iii. Date by which delivery is to be completed;
- iv. Quantity being contracted;
- v. Price or formula to be used in determining the net price;
- vi. Price adjustment if you are unable to meet the specified grade;

- vii. Signatures of both parties and date of signing.

Principles and Requirements of trade contracts

Principles

- i. A contract is a promise or set of promises, the performance of which the law (e.g. EAGC rules of Trade) recognises a duty of and for the breach of which the law gives a remedy (e.g. arbitration).
- ii. Every contract involves at least two contracting parties and they may enter into that contract in the words they say (an express contract) or by the actions they take (an implied contract).
- iii. Contracts are negotiated.

Key Requirement

- i. The parties must make clear their mutual agreement to the same terms, which is usually accomplished by an offer and an acceptance.
- ii. Before entering into any contract, it is crucial to understand exactly what is required of all parties.
- iii. Contracts are legally binding documents requiring performance.
- iv. Failure to perform on the contract can be costly and can result in legal action. For example, if a seller fails to deliver, the buyer can cover by purchasing substitute goods and charging the net cost back to the seller.

Benefits of a Trade Contract

- i. Trade contracts specify the responsibilities and obligations of the seller and buyer.
- ii. They can be used to reduce risks such market (price risk) and performance risks.
- iii. It makes the grain availability and delivery predictable by the processors.
- iv. It ensures grain sales over an expected period of time to both farmers and traders.

Grain Trade Contract



Contract No.2: Ex Warehouse (ExW)

Buyer			
Seller			
Contract Date			
Commodity			
Quality Specifications required	Foreign matter		
	Broken grains		
	Aflatoxin		
	Inorganic matter		
	Pest damaged grains		
	Discoloured grains		
	Immature / shriveled grain		
	Rotten or diseased grain		
	Live insect infestation		
	Dead insects		
	Total defective grains		
Quantity (MT)		Tolerance +/-	%
Number of bags		Size of bags	

Price per unit			
Payment terms			
Delivery period/Days		Delivery Terms	Ex – Warehouse Location
Handling costs			
Responsibility of Seller	Seller to notify the buyer in writing when the commodity is ready for uplift from the warehouse		
	Weight to be confirmed during loading		
Responsibility of buyer	Buyer to provide appropriate packing material and equipment.		
	Buyer responsible for the cost of loading the goods from the warehouse		
Other conditions			
Governing terms	This contract is subject to the provisions of the terms and conditions of the EAGC contract No 2, which are deemed incorporated herein and made part of this contract which the Buyer and the Seller hereby acknowledge accept and agree to be bound by.		
	EAGC shall arbitrate in case of any disputes.		
	Kenyan Law shall apply		
Whole agreement	This document constitutes the whole agreement between the parties and no term, condition, warranty or representation shall be of any force and effect unless recorded herein.		
	Any amendment to this agreement shall only be binding if such amendment is in writing and signed by both parties.		
Signed by the Buyer		Signed by the Seller	
Stamp:		Stamp:	
Date:		Date:	

Group Discussion Questions

1. What do you understand by Trade Contracts?
2. What are some of the examples of the use of trade contracts?
3. What are the requirements of a trade contract?
4. How can trade contracts be used to enhance market access for smallholder farmers?
5. How can smallholder farmers begin to use EAGC trade contracts?
6. What will be the benefits of using trade contracts?

SESSION 10: AGRICULTURE COMMODITY EXCHANGE

Introduction to Agriculture Commodity Exchange

A commodity exchange is an open and organized market place where commodities are traded. Trading is done in an organized way through a system of bids (to buy) and offers (to sell), governed by a set of rules. It's a platform that brings together buyers and sellers to conduct business through a team of brokers who make it easier for them to find each other and agree on prices. Because the transactions are made public, they also reveal what the current market price is. This is called **price discovery**.

It has also been described as an “Open and organized marketplace where ownership titles to standardized quantities or volumes of certain commodities (at a specified price and to be delivered on a specified date) are traded by its members”.

How does a commodity exchange works

1. Alois has 100 tonnes of maize under a warehouse receipt. He wants to sell the grain at \$300 per tonne. He contacts Benjamin, a broker on the exchange, with the details.
2. Benjamin registers an offer on the exchange. This specifies the quantity, grade, location and desired price of the maize.
3. Meanwhile Carol, a miller, wants to buy 150 tonnes of maize at \$280 per tonne. She contacts Deidre, another broker, and asks her to arrange a purchase on the exchange.
4. Deidre looks at the various offers on the exchange, and sees the one from Benjamin. It is priced a bit higher than Carol wants to pay, and it is only 100 tonnes. But it is the right grade and the warehouse is close to Carol's mill. So Deidre places a bid for the maize at \$280 a tonne.
5. Benjamin sees the bid, and calls Alois to discuss it. Alois tells Benjamin to negotiate a price between the bid and the offer.
6. Benjamin calls Deidre and says that he would accept \$290 per tonne. Deidre checks with Carol, who agrees.
7. Benjamin and Deidre agree on the deal. The exchange automatically generates a contract.
8. Carol pays the agreed price to the exchange. The exchange deducts the fees for Benjamin and Deidre, as well as a handling charge. It instructs the warehouse to transfer the ownership of the grain to Carol. It then pays Alois.
9. The exchange announces the quantity and type of grain traded, and the price agreed. That lets other buyers and sellers know what they can expect to pay or get for a similar consignment of grain.

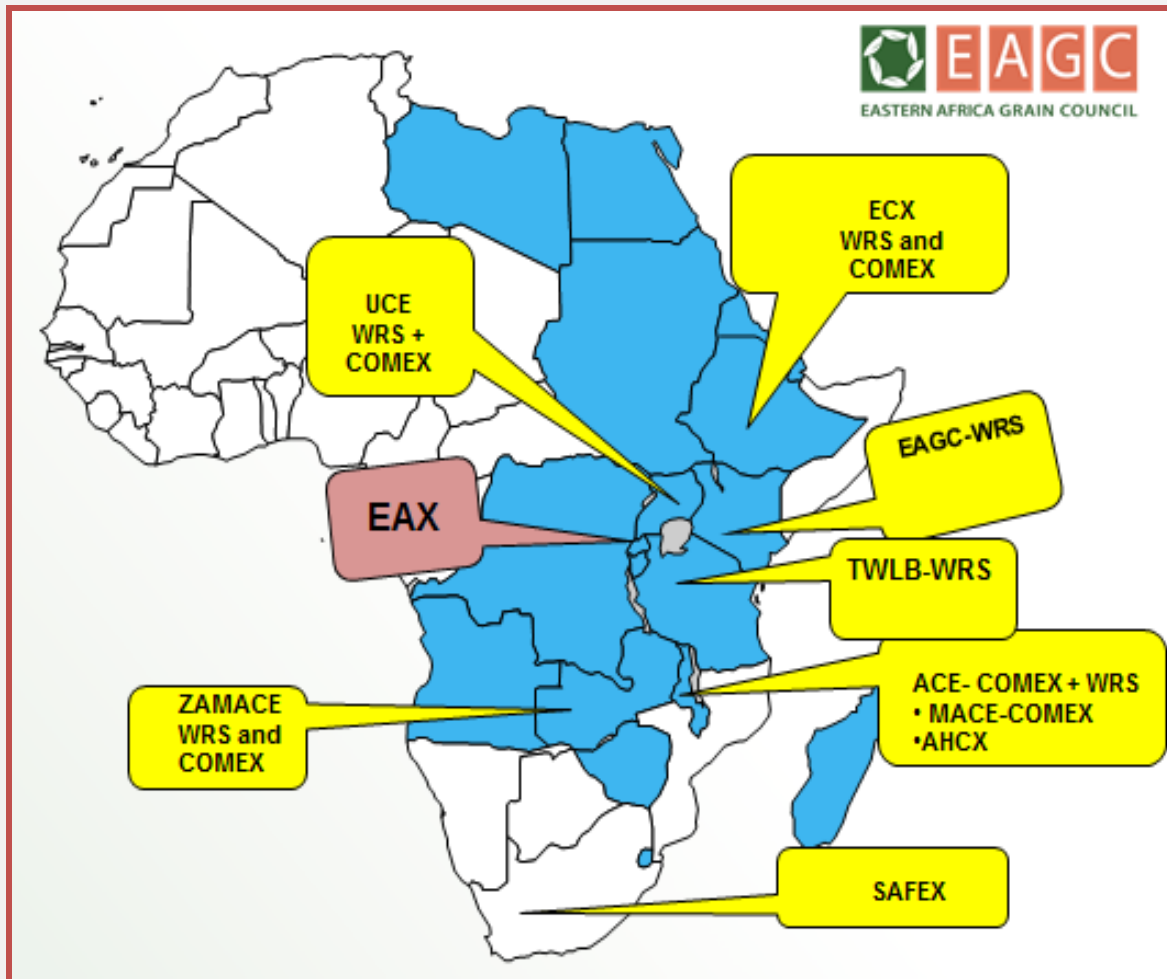
Benefits of trading on an exchange

There are many benefits to be gained from trading through an agricultural commodity exchange. Here are some of them:

- **Lower risk.** Exchanges reduce the risks for all parties. The buyers are confident that the grain actually exists and is what the seller says it is. The sellers are confident that they will get paid.
- **Integrity.** The rules and regulations of the exchange govern how deals are transacted. This makes it possible to monitor the integrity of both the traders and brokers. The exchange ensures that quality standards are maintained for both the commodities and the trading practices.
- **Transparency.** All the deals are transparent. Prices are announced on the exchange's website and in the news media, and the transaction costs are transparent to both the buyer and seller.
- **Price discovery.** Grain prices go up and down from season to season, from day to day, and even from minute to minute, reflecting supply and demand for the grain. Exchanges make it easy to keep track of these movements because they publish the prices that buyers and sellers agree on. Prices on the exchange are the most reliable because this is where the most trading takes place.
- **Standardized products.** Trading on an exchange requires that the grain be graded. It is possible to trade "Grade-1 white dent maize" on an exchange. It is not usually possible to trade grain without having it graded, although in some cases an exchange may accept ungraded grain for offer on an "as per sample" or "FAQ." (fair average quality) basis. If the buyer accepts, it can be contracted on that basis.
- **Dispute resolution.** If a dispute arises that the parties cannot resolve between them, the exchange's arbitration rules will come into effect. The parties can agree to the appointment of an arbitrator from a list provided by the exchange. If they cannot agree on an arbitrator, the exchange's arbitration board will appoint an arbitrator to review the disagreement. That saves time and money and avoids the need for legal action (see Chapter 8).
- **Cost-effectiveness.** An agricultural commodity exchange provides a very cost-effective marketing system. It brings together many potential buyers and sellers, and transactions are conducted quickly and efficiently.
- **Empowerment.** Because the information on an exchange is transparent, it opens up choices. Smallholder farmers or small-scale traders can know what the price for their grain should be, so can negotiate accordingly. However, this does require that they fully understand the arrangements relating to warehouse receipts and exchange trading. For example, they must understand that if they deposit 1,000 kg of grain they will receive less than that back because of unavoidable losses

Examples of Commodity Exchanges in Africa

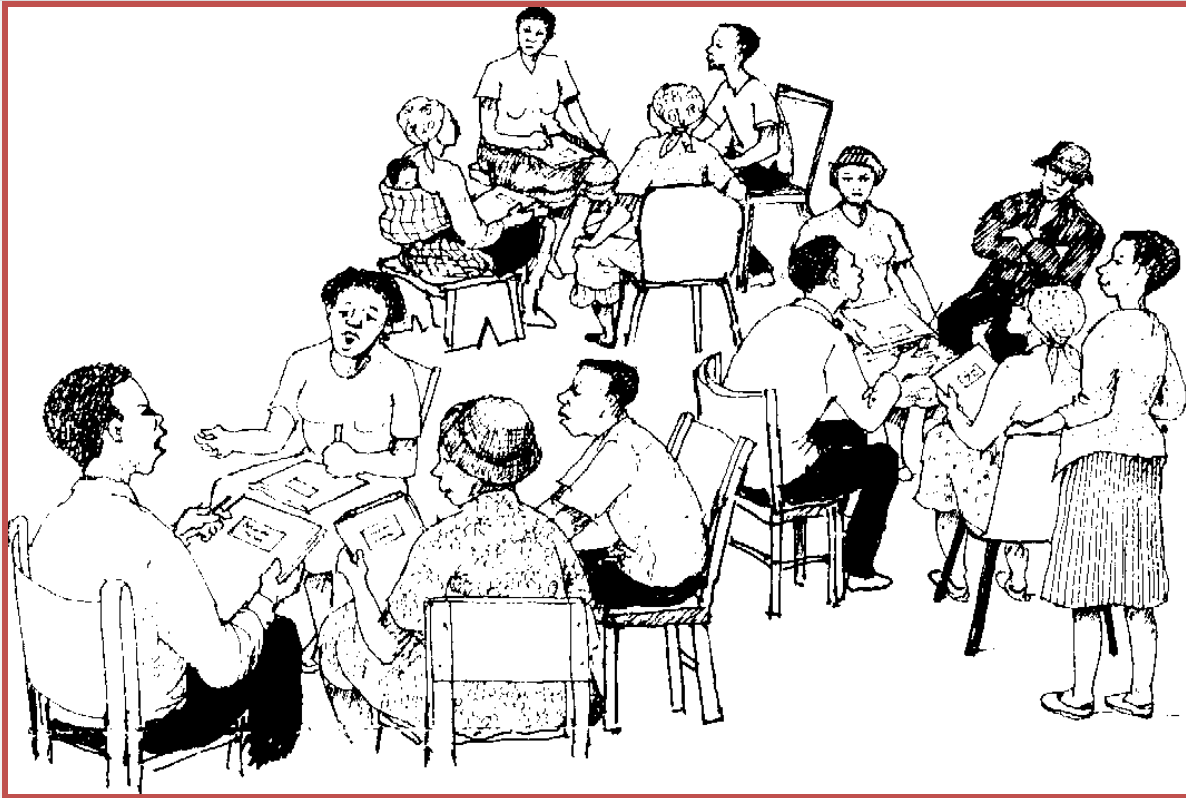
- i) SAFEX – South African Futures Exchange for South Africa
- ii) ACE – Agricultural Commodity Exchange for Africa for Malawi



Group Discussion Questions

1. What is an Agricultural Commodity Exchange?
2. How does an Agricultural Commodity Exchange work?
3. Site examples of an Agricultural Commodity Exchange.
4. What are the benefits of using an Agricultural Commodity Exchange to trade grains?

SESSION 11: ORGANISATIONAL MANAGEMENT, GOVERNANCE AND AGGREGATION



Farmer Group Organisational Management

Farmer Group Organisational management is a process of organizing, planning, leading and controlling of resources within a farmer group to meet specific objectives. Organisational management has to involve making key decisions and proper conflict resolutions processes for effectiveness to be achieved.

Farmer aggregation is the process of putting together resources from various individual farmers to attain a stronger base and create easy access to various opportunities.

Importance of proper organizational management

- Ensures accountability which increases members' confidence in the success of the farmer group
- Gives members an opportunity to exercise their rights and fulfill obligations which can only be sustainable when transparency is given priority.

- Need to seek professional help from external bodies which requires properly structured group management system.

Benefits of farmer aggregation

- i) Leads to improved production and processing
- ii) Leads to easy access to markets
- iii) Leads to easy access to finance
- iv) Leads to reduced transaction costs
- v) Provides an opportunity for engaging in policy related matters that would counter various trade barriers

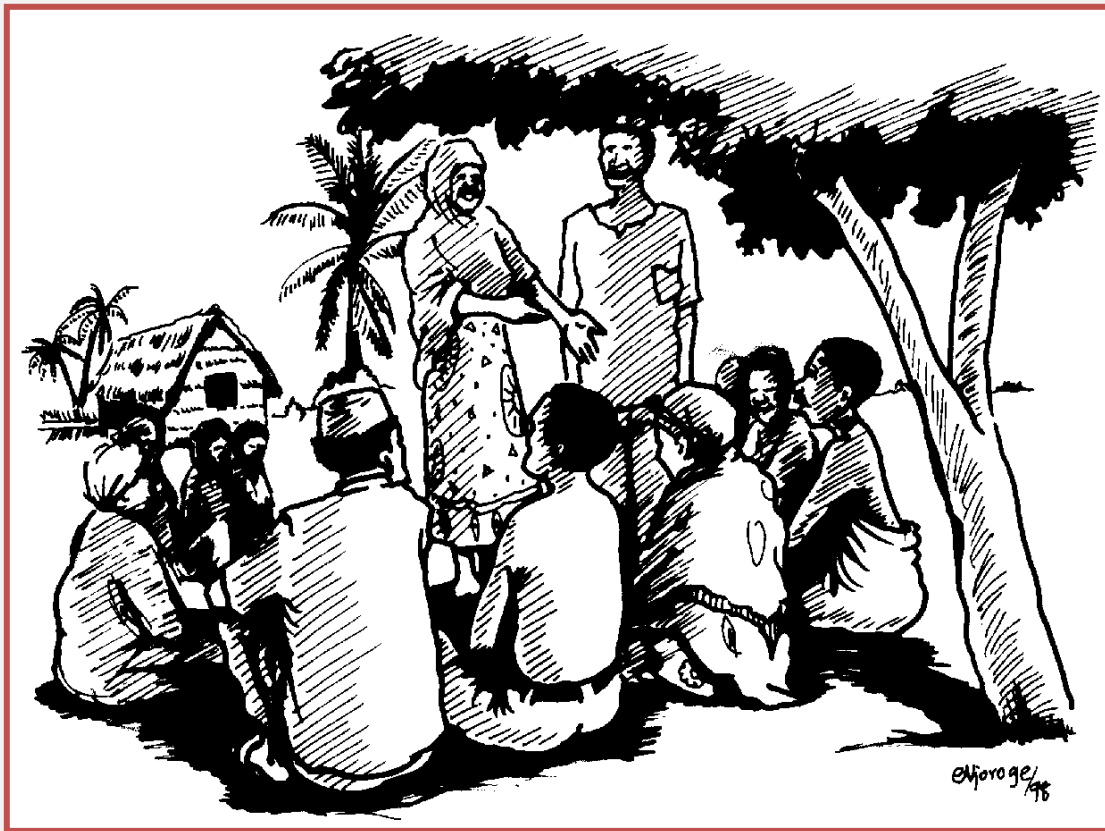
Effective Governance and Management

The major reasons why farmers are not able to gain from aggregation related benefits is weak governance structures within the various groups that has later resulted to low membership. It is therefore noted that there is need to have strong and able leadership within the farmer groups which should be free from any form of bias and political interference.

To achieve this, the following should be put into consideration:

- i) Farmer groups should have a legal framework/constitution which will govern the operations of the groups and provide room for monitoring of the management structure
- ii) Effective and proper communication channels should be applied at all times with each member to be involved in key decision making
- iii) Need to have strong leadership within the farmer groups which is capable of translating the vision into achievable goals and objectives
- iv) Need to maintain a good working environment with clearly defined working process
- v) Need to adapt effectively to culture change and ability to prioritise the group's objectives.
- vi) Need to manage time properly and have
- vii) Need to have proper conflict resolution process

viii) Need to focus on chain results i.e output, outcome and impact



Group Discussion Questions

1. What is Organisational management?
2. How does effective organisational management affect farmer aggregation?
3. What should be done to ensure effective governance and management within the farmer groups?

SESSION 12: GENDER LENS IN LEADERSHIP



Method: Theory - Case studies, presentations, discussion

Activity

1. Participants to list out leadership roles in the farmer organisations
2. Participants to map out the current situation in the above roles by gender. Questions to be answered will be;
 - Where are the women?
 - Where are the men?
 - Where are the youth?
 - Where are the disabled?
3. Why are they distributed as above?

4. Participants to discuss and fill in the table below

Activity/Task	Role	Decide	Influence	Implementer	Nice to know
Membership					
Registration					
Bank signatories					
Group activities					
Group allocation of duties					

Overview

Several studies have identified the exclusion of women from engaging in active farm related activities and group management which is an impediment to future development. It is therefore critical to ensure that both men and women have equal access to resources, have control in decision making process and they equally benefit at all stages of development and Agricultural projects.

Role of women in agriculture development

Women in small holder farming contribute a lot to labour but are always denied access to productive resources.

Women are the backbone of economy for most developing countries and contribute a majority of small holder farmers in some countries. This explains the need to give women access to various resources so as to promote agriculture productivity hence increasing the economy of the country. Several studies have shown that women will more likely use their income in maintain and supporting their families and especially for children's education and health unlike men, hence having a long term value increase.

EAGC-WRS, Mosoriot Cereal Traders, Nandi. March 2012



Promoting gender balance

To address this, the following should be put into consideration;

- i) Legal frameworks should be revised to allow women participation in various leadership roles within the farmer groups
- ii) Policy advocacy groups should engage relevant governments to promote gender integration.
- iii) Involving women in key decision making processes and giving them access to land and other resources

“A woman is the full circle. Within her is the power to create, nurture and transform” – Diane Mariechild.

Group Discussion Questions

1. What is the current state of leadership in the farmer organisations based on gender balance?
2. What is the role of women in Agriculture development?
3. What should be put in place to ensure equal opportunity for all gender groups?

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