

- By James Muthee

SEMI-S - UON

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1. Seed Processing, Plant-level Sampling, Testing For Quality Control And Process Management

SEMIIS - UOIN

**KENYA PLANT HEALTH INSPECTORATE SERVICE  
(KEPHIS)**

**SEED PROCESSING, PLANT-LEVEL SAMPLING, TESTING FOR  
QUALITY CONTROL AND PROCESS MANAGEMENT**

**Presented to SEMIs Training**

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# 1. What is Good Quality Seed?

Good quality seed has the following properties:

- ✓ a high germination rate;
- ✓ well dried;
- ✓ pure: all seeds are of the same variety and of the same size;
- ✓ clean: is not mixed with foreign matter such as stones or dirt, or other seeds;
- ✓ not damaged, broken, shriveled, mouldy, or insect damaged;
- ✓ not rotten (may be diseased);
- ✓ not discoloured or faded (may be diseased).

# 1. SEED PROCESSING

- Seed Processing is that activity of the seed industry responsible for upgrading seed, improving planting condition of seed and applying chemical protectant to the seed

## 2. ADVANTAGES OF SEED PROCESSING

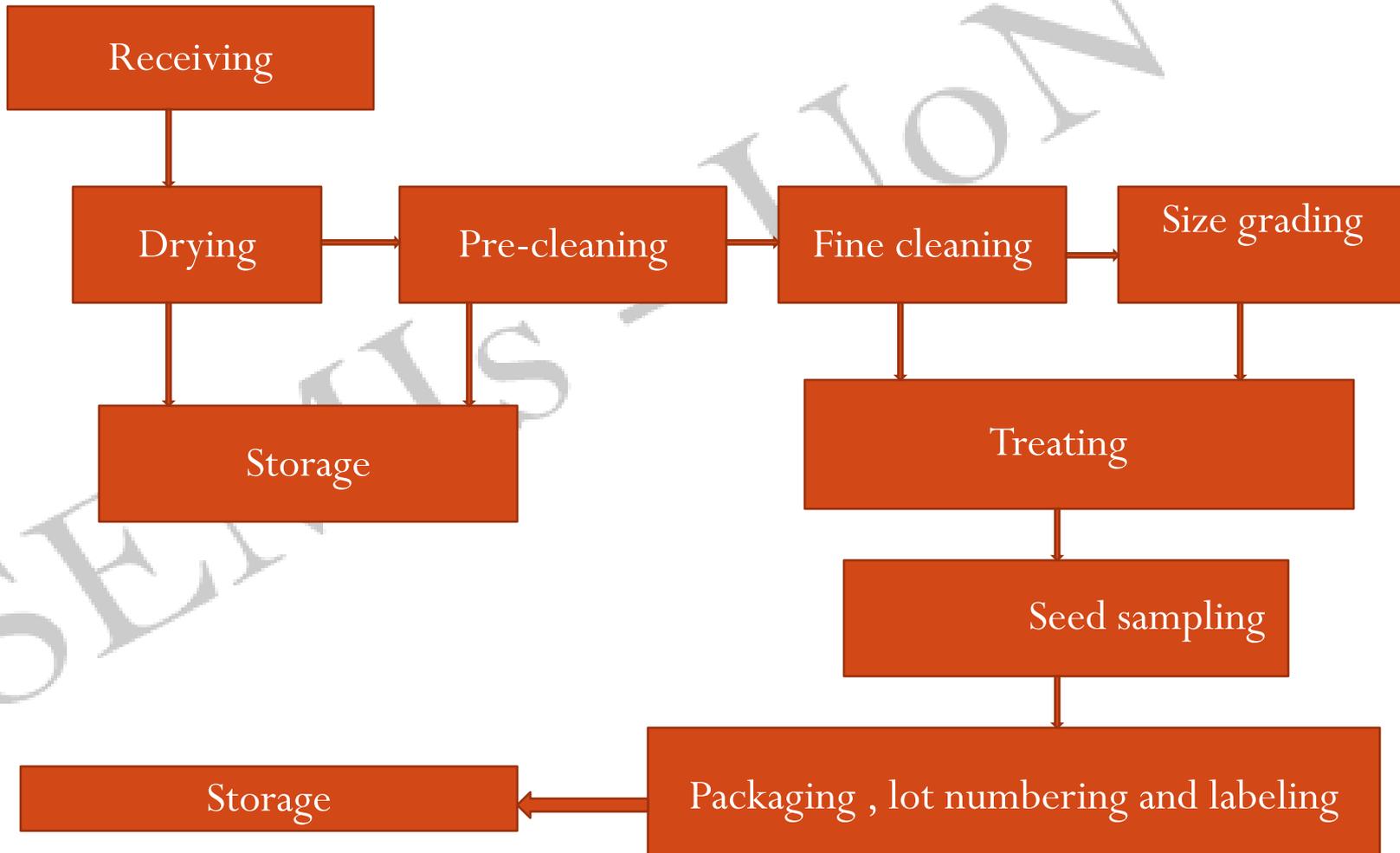
- ❖ Better uniformity in planting rate by proper sizing
- ❖ Prevents spread of weed seed
- ❖ Prevents crops from diseases
- ❖ Reduce seed losses by drying to proper moisture content

### 3. SEED PROCESSING

It involves upgrading of seed quality by:

- Removing Contaminants eg broken ,diseased, and insect damaged seed, straw, weed seeds and other rops seed.
- Drying seed to safe moisture levels for storage
- Uniform size grading of seed
- Applying chemical protectants to the seed

## 4. AN OUTLINE OF THE STAGES OF SEED PROCESSING



## 5. HARVESTING

- Pre-harvest inspection-Ensure that male and male plants are separated
- Post harvest inspection-Ensure that rejected fields are left out while approved fields are harvested
- harvest at physiological maturity
- -black layer forms at point of attachment between the cob and the kernels(maize seed)
- -moisture content 20-30% (maize seed)
- Rejected seed fields-Used for other purpose but not seed

# 6. RECEIVING

## Seed inspectors ensures that:

- All containers are clearly **marked** to ensure that the correct identity of a **seed lot** can be ascertained
- Delivered Seed is from approved fields(Records)
- For imported seed the ISTA certificate, phytosanitary certificate and plant import permit
- Sampling for post control is done



Machine inspection is done by an inspector including Elevators to ensure that they are clean before processing start.

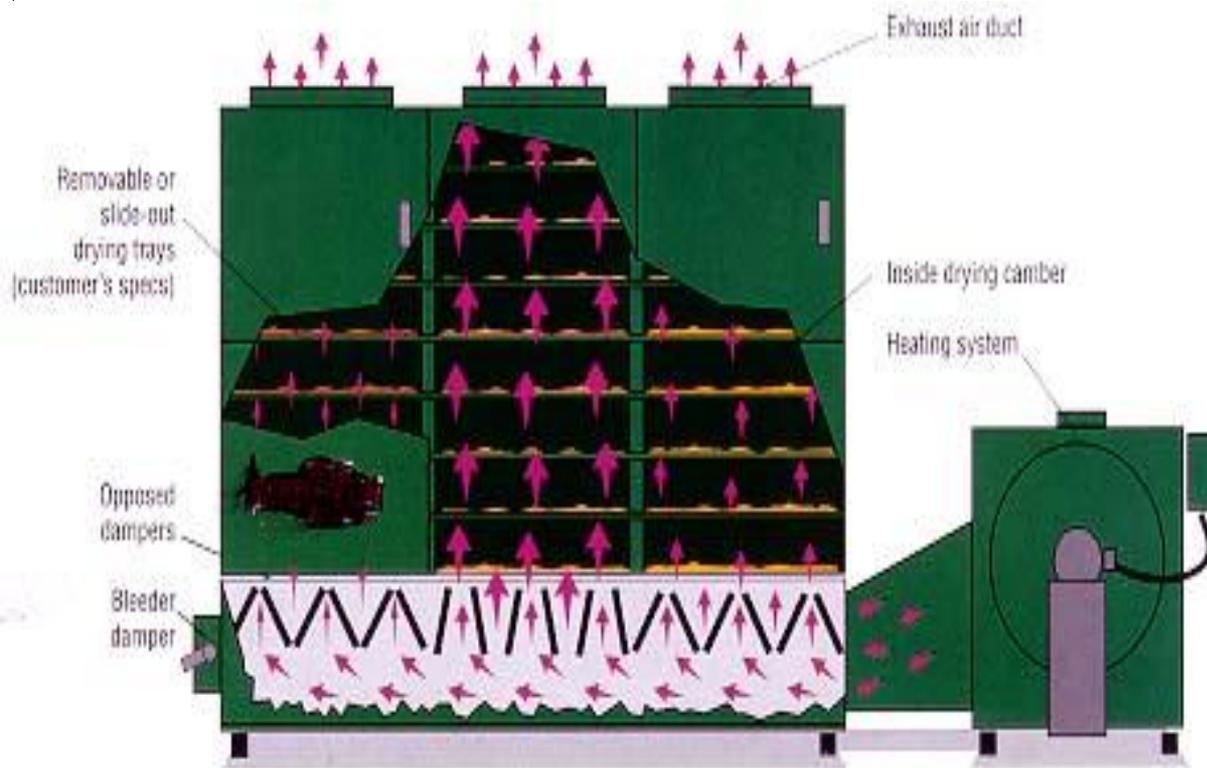
## 7. COB SELECTION



Seed Inspector check for: Trueness to variety;

Maize: Selection is done against off-types, diseased cobs, rotten cobs, wet cobs, insect damaged cobs, sprouted cobs, coloured grains and doubtful cobs

Seed inspector –allows shelling if selection is satisfactorily done and issue a work order(SR 8)



## 8. DRYING

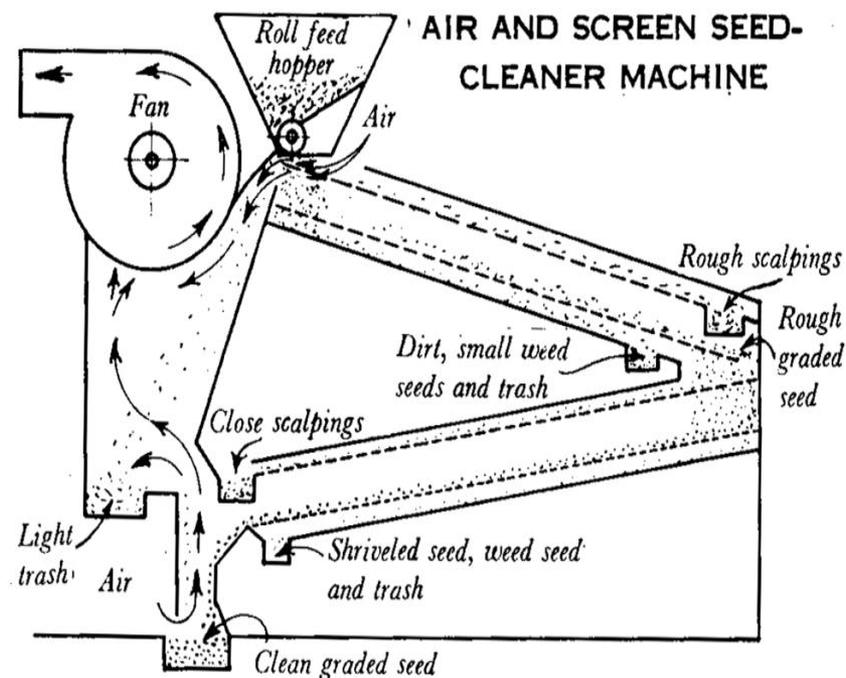
- Seeds which are dry will retain their viability for longer periods in storage.
- Drying Tem. Seed Maize-40-45<sup>0</sup>C
- Moisture content should be reduced to less than 12%
- Seed inspector- Carries out dryer inspection

This is the reduction of seed moisture content (mc) to the recommended levels for seed storage

The drying process should begin as soon as possible after the receipt of the seeds

# 9. Precleaning

- Basic machine in almost all seed processing plants.
- uses two air blasts and two screens.
- removes dust and light chaff, shriveled, immature, small, damaged and diseased seeds; as well as weed seed and seed of other crop species
- good seed to drop onto the second screen.
- foreign material rides over the first screen and is discarded.
- Cleaning improves seed quality by improving physical purity and germination.
- Cleaning can be done because seeds differ in length, width, thickness, density, shape, surface texture and color



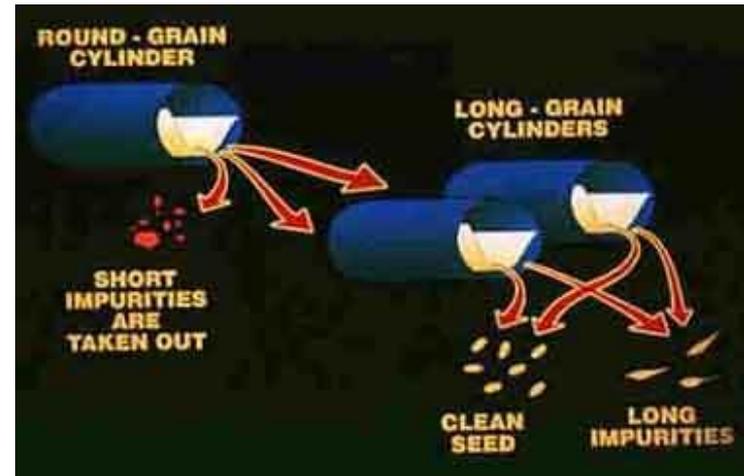
# 10.FINE CLEANING

## Specific gravity separator

- Seed of same size and general shape can be separated because they differ in specific gravity by using gravity separator. It removes light immature seed or heavy sand and rocks to improve the purity and germination of seed.



# FINE CLEANING



## Indented cylinder:

Seed of the same width and thickness can be separated by taking advantages of difference of length. Indented cylinder can do very precise separation by using length difference.

The indented cylinder separator is a rotating almost horizontal cylinder with a movable horizontal separating trough mounted inside it. Thousand of half round indents line the inside surface of cylinder.

# FINE CLEANING



- Seed can be sorted by colour .
- wrong coloured or damaged seed are removed.  
Eg wheat out of barley

# 11. SIZE GRADING

Involves separation of seed into different sizes eg

Maize-

- HP-hand plant-Mixed grade- For small scale farmers
  - 2 kgs, 5 kgs, 10kgs
- MF-Medium flat, LF-Large flat, MR-Medium round
- LR-Large round
  - For large scale farmers-25 kgs

Potatoes-

Size 1-28-45 mm

Size 2-46-60mm

# 12. LOT EXAMINATION

- Lot examination is carried out to ensure that the seed lots meet processing standards.
- -obtain seed free of noxious seeds
- -determine trueness to types
- -check diseased seeds
- -check mixtures with other species
- -removal of rejects
- -Graded seed lots

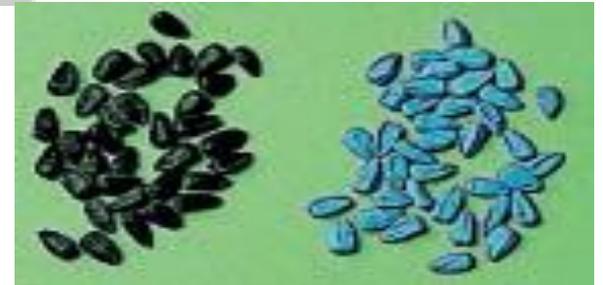


## 13. TREATING

Seed treatment refers to the application of fungicide, insecticide, or a combination of both, to seeds.

### Benefits of Seed Treatment:

1. Prevents spread of seed borne diseases
2. Provides protection from storage insects
3. Controls soil insects



# 14.SAMPLING SEED FOR ANALYSIS

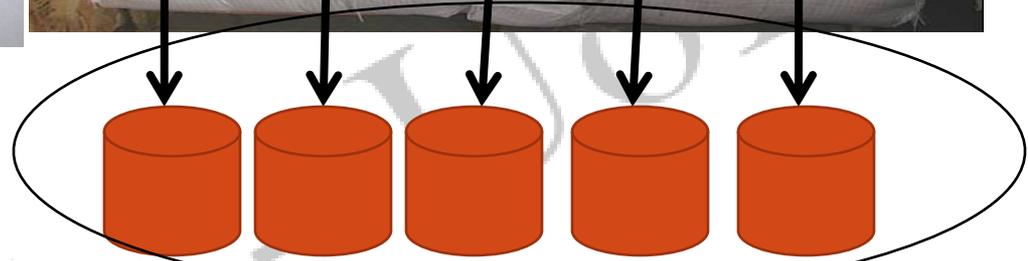
- The objective of seed sampling is to obtain a representative sample of each lot of seed under inspection.
- No matter how accurate the technical work is done, the result will be no better than the sample submitted for testing.
- Therefore, drawing, mixing, dividing and preparation of samples
- should be so done as to ensure that the sample is representative of the entire *seed lot*\*.
- KEPHIS uses **ISTA** Rules in all seed sampling and testing operations
- *\*A seed lot is a specified quantity of seed , physically idenfiable, in which an international seed lot certificate may be issued*

## SAMPLING PROCEDURE

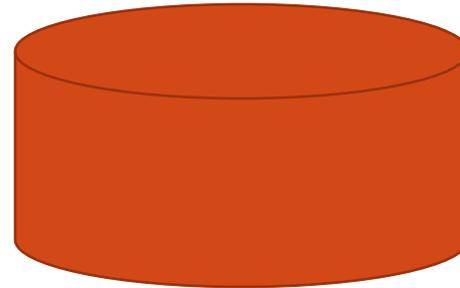
1. The use of a dynamic for free flowing seed



**Primary samples:**  
*A small portion taken from one location in the lot.*



**Composite sample:**  
*A mix of all the primary samples from the lot.*



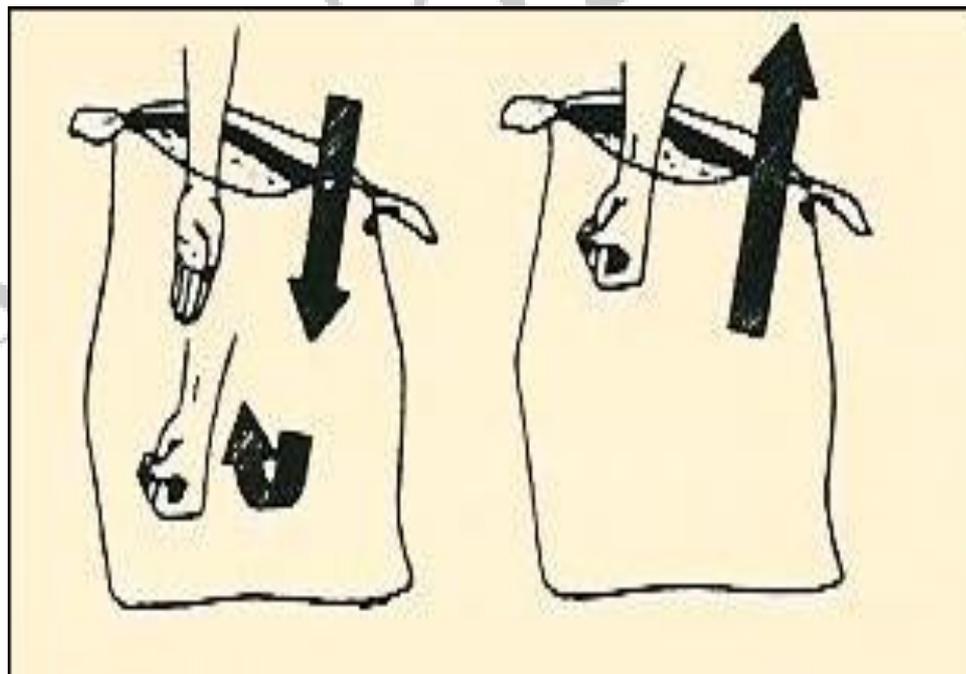
**Submitted sample:** *The sample submitted to the testing station*, comprising the composite sample after mixing and dividing





## Hand sampling for non-free flowing seed

- *The hand* sampling method is used on seed that would clog up triers. The bags are sampled at the top, middle and bottom. The sample is grabbed by pushing a hand into the bag until it reaches the depth required. The hand is closed after grabbing a sample, withdrawn and the sample placed in a container.



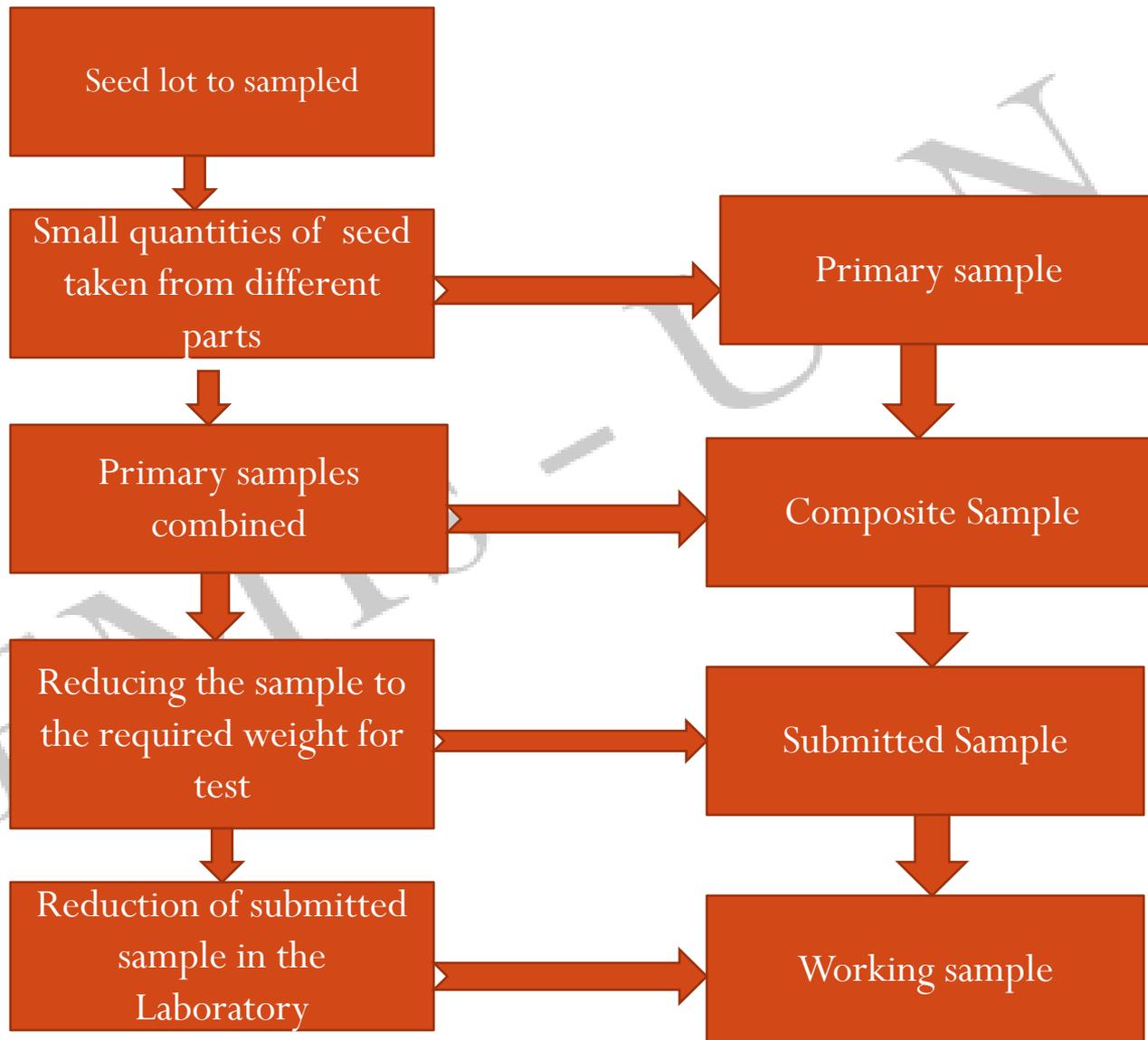
## SAMPLING BY AUTOMATIC SEED SAMPLERS

- Primary samples are drawn from a seed stream automatically, using an apparatus regulated by a timing device.
- The seed sampler is involved only in handling the composite sample
- Automatic samplers utilize systematic sampling instead of random sampling
- They can be used in a closed processing system

## Sampling from small containers

- For containers smaller than 15kgs, containers must be combined to sampling unit not exceeding 100kg, and the sampling unit regarded as a container.

## Summary of seed sampling



## 15 MAXIMUM SEED LOT SIZE

- ISTA rules prescribe maximum seed lot sizes for different seed types. Should the lot size be greater than the maximum, the lot would have to be split into two lots. For example, maize has a maximum lot size of 40,000 kg. If the amount is 42,000 kg, it should be split into two lots, of 21,000 kg, each. Then a sample should be taken from each lot.

## 16: SEED TESTING

- All processed seeds must be sampled for laboratory analysis.
- Seeds are tested for: -
  - ❖ Purity
  - ❖ Germination
  - ❖ Moisture content
  - ❖ Health status

KEPHIS issues certificate (local/ISTA) for each seed lot that meets the minimum standards

## 17: PACKAGING AND LOT NUMBERING AND LABELLING

- After the seeds are tested and found to meet the minimum standards they are packaged, labeled and lot numbers printed on the packets
- Packets designed to hold convenient quantity for handling and transportation
- Seed inspector ensures the seed meet the germination and purity standards before Marketing.

# 18. Seed Storage

- Seed of each variety should be stacked separately
- The bags should be laid on pallets
- There should be sufficient space between the stacks to allow easy access
- Rodent and bird proof
- Label all containers
- Proper ventilation
- Keep record of all seed lots and their history



Properly stacked bags

# THANK YOU

For more information contact  
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