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1. Seed Quality Control In Seed Processing

SEED QUALITY CONTROL IN SEED PROCESSING

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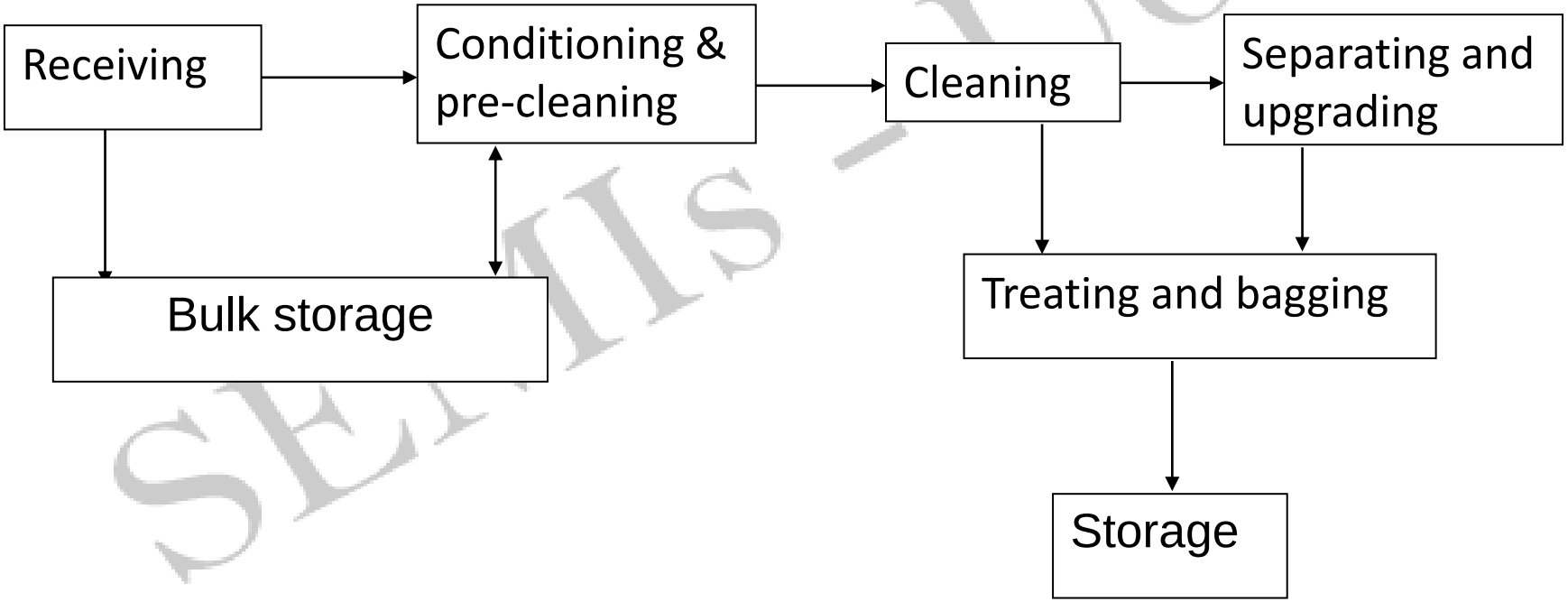
BASIC FLOW AND ESSENTIAL STEPS IN SEED PROCESSING



1. MECHANICAL DAMAGE

May occur during the following operations:

(a) HARVESTING

- Machine harvesting for grain
- Hand harvesting for root crops

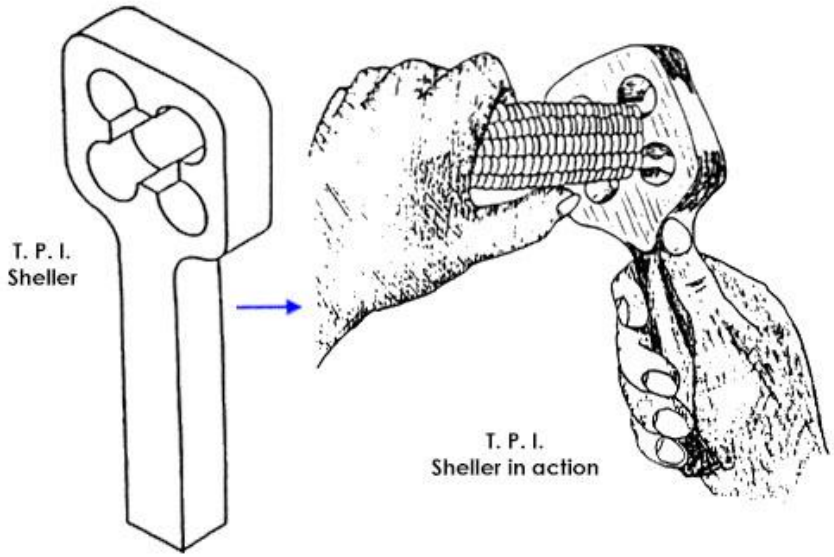
(b) SHELLING / THRESHING

Damage is caused by:

- Beating seed with sticks in sacks
- Interaction with machine parts

Performance of Tubular Maize Sheller as compared to traditional practices

Particulars	Tubular Maize Sheller	Beating maize with stick
Shelling efficiency (%)	98	90
Labor requirement (Man-hour/q)	4	4.30
Field Capacity (Kg/hour)	25	22.22
Damage/Broken grains (%)	1	10


T. P. I.
Sheller
T. P. I.
Sheller in action

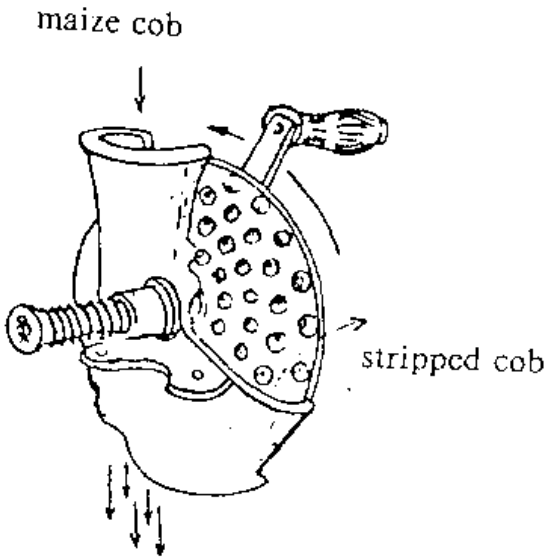
BEST PRACTICES FOR MACHINE SHELLING

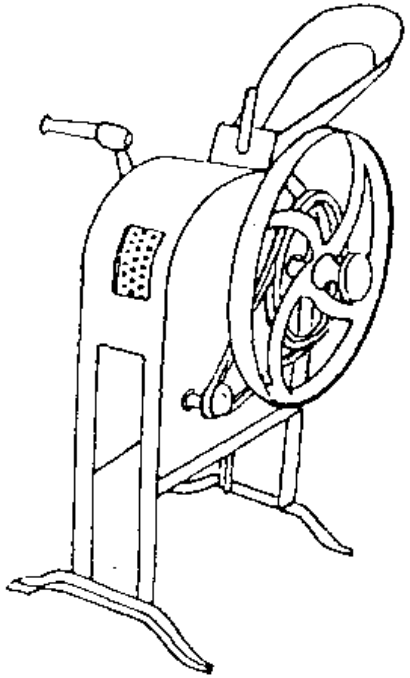
Baker *et al. (1991) found that drying,* germination of shelled maize seed were affected greatly than the unshelled seeds.

To reduce mechanical shelling damage do the following:

- For shelling, optimum level of moisture content should be 13-20%.
- For preventing, reducing mechanical damage or cracking of seeds, speed of shelling machine is needed to adjust.

After shelling, seeds can be redried to reduce seed moisture content for good storage level (lower than 11 %)

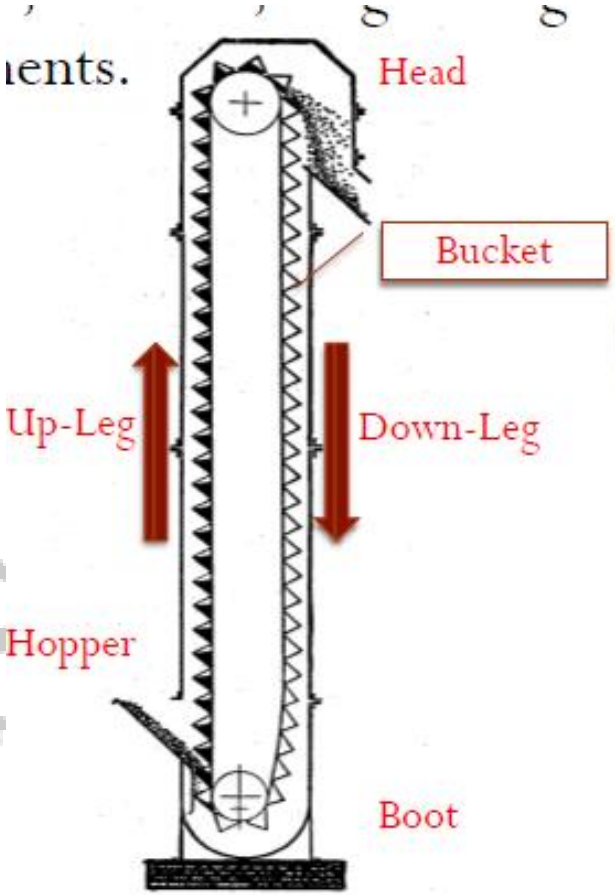




Source: CIRAD

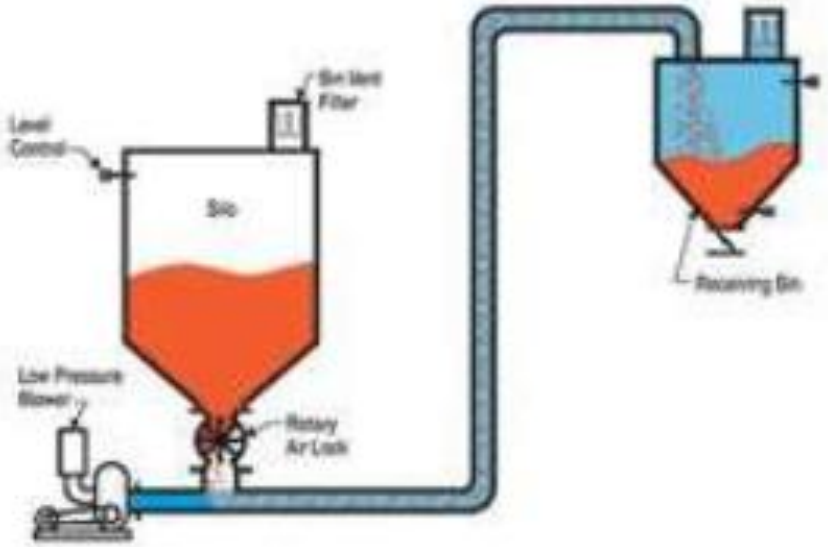
(c) CONVEYING DEVICES

Bucket elevators may cause impact damage as seed is thrown at the head

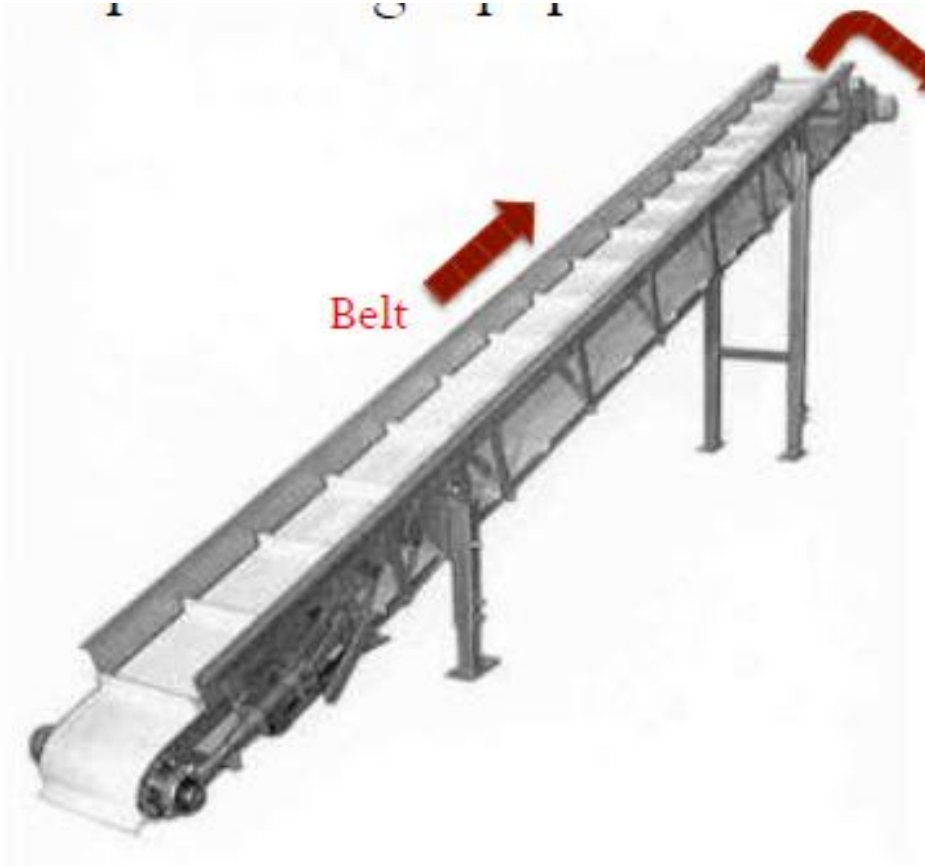


Screw feeders may compress the seed to breakage

Pneumatic conveyors may damage seed



Belt conveyors are much better

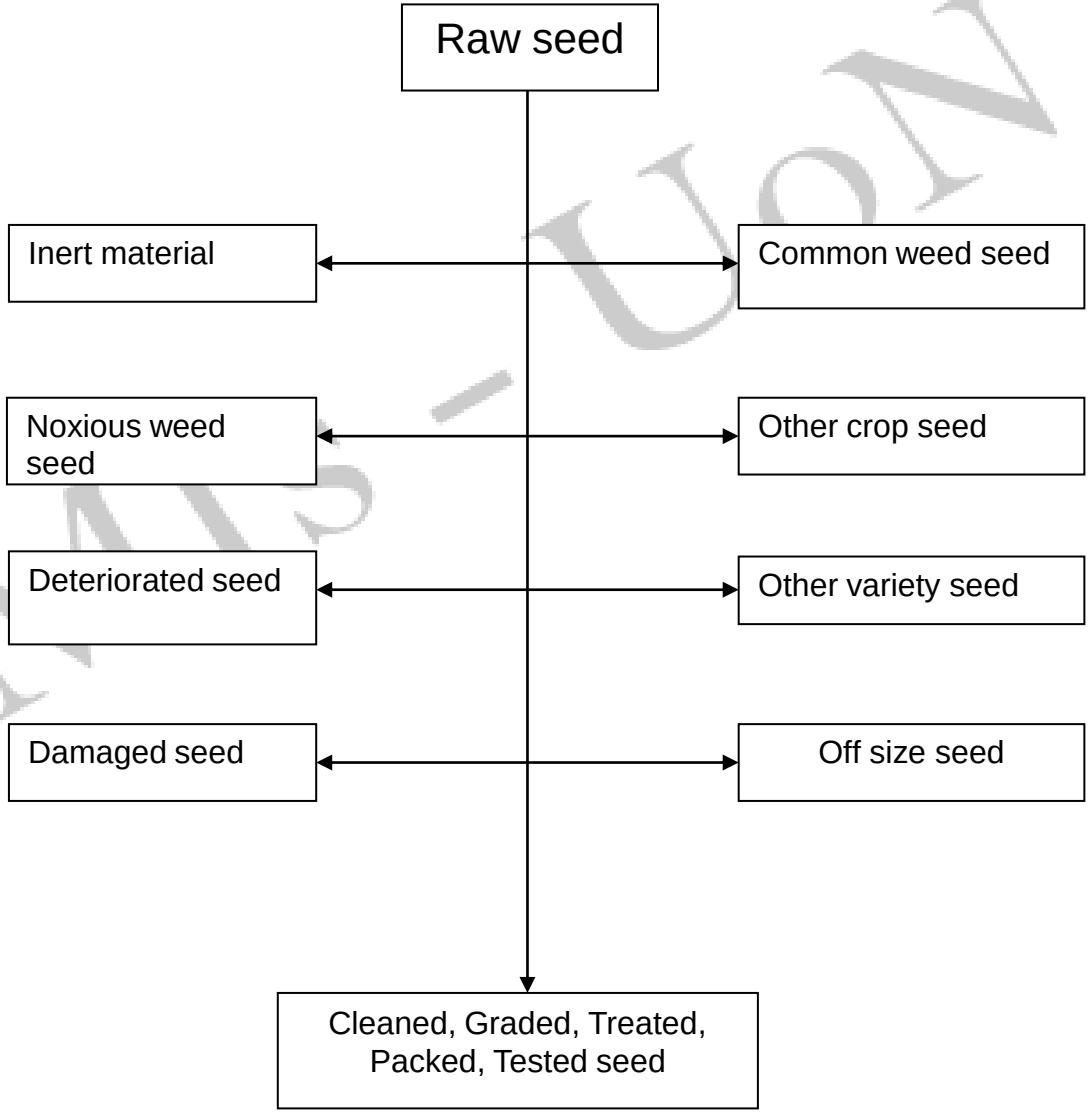


Vibrating conveyors are much better

Lift Truck

2. REJECTS FROM SEED PROCESSING

Reduces quality



3. ENVIRONMENTAL CONDITIONS

Dry cool conditions are best for seed storage.

a) SEED MOISTURE AND HUMIDITY ON SEED LONGEVITY:

The general relationship is that for each one percent increase in seed moisture, longevity decreases by half (Harrington, 1972). This rule applies to seed with moisture content between 5 and 13%.

Above 13% moisture content, seed storage fungi and increased heating due to respiration cause longevity to decline at a faster rate.

Once seed moisture reaches **18 to 20%,** increased respiration, and the activity of microorganisms cause rapid deterioration of the seed.

- **40-80%** Moisture content of developing seed. Seed not mature enough to harvest
- **18-40%** Physiologically mature seed, High respiratory rate, susceptible to field deterioration, ***heating*** occurs if seed is bulked without proper ventilation.
- **13-18 %** Respiratory rate still high, mold and insects can be damaging and seed resistant to mechanical damage
- **10-13 %** Seed store well for 6-8 months in open storage in temperate climates.
- **8-10 %** Seed sufficiently dry for 1-3 years open storage in temperate climates. Very little insect activity.
- **5-8%** Safe moisture for sealed storage
- **0-5%** Extreme desiccation. Can be damaging to seed.
- **33-60%** Seed germinates when they imbibe water to these levels.

How do you tell when your seed is dry enough for storage?

Share any simple techniques

(b) Temperature

- The general effect of temperature on longevity is that longevity increases as temperature decreases.
- The relationship between temperature and seed longevity is that for each 5.6 °C decrease in temperature, longevity doubles.
- This rule applies to seeds stored between temperatures of 0 °C and 50 °C. This rule assumes that the moisture content is a constant.
- temperature is **less than 45 °C** is favorable for seed germination and vigor.
- Drying of seed at **50 °C** causes damage of seed
- At **60 °C** causes germination loss
- At **70 °C** all seeds can be lost

(c) Illumination

- Seeds stored in glass containers should be stored out of direct sunlight because of the localized "**greenhouse heating effect**" on seeds.

- Drying seeds in the sun is a questionable practice if the air temperature is above 32 oC. The air temperature at the seed surface is higher because of the conversion of light energy into heat at the seed surface, and the heat is "**moist heat**".

- **Ultra-violet light** from the sun may have a deleterious effect on seed longevity while the seeds are drying (Harrington, 1972).

4. **SLOW COMPRESSIVE DAMAGE IN STORAGE**

Stacking too many bags of seed may result in slow mechanical damage of the seeds at the bottom of the stack

QUALITY MEASUREMENT

Normally, germination tests considered as quality
test of seed during conditioning and it is indicated by germination percentage. It can not indicate the change of seed vigor and the step of conditioning

- *Standard germination test **: It was done by following ISTA,(1985).***
- *Membrane deterioration test : It was done by Electrical conductivity (AOSA, 1983)*
- *Seed leachates : It was done by Tetrazolium test (ISTA,1985)*
- *Seedling growth rate (SGR) : It was determined by ISTA, (1985)*
- *Seed damage by Fast green test (0.1%)*