

# Shelling, sorting and drying of maize

Once maize has been harvested, dehusked and dried, it is shelled by hand threshing or a machine sheller. Maize grains obtained after threshing must be thoroughly dried to attain the moisture level (12-13%) required for storage. This factsheet indicates good grading, shelling and drying practices that allow better grain storage and conservation.

## Shelling of maize

**S**helling consists of separating the grains from the cob. It is necessary to shell maize after dehusking (recommended in the field), which is the removal of maize from husks.

Usually, shelling is done by threshing maize cobs with a stick in a sack or on the ground in a confined space where all the grains can be recovered. This practice should be avoided because it causes physical damage to grains, which makes them more vulnerable to parasites if certain measures are not taken. Manual and mechanized practices are among those recommended:

### Manual shelling

- This is a primary manual method but tedious. It consists of scrubbing two maize cobs against one another or manually shelling them with the hand, one after the other (Fig. 1). This method is mostly recommended for seeds and small quantities of maize.
- Another method is the use of small tools made by local craftsmen to

accelerate and facilitate shelling.

- Manual methods have the advantage of considerably reducing the breakage rate and offer a possibility of more reliable sorting of grain.



Fig. 1: Manual shelling

### Mechanized shelling

- For mechanized shelling (Fig. 2), one needs to pay a service provider who has a sheller. Motorized mechanized shelling reduces time and sometimes does winnowing. To limit breakage during shelling, maize cobs must have a water content within the range of the sheller used.

After shelling, winnowing needs to be done

before sorting. Maize that is damaged during shelling should be used within a short time.



Fig. 2: Aziza maize sheller and winnower

## Sorting of maize

The process of sorting consists of separating and removing foreign bodies and damaged grains. It helps in protecting maize from future degradation. Its purpose is to select maize for storage in an intact and good condition. Visual inspection, winnowing and sorting are operations that contribute to this objective. Sorting is carried out at all stages of the maize have and post-harvest process, from harvest to storage.

Even if maize shall be stored in grains, a first selection is essential before shelling. This can

be done during harvest or at home.

- During harvesting, grains damaged due to insect or disease infestation should be removed. This is the first step in reducing infestation levels. Insect-infested grains are not completely covered by husks or they contain moldy grains. It is for this reason that it is advisable to dehusk at harvest.
- In the case of seeds, harvesting on cobs also makes it possible to eliminate the badly fertilized and aberrant cobs through sorting. The grains can be cleaned by hand, winnowing, sieving and / or sorting.
- Before shelling, it is advisable to sort the good cobs (well filled, healthy and grains with no holes) from degraded ones (attacked by rodents, insects, moldy and blemished).
- After shelling and threshing, broken grains should be isolated and consumed within a short period of time as they are more susceptible to insect attack and mold.
- For storage in form of grains, it is advisable that after shelling, maize





Fig. 3: Sorting after shelling

should be winnowed to separate good grains from bad ones (Fig. 3). The goal is to keep the grain clean. Sorting is therefore an effective means of reducing infestation levels in stored maize, although the percentage of sorted maize varies widely per farmer and may depend both on the individual's judgment and on the producer's economic situation.

### Drying of grains

Moisture is the biggest enemy of maize in stock. At harvest, the grain's water content is about 30 to 35%. At this stage, an organism can still live, breathe and produce heat, water and carbon dioxide. Therefore, the grain should be dried **as soon as possible** after harvest. The purpose of drying is to preserve the quality of the stored maize by reducing its **initial water content to around 12%**, which is the recommended WFP level. Several methods are useful in evaluating the water content of maize. These include the sound



Fig.4: Drying maize on a liner

produced by grains when broken using teeth, moisture absorption by salt when mixed with the grains in a dry jar, or the use of a moisture meter. The first two methods are much less accurate than the moisture meter.

### Recommended practices

- Drying should be done on a suitable concrete surface (Fig. 5), sturdy polyethylene or canvas (preferably) to reduce the risk of contamination.
- Use clean concrete drying areas to accelerate drying due to rapid heating. In clear, sunny weather, a 5 × 5 m slab can dry 1 ton of maize in a day and a 10 × 10 m slab can dry up to 4 tons of maize in a day.
- Ensure that the maize layer on the canvas does not go beyond the first joint of the index finger. Otherwise, the grains that are below the surface layer will not dry quickly.
- Dry under the warm midday sun for

at least four hours a day until drying is complete (Fig. 5). The grains dry faster if they are turned several times during the day.

- Use sun-drying preferably and avoid slow and incomplete drying.
- Pre-dry maize cobs naturally in special granaries or silos-cages or cribs.



Fig. 5: Drying maize on a developed area

### Practices to avoid

- Avoid any contamination from dust or sand that can reduce the market value of maize.
- Allow maize to cool until evening before putting it in appropriate storage structures. Avoid drying maize in husks since they serve as hiding places for insects.

- Avoid drying maize in the field as it is highly infected and infested with insects and microorganisms.
- Avoid rehydration of maize during drying as it promotes infection with *Aspergillus* (aflatoxin fungus). Aflatoxin contamination may increase tenfold in three days if the

maize grain is not dried properly.

Do not let pets such as chicken, goats, dogs and cows walk through the maize drying area because they may damage or eat the grains.

## Sun-drying

Sun-drying is a direct drying method that uses sunlight to reduce the moisture content of maize before storage. It reduces post-harvest losses and provides a better quality dried product or market product.

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