10. Harvesting and Post-harvest Management

In most smallholder farming situations harvesting crops requires considerable amounts of labour. Harvesting usually consumes 20-30% of the labour needed to produce a crop. Yield losses from late harvesting of crops may occur so farmers should ensure crops are harvested on time. Common challenges arising from late harvesting include the following:

- Weevils and other pests attack the crop
- Crop may rot in the field before being harvested
- Roaming livestock may feed on crop

Crops that are being harvested may also get spoilt if rains come when the crop is heaped as this results in the crop rotting due to excessive moisture. Harvested crops should be allowed to dry sufficiently before threshing or shelling and stored in dry to avoid rotting.

Various drying option are available range from sun drying, solar drying and more advanced techniques employing electric drying systems. For maize drying may achieved through cutting and putting the standing stalks on stacks which allow it to slowly dry out further but without direct exposure to the sun. Alternatively, the cobs may be removed from the stalks when mature and dried in a raised crib with a roof for shedding to prevent direct sun heating and then thrashed on clean surface. Clean the grain by winnowing to remove any chaff or foreign objects. For maize grain to store well, the moisture content must be below 12.5%. Similarly for legumes the mature dry pods can be harvested and dried in the sun before threshing on a clean surface. Harvested grains are dried further, cleaned by winnowing and stored in appropriate conditions. For storage the grain must be below 11% moisture content.

Checking grain moisture content: To check if the grain is dry enough to be stored a simple technique is suggested here. A few grains are put in a dry glass bottle together with 2-3 spoons of salt. The contents can be mixed thoroughly for a few minutes and left for 15-20 min. If the salt particles are left sticking on the glass walls, it shows that they have absorbed some moisture from the grains. This is an indication that the grains are not yet dry indicating further drying is required. If the salt particles do not stick to the glass walls, it means the grain is dry enough for storage.

As soon as threshing/shelling has been completed the next step is usually to store the grain in a place where losses due to weevil attack may be minimized. Different types of storage methods are used from country to country and in different cultures. Post harvest losses of grain through weevil damage and other pests or diseases is thought to amount to between 20-30% in maize, thus impacting negatively on food security and income generation. This means farmers lose at least 20% of their little harvested grain to weevils such as the grain borers thereby further worsening the situation. Different grain storage methods are used in ESA and some of the most common are presented here.

Grain storage structure: Raised or suspended grain storage structures with compartments are used for storing different types of grain. Inside walls are plastered with a mixture of cow dung and clay. This allows aeration and exchange of gases with the outside and helps to keep the grain cool.

Metal Grain Silos: A metal silo is a cylindrical structure, constructed from a galvanized iron sheet and hermetically sealed (airtight). The metal silo technology has proven to be effective in protecting the harvested grains from attack not only from the storage insects but also from rodent pests. Any pests inside the silo die of suffocation as no oxygen can enter the the structure. Different sizes can be made, typically ranging from 100-3000 kg of grain and can cost between USD 30 to100 USD per unit silo.

Hermetic storage bags

The hermetic storage bags system originates from Purdue University in the United States. The bags are also commonly known as Purdue Improved Cowpea Storage (PICS) having been originally designed for storing cowpea in Chad. With the PICS system, farmers place their grain maize or cowpeas in a polyethylene bag and seal it by tying it with a string. This inner bag is inserted into another identical polythene bag and sealed with a string, and the double-bagged grain then inserted in a third woven nylon bag. The principle is like that of metal grain silos because in both systems air is kept out and this suffocates the insects or pests. All materials used for this are cheap and affordable to farmers, and PICS are increasingly available in cowpea-growing regions.

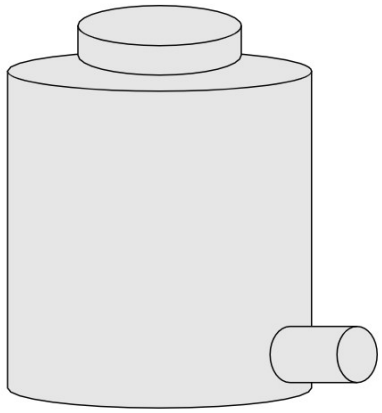

Figure 10.1 A typical grain metal Silo.

Use of grain protectants

Farmers can treat grains with recommended storage chemicals to control damage by storage pests, especially if storing in containers that are not air tight. Grain protectants are commonly available in Africa and fairly affordable but as with all chemicals, farmers need to read the label carefully and follow the instruction while using.