



C2 REVEALING GOOD PRACTICE

Reducing losses after harvest

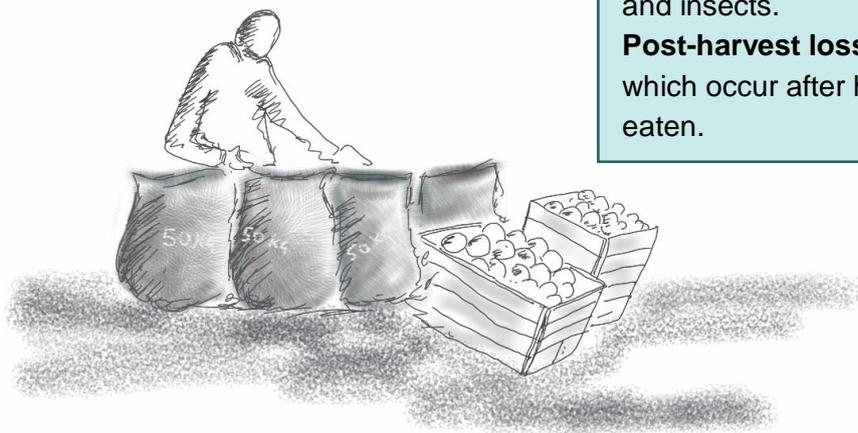
At a glance

- Reducing crop losses after harvest increases the amount of food available to eat or sell.
- Choose crop varieties that store better, are pest-resistant and suited to local weather conditions.
- Harvest when the crops have most value (cost and nutrition).
- Reduce damage and losses during transportation.
- Drying crops preserves them for longer. Ensure crops are protected from dirt and damp during drying.
- When storing crops, keep sacks or containers away from floors and walls. Consider using wooden pallets, storing in raised structures or using air-tight containers.
- Keep pests away (many local plants are effective).
- Use market information to decide when and where to sell your produce.



Why use this tool?

Between 30 and 50 per cent of all food is lost or wasted after harvesting. Reducing these post-harvest losses can be an important way for households to increase the amount of food available to eat and sell. This means better nutrition and more income.



Explaining the words we use

Genetic variability – the natural differences between plants or animals of the same species such as height, colour and yield.

Grains – the seeds or fruit of cereal crops.

Grain protectants – chemical treatment to the grain to prevent damage by pests.

Hermetic storage – removing oxygen from storage to create an air-tight environment.

Insecticides – a substance used to kill pests and insects.

Post-harvest losses – losses to the crop which occur after harvest and before they are eaten.



A brief description

Things to consider when trying to reduce crop losses, particularly grains, after they have been harvested.



Time taken

Particular attention is needed during and after harvest but many of these activities are ongoing.



You will need

A clean, dry and well ventilated place to dry and store the crop.



Keys to success

- Choose crops that are resistant to pests, disease and changes in weather. If planning to sell produce, choose high value crops – those in demand but less available.
- Harvest at the time when the crop has most economic and nutritional value.
- If drying crops, ensure you use a well-ventilated place that is protected from bad weather, and that the crops are dried without touching soil.
- When storing grains, ensure sacks or containers are not stored directly on the floor or touching walls. For sacks, use wooden pallets with spaces left between the sacks to improve air circulation.
- Prevent pests from destroying stored harvest.
- If transporting crops, ensure careful loading and stacking to reduce damage, bruising and spoilage.
- Ensure you have access to market information when thinking about when to sell the crops, and what price to charge.



What to do

Choosing crop varieties

Choose crop varieties that store well, have good resistance to pests and fungi, and are suited to local weather conditions. Are there local experts you could ask for advice? As well as experimenting with new crop varieties it is important to also keep some traditional varieties, to maintain genetic variability and keep varieties suited to the local environment.

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Harvesting

Harvest when the crop has most economic and nutritional value. It is particularly important to avoid losses from overripe produce. Ensure the crop isn't damaged during harvesting, and sort the produce after harvesting to remove any damaged or diseased produce.



Transport

After harvest, losses can occur as the product is transported. Careful loading, stacking and transport of the product will help to reduce damage to the crop. Consider refrigeration of fresh products if this possible.



Drying

Many crops can be dried after harvesting to preserve the food for longer. Drying can add value or improve some crops. Drying involves the removal of water from the product. There are many different ways of doing this. Here are some general points to consider:

- It is important crops are dried either directly in the sun, or in a well-ventilated place that is protected from damp and flooding.
- The crops should be dried without touching soil, for example on cement floors, clean sheets or mats. Sometimes they are dried on raised structures such as drying racks, or hung from a roof, often above the cooking fire.
- Crops such as grains should be completely dry before being stored to reduce the chance of mould and diseases developing.

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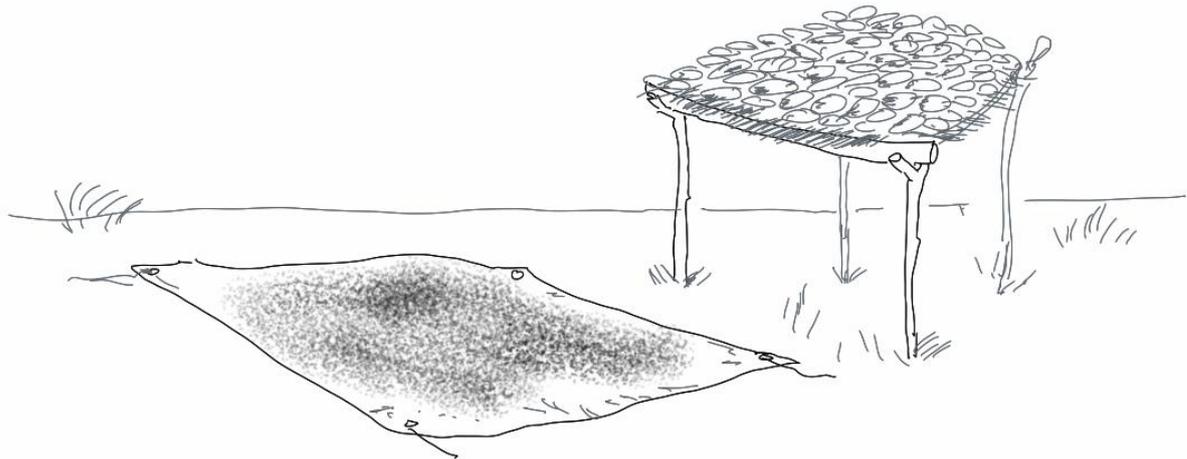
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As well as being dried, root and tuber crops, such as yams, potatoes and cassava, can also be 'cured' to help them store better. This process involves placing tubers in the sun under a cover of leaves. The moisture and high temperature causes a protective layer to form on the outside of the tubers.

Please see **Tool C2 - Processing and preserving fresh produce** for advice on preservation and storage of fruit, vegetables and fish.

Storing crops at home

There are a number of different ways of storing crops depending on what is being stored, and how much of it there is. Here are some common examples for storing **grain and pulses**:

Sacks: Produce is stored in clean bags or sacks at home or in a store. Sacks should not be stored directly on the floor or touching the walls. Instead they should be placed on wooden pallets with spaces left between the sacks to improve air circulation.

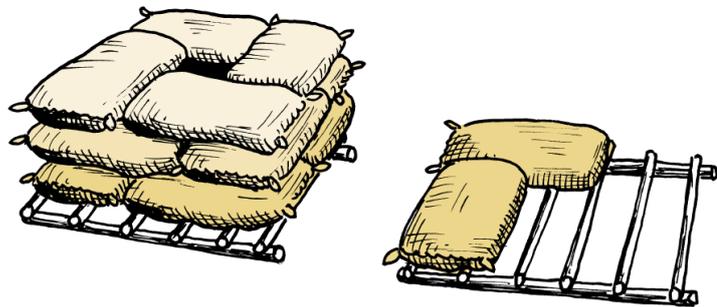


Image source: *Pillars - Improving Food Security* p20

Earthenware pots or other containers: Like sacks, avoid storing directly on the floor to prevent them from absorbing moisture. Sealing the pots with wax, oil or a clean cloth can also prevent insects from entering the pots. The contents need to be checked regularly to ensure that they have not become contaminated.

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Traditional elevated storage structures: A number of different materials can be used to construct elevated storage structures or granaries including mud, baskets, reeds and bamboo. To prevent rats and mice from entering, ensure the structure is raised to over 1 metre high, and place guards made from old tin cans on the legs of the building.

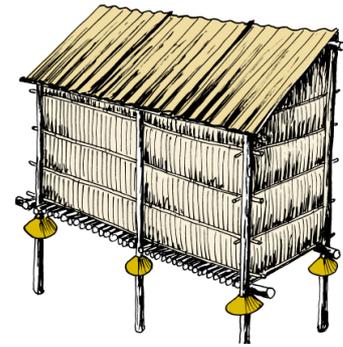


Image source: *Pillars - Improving Food Security* p8

Roof storage: Many crops, especially grains, are dried and stored by placing them in the roof of the home, often above the fireplace. The smoke and heat helps keep the product dry and protected from insects. However, it does not necessarily deter rodents.

Improved storage: Insects and other pests need oxygen to live. Hermetic storage – storage without oxygen – creates an airtight sealed environment which prevents insect damage. Hermetic storage can be created using airtight and waterproof plastic storage bags or plastic containers. Other improved storage includes metal drums or silos which can also be made airtight or ventilated with natural airflow. However do not place these in full sunlight as it is important to prevent large temperature changes.

Other food products will need to have different storage mechanisms. For example, **root crops and tubers** are often stored in underground pits or ‘clamps’ (called **pit storage**). Clamps are heaps of tubers covered in straw and soil often protected from the weather with a thatched roof or under trees. Underground storage can also be improved through putting the crops into sealed plastic bags before placing them in the pit or lining the pit with a mud/straw/dung mixture.

Preventing storage pests

As well as removing the oxygen from storage vessels there are other ways to prevent pests from destroying the stored harvest, including chemical insecticides and grain protectants. However, many local plants can also be used effectively. For example, neem leaves (*Azadirachta indica*), ginger roots and chillies can be dried and mixed with the grains before putting them in a secure storage container. Neem oil can also be used to treat storage sacks whilst neem leaves can be mixed with traditional plaster to coat the inside of the grain store. These techniques prevent the pests from reaching the grain.

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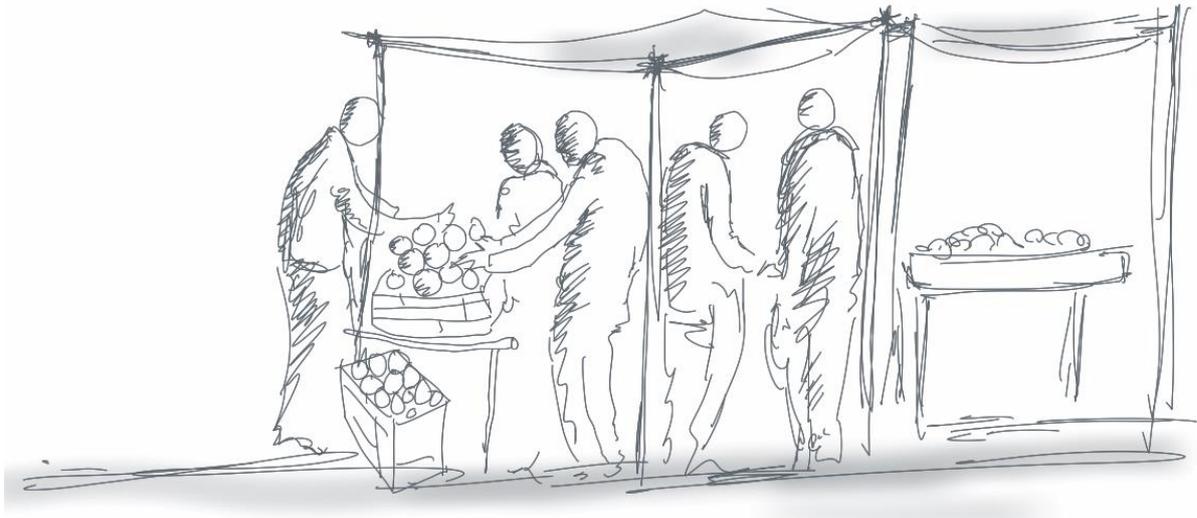
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Market

If the crops are to be sold it is important to think about the best **time** for selling. This will depend on seasonal price changes as well as household needs. Information about markets and an understanding of how much food and income a household needs will help plan how much of the crop can be sold straight away, and how much can be stored, for how long and using what method.

Please see **Tool C2 - Starting a business** for advice if you are planning on selling produce.



Finding out more

- Tearfund (1997) *Footsteps 32: Food Security*, particularly articles on 'Grain storage' and 'An improved granary design' - http://tilz.tearfund.org/en/resources/publications/footsteps/footsteps_31-40/footsteps_32/
- Tearfund (2014) *Footsteps 94: Valuing food*, article on 'Preventing pests' - http://tilz.tearfund.org/en/resources/publications/footsteps/footsteps_91-100/footsteps_94/
- Tearfund (1994) *Footsteps 21: Technology*, article on 'Food drying' http://tilz.tearfund.org/en/resources/publications/footsteps/footsteps_21-30/footsteps_21/
- Tearfund (2001) PILLARS guide: *Improving food security* http://tilz.tearfund.org/en/resources/publications/pillars/improving_food_security/
- Farm Radio International has a number of radio scripts about reducing post-harvest losses including Package 66 on improving storage methods, Package 79 on post-harvest and Package 90 on farmer innovation - www.farmradio.org/radio-resource-packs

Related tools:

- B – Stewardship of the land (Bible study) [*B: Climate & environment-4*]
- C2 – Composting [*C2: Climate & environment-1*]
- C2 – Conservation agriculture [*C2: Food & livelihoods-5*]
- C2 – Starting a business [*C2: Food & livelihoods-6*]
- C2 – Developing rural home gardens [*C2: Food & livelihoods-8*]
- C2 – Processing and preserving food [*C2: Food & livelihoods-11*]