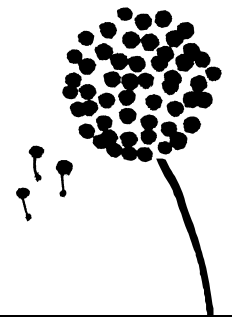


Improving food security



TEARFUND

A PILLARS Guide

by Isabel Carter



Partnership in Local Language Resources



Improving food security

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by Isabel Carter

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A PILLARS Guide

Introduction to PILLARS Guides

These guides are designed for use in small group situations where one or more people are literate and confident enough to lead others in group discussion. They aim to provide material for discussion around a subject either in isolation or as part of a regular group meeting; for example of farmers, literacy trainees or Mothers Union members. Ideally just two or three pages should be used each time allowing plenty of time for discussion of the issues raised and for carrying out some of the practical ideas suggested. No training is first necessary for the discussion leader.

PILLARS Guides aim to increase confidence among group members, so that they can successfully manage change within their own situation without the need for outside intervention. They try to build on existing knowledge and experiences among the members or within their community, so that different ideas can be tried out, adapted, and then either abandoned if not useful or appropriate, or found useful and adopted.

Objectives of this guide

- To raise awareness of the extent of post-harvest losses due to pests and diseases
- To increase awareness of the benefits of maintaining genetic variability and traditional crop varieties
- To introduce the concept of grain banks
- To introduce new concepts of food preservation and storage

Anticipated outcomes

- Local groups encouraged to try out a variety of ideas to improve grain storage
- Groups encouraged to discuss introducing the idea of grain banks to improve food security, either at local or community level
- Family diet and overall nutrition to be improved
- The use of new techniques in preserving fruit and vegetables to be encouraged and implemented
- The use of new food processing techniques such as making jams, chutneys and juices to be introduced

Glossary of difficult words

aim	broad, long-term, important goal
chutney	spicy relish made from fruits, sugar, vinegar and spices
co-ordinate	to manage activities by working together with others
curing	to preserve meat or fish by smoking, drying or salting
cyanide	a very poisonous chemical found naturally in cassava
environment	the natural habitat of soil, climate, vegetation and living things
genetic variability	the natural variation between plants (or animals) of the same species that causes differences in height, colour or yield, for example
grains	the seed or fruit of cereal crops
hybrid	high-yielding offspring produced by breeding two different varieties of cereal (or livestock). Retaining seed from a hybrid crop for planting will usually give poor results.
jam	sweet spread made from fruit and sugar
kiln	special oven used to process foods by smoking and drying
objective	measurable activity which contributes towards achieving the main aim
pickle	vegetables preserved in spices and vinegar
potassium metabisulphite	a preservative
resource	something needed to achieve an objective: money, information, human skills or natural products
shea butter	oil obtained from the fruit of the shea butter tree
tarpaulin	heavy waterproofed canvas material
traditional crops	crop varieties which have been passed down from one generation to another

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Storing the harvest



- How many of the crops which you produce with so much hard work are lost to pests and diseases, either in the field or during storage?
- What are the particular problems you face in storing food safely?



Discussion

G1

- One third of all grains (this word includes cereals, beans and oil seeds) are lost because of poor storage and pest damage, both in the field and in storage. Does this surprise you?
- Discuss how present methods of storing grain and other foods may be unsatisfactory.
- How do new crop varieties compare with traditional varieties both in their resistance to pests and diseases, and in their storage quality?

The benefits of a mixed harvest

- Commercial seed producers want to persuade farmers that their new varieties will produce better and larger yields. Often they do; sometimes they do not.
- However, if new varieties of crops replace all the traditional varieties, this could result in problems in the future. Traditional varieties of crops enable the farmer to produce some food whatever the conditions. Some will cope with drought, some with disease, some with flooding, some with poor infertile soils. New varieties usually only yield well under good conditions with fertile soils. They often yield very poorly in difficult conditions.
- So experiment with new varieties, but keep some of the traditional varieties too.



Discussion

G2

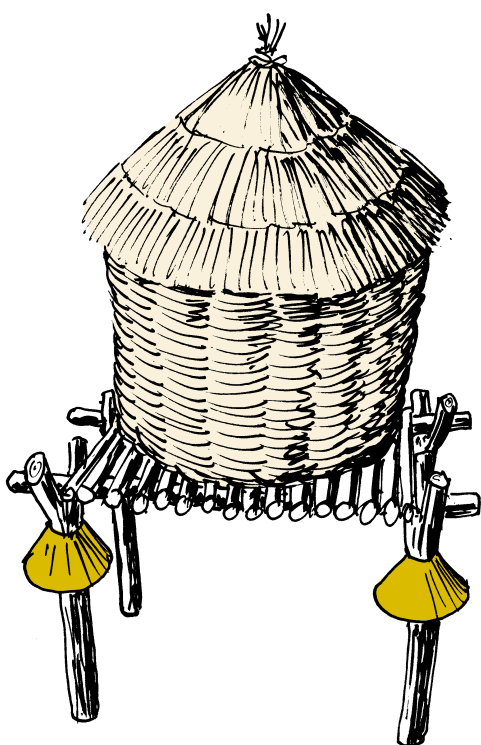
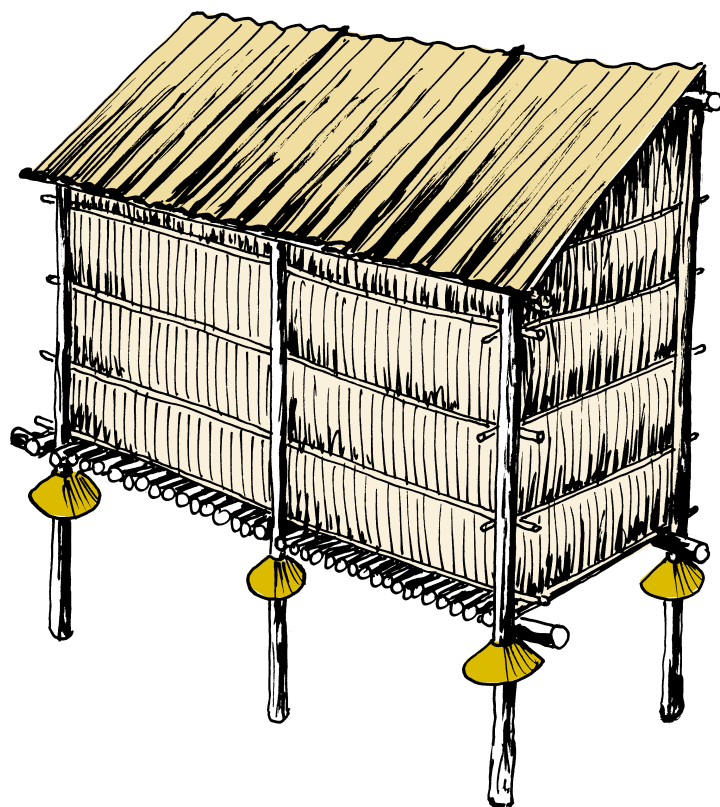
- Traditional varieties have been selected by farmers over hundreds of years to be adapted to the local environment. Though they may not yield as highly as new varieties, they can provide security in difficult times. Do farmers still preserve these? They are often lost when new varieties replace them.
- Encourage farmers to discuss their own experiences and consider the local names and characteristics of the various varieties they know, not just of grain crops but of vegetables and fruits.
- What has been the participants' experience of using hybrid varieties (which need new seed to be bought each year) or other new varieties?
- Emphasise that both new and traditional varieties have advantages and disadvantages and that farmers should experiment carefully. The total replacement of traditional varieties may carry considerable risks for farmers in the long term.

Grain storage

Simple improvements to local grain stores may help reduce the loss of grains to pests and diseases. Most areas have different requirements and different traditional storage methods.

Here are some points to consider when building grain stores:

- Raise the platform to over one metre above the ground to prevent rats and mice jumping up.
- Make rat guards from old tin cans and place at knee height around the legs.



- Coat the inside of the basket using traditional plaster.
- Dip poles into old engine oil to give protection from termite damage before they are put into the ground. You can also soak the holes for the poles with engine oil.



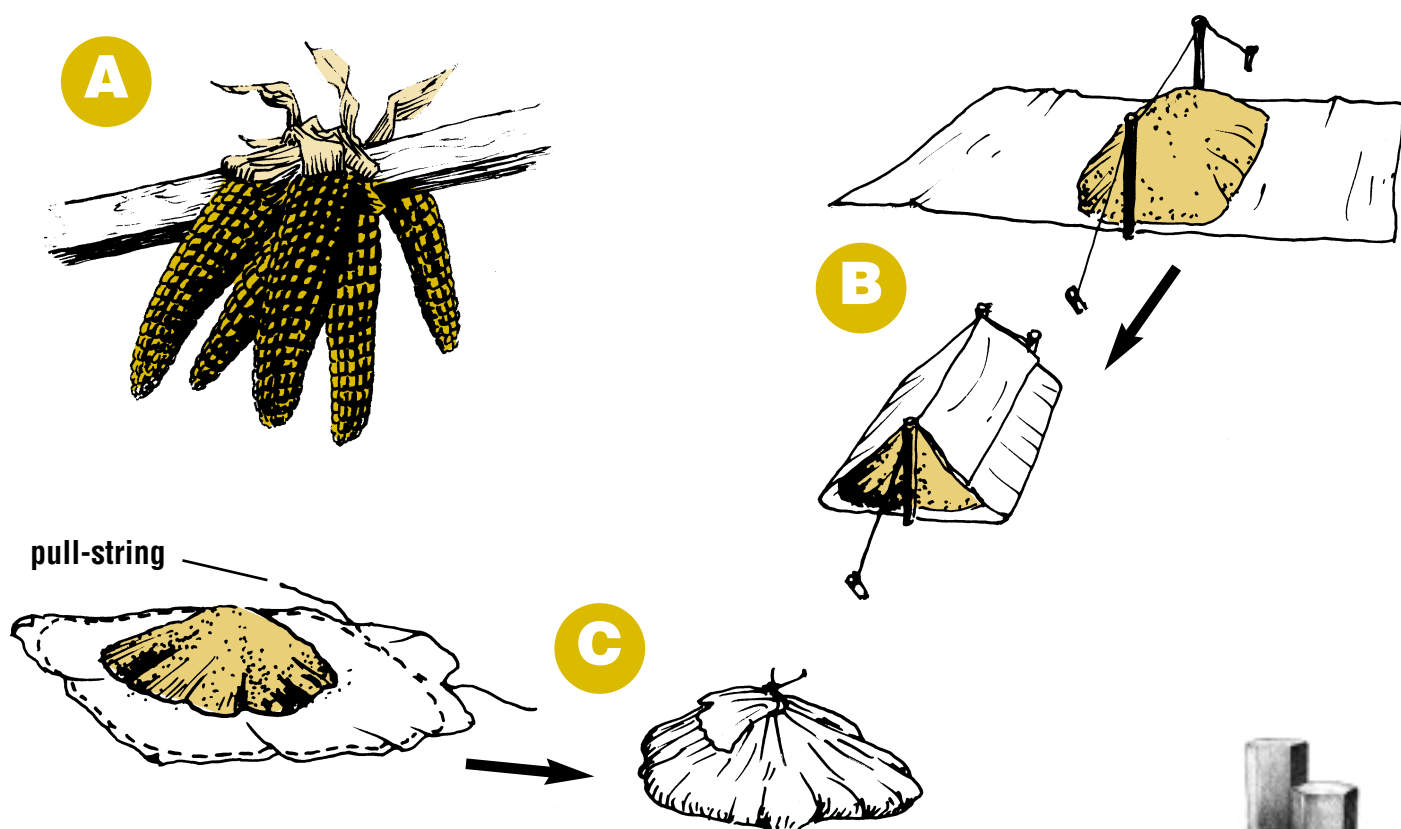
Discussion

G3

- If possible, visit several farms and examine their granaries or other methods of grain storage. What problems have the farmers experienced?
- Consider the possible improvements mentioned and discuss their potential. Are there other ways of improving the design? What are they? How practical are they to introduce?
- Have any participants travelled to other areas where people use different designs or methods of grain storage? Did they learn any useful new ideas? What are they?

Practical tips – drying grain

- When storing grains, they should be completely dry. Otherwise mould and disease can develop.
- A simple test is to check by biting on the grains. A very sharp cracking sound between the teeth is a sign that the seed is dry enough to be stored.
- Well dried grains in good stores should stay in good condition for a year. Storing grains in cool granaries or store-rooms helps to lessen the risk of damage due to any dampness that may remain in the grain.
- Avoid the build-up of pests, either through leaving grains to dry in the field or by leaving the leaves and stalks attached.
- The diagrams show three methods of drying grains. Methods B and C use plastic sheeting which will protect the grains at night or before rain.



Discussion

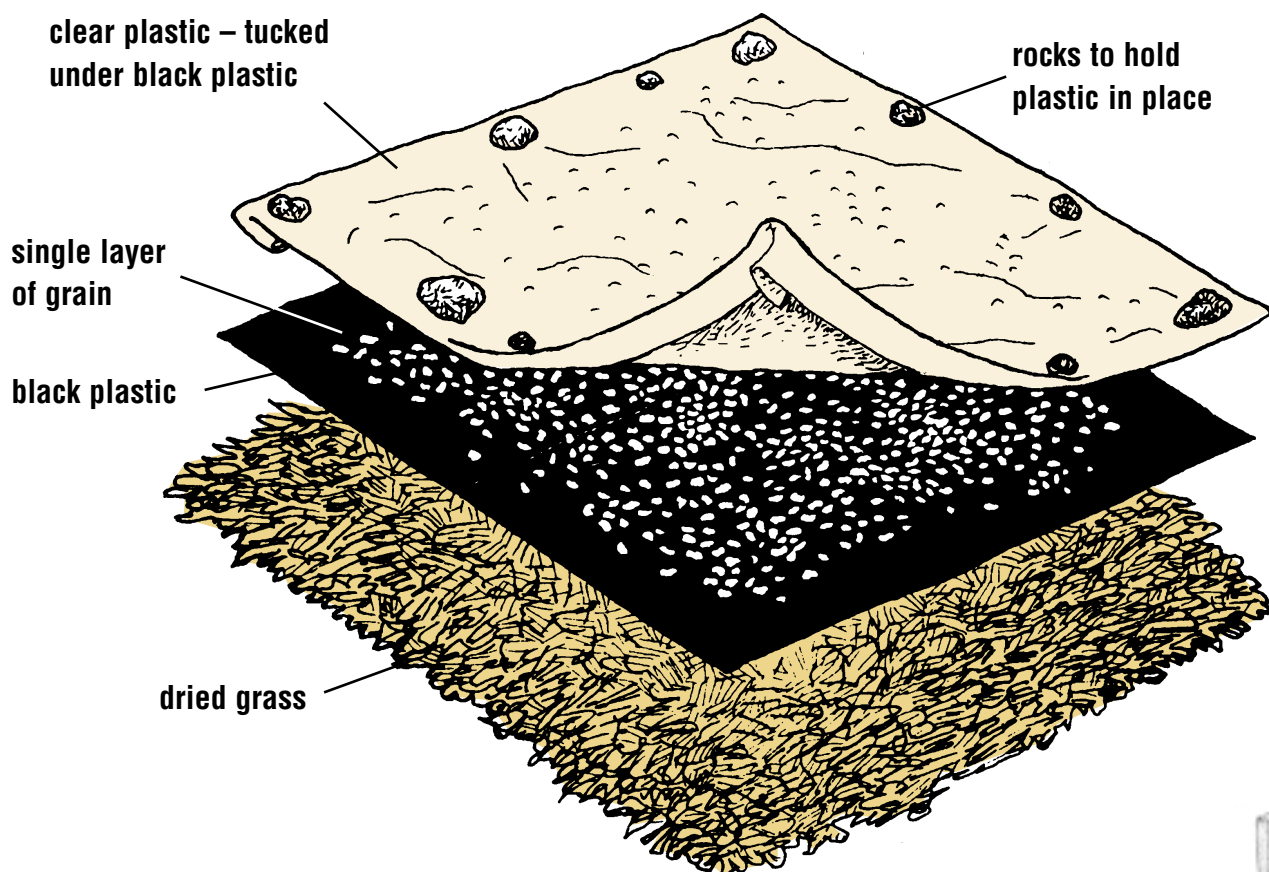
G4

- Discuss methods of drying grains. Are there any problems which participants have found in drying grains well? Where do people normally dry their grain?
- Are the areas where grain is stored as much in the shade as possible? Why is this important?
- Consider how to use the two ideas which use plastic sheeting or tarpaulin for keeping grains dry while they are laid out on the ground. Is there suitable material available to make these covers? If possible, try producing a sample of the circular cover together. Use a large needle to thread string around the edge of the circle, leaving extra plastic to cover the gap when the string is pulled tight.

Solar grain driers

The simple drier shown below will heat grain to temperatures high enough to kill most pests, including weevils, beetles and other insect pests, together with their eggs.

- Place a sheet of black plastic on top of an insulating mattress of dried grass. Place a single layer of dry grain on top of this. Place a larger layer of clear plastic over the grains. Fold the clear plastic under the black plastic layer and use stones to hold it in place.
- Make sure grain is well dried before treating in this drier. Exposing the grain to at least two hours of strong sunshine in the middle of the day should be sufficient to kill most pests.



Discussion

G5

- Discuss the benefits of using this drier. How easy would it be to make? Are there any other types of solar driers that people have seen?
- How long would the plastic last? How appropriate would this method be for local people?
- Discuss ways of introducing this within your community.

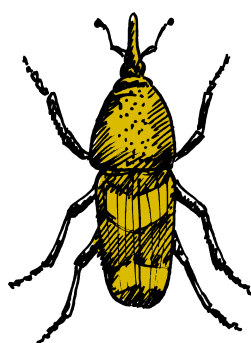
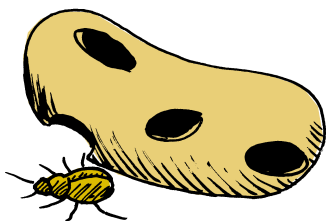
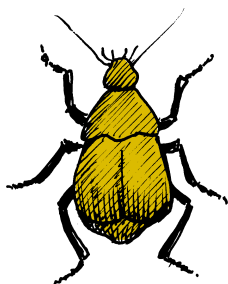
Controlling pests

There are many different ways of controlling pests without buying expensive chemicals.



- Coating beans with a thin layer of edible oil before they are stored, is known to make it difficult for some insects to breathe. Unrefined cooking oils such as palm oil are best. These are cheap and take longer to become rancid. Shea butter is also effective. Before cooking, soak and wash the beans well.

- Mixing grains with equal quantities of wood ash helps prevent pests from reproducing. Mix well before storing. Small quantities of lime can also be used instead. In both cases, wash the grains very well before cooking and eating!



Discussion

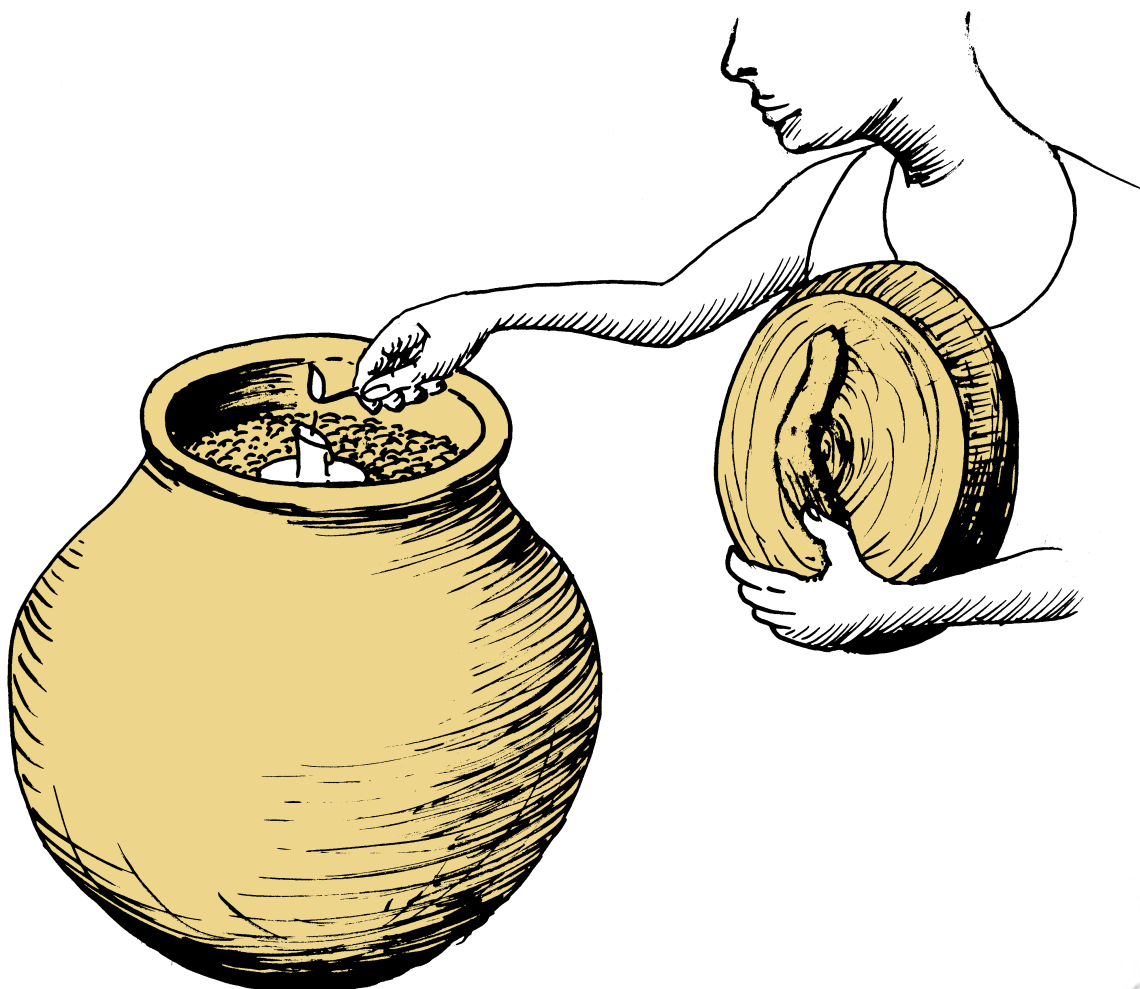
G6

- If possible, collect materials and experiment with these different techniques.
Discuss what oils are easily available and might prove useful.
- What are the dangers of using oils which are not edible?
- Are there any other similar methods that participants are aware of?
- Try storing some beans with edible oil and some beans without oil in similar conditions. Compare how effective the different methods are after a few weeks and again after several months.

Removing oxygen from grain

All insects and other pests need to breathe oxygen to survive. Here is a simple tip which can remove oxygen from a storage container. This is only useful if grain is stored in airtight containers such as clay jars or underground pits.

- When the container is full of dry grain, place a candle firmly into the grain. Make sure it has room to burn without setting fire to the grain. After lighting the candle, put the lid on the container and make it airtight.
- The candle will continue burning for just a few minutes until all the oxygen is used up. It will then go out. Without oxygen the pests will die before they can damage the grain.



Discussion

G7

- It is very important that the candle is not pushed too deeply into the grain, just in case it sets the grain alight!
- What airtight containers are available locally which could be used for this technique? How could these containers be sealed to make them airtight? Could mud or wax could be used to seal them?
- If possible, try this out with suitable containers. Check on the results after a few weeks and a few months.
- Remember that if the container is opened or unsealed at any time, the whole process must be repeated.

Using protective plants to reduce pest damage

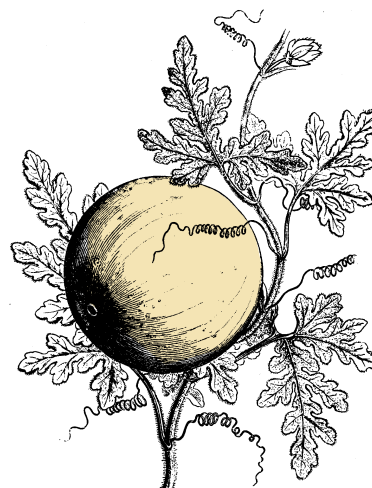
Many local plants can be used to protect harvested crops from pests. What plants have traditionally been used within your community? Many new introduced plants may also be useful to reduce pest damage.



- Neem (*Azadirachta indica*) and Cassia vine (*Cassia nigricans*) leaves can be dried and mixed in with grains. The leaves can also be powdered and mixed with traditional plaster and used to coat the inside of the grain store. Ginger roots and chillies can also be dried and powdered and mixed with grains.



- Another useful plant is the wild water melon or bitter apple (*Citrullus colocynthis*) which is related to the water melon. The dried pulp of fully grown but still unripe fruits can be mixed with grains or mixed into plaster for coating grain stores.



Discussion

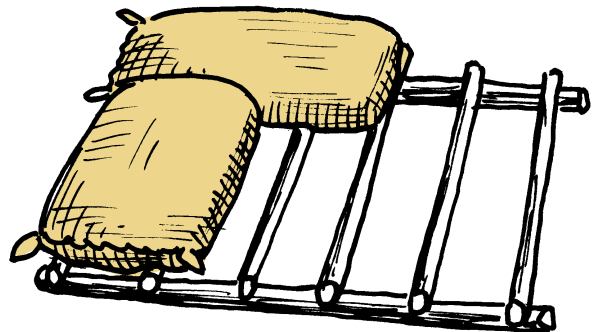
G8

- Discuss any local plants known to be effective against pests. If possible, invite a local herbalist or an elder person to attend and learn from their knowledge. Do they continue to use such plants?
- Do any participants have experience of using any of these methods? What were the results? If possible, obtain samples of some of these plants and try out the ideas. Again, compare their effectiveness after a few weeks and a few months.
- Remember that some plants may be poisonous. Always wash grains very well before cooking and eating.

Using sacks for grain storage

Storing grain in sacks is useful if there are large quantities to store. If theft from outside granaries is common, sacks can be stored in a room with a lock. Sacks are best stored in rooms with concrete floors and walls.

- Sacks should never be stored directly on the floor. Make strong frames from poles or wood. Stack the sacks on these frames allowing an open space in the middle for air. Don't let the sacks touch the walls.
- If the sacks are turned twice each day for the first two weeks, most pests will be destroyed since pests need to fix themselves into one position to start eating into a grain. Regular turning prevents this and results in pests dying of hunger.



Discussion

G9

- Discuss the advantages and disadvantages of using sacks to store grain. What kind of pests might prove a problem? Would rat and mouse traps or a cat be a wise investment?
- If possible, visit a large grain store. Discuss the practices that are observed. Are there useful ideas that could be implemented?
- Can you put any of these ideas into practice?
- For example try turning one sack twice a day for two weeks and compare the resulting damage from pests in this sack with one which was not turned. Was there a difference in the amount of pest damage?

Good hygiene



- After emptying a grain store or granary, immediately sweep it out very thoroughly. Make sure no grains at all remain from the previous year.

- Repair any cracks in the walls or holes in the roof or floor. Dust with lime, ash or dried neem.



- Never mix grain of different ages together as this encourages pests and disease to spread into the newer grain.
- Regularly inspect stored grain every few weeks for any signs of rats, pests or mould. Take action immediately if damage is seen.



Discussion

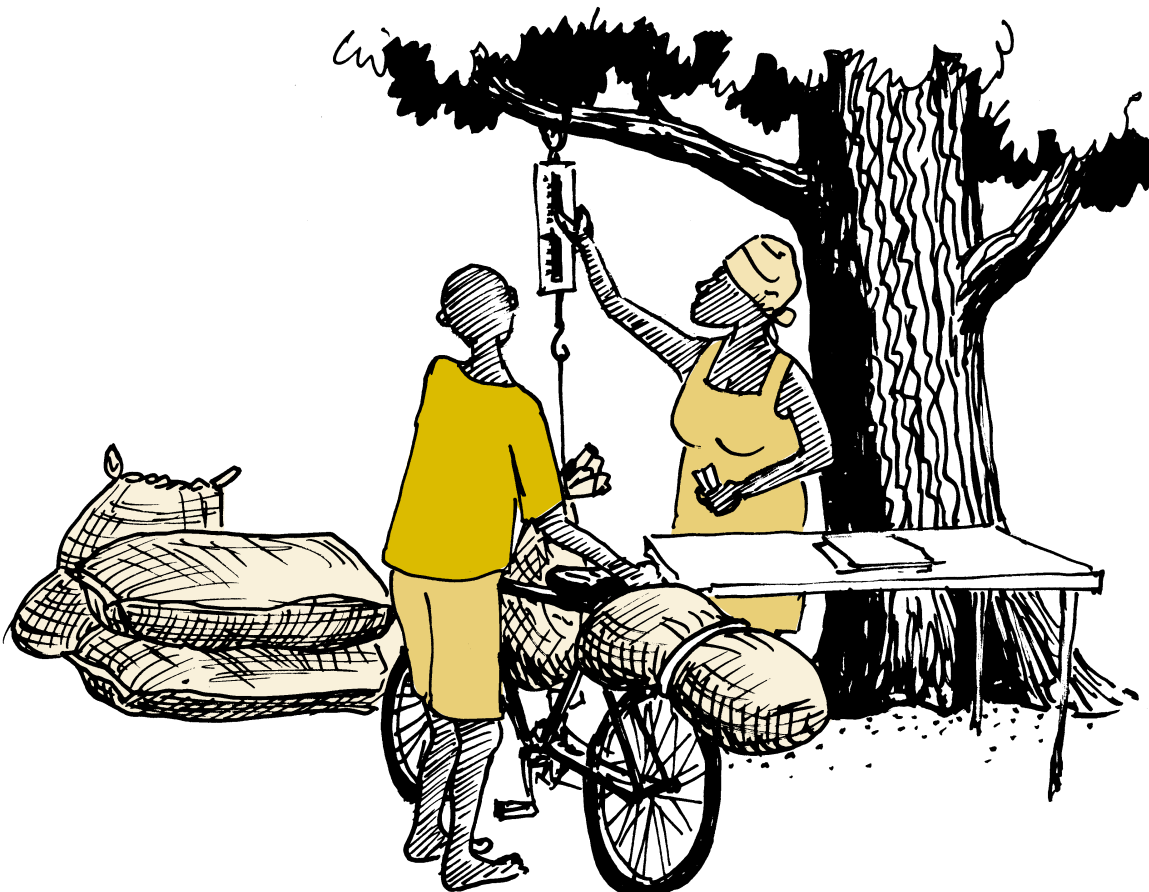
G10

- Although the pictures show a large grain store, this advice is just as important for small granaries. Do you agree?
- Discuss good hygiene practices which local people use in grain storage. Are there any useful ideas or plants that are already used to discourage pest build-up?
- Try mixing different powdered leaves of plants known to be effective against pests, with traditional plaster mixes and use them in grain stores and granaries. Over time compare the effectiveness of different plants or chemicals.

Community grain banks

Grain banks can be used to store grain within a community, that can be available to people at fair prices during times of shortage.

- Usually grain prices are very low just after the harvest period, when most people have plenty of grain. Later in the year, grain prices may rise sharply. When people need to buy grain as their own supplies run out, prices are often very high.
- Grain banks can buy grain when prices are low around harvest time and sell it at a fair price when it is in short supply.
- In times of drought or famine, community grain banks can prevent traders exploiting a difficult situation and provide a fairer way of organising food supplies.



Discussion

G11

- Discuss the advantages and disadvantages of the present market system of buying and selling grains in your community.
- How much do prices change throughout the year?
- Are many families in real need of grain in the months before the main harvest?
- Are there any grain banks in the area? Do any participants have any experience of them?
- Would grain banks be of benefit in your area?

Establishing community grain banks

There must be a community decision to establish a grain bank. Outsiders should not make this decision. The community must own and control the grain bank itself.

- If a community feels that a grain bank will improve its food security, first it should elect a committee to manage the grain bank. Men may find it easier to travel to distant markets to purchase grain, whilst experience shows that women are often better at keeping open and fair accounts.
- Initially a grain bank will require money or credit to enable the purchase of grain at low prices. Sometimes outside organisations may be able to help. Community members may be able to provide start-up loans or supplies of grain with the assurance that they will receive this back with interest later in the year.



Discussion

G12

- Discuss all the different issues that setting up a grain bank might involve. Is there sufficient interest to call an open meeting to discuss all these issues?
- If possible, ask someone from an outside organisation with experience of grain banks to come and give advice.
- What issues would need to be discussed? These might include:
 - finding or building an appropriate store
 - who would be able to use the grain store
 - who would be responsible for setting fair prices.
- Discuss the need for training for specific roles for committee members. These might include record keeping, purchasing good quality grain, preserving grain, marketing the grain and how to manage the store.

Operating a community grain bank

- Successful grain banks need to obtain large amounts of good quality grain at harvest time. Make sure that stored grain is kept dry and free of pests. Grain must be stored in waterproof buildings which are secure from thieves.
- When local grain prices begin to rise, and grain supplies fall, the bank can make grain available.
- Successful grain banks provide food at fair prices at the times when families need it most. This means farmers will not be forced to work for cash just when they need to spend time on their own land preparing for the next harvest.



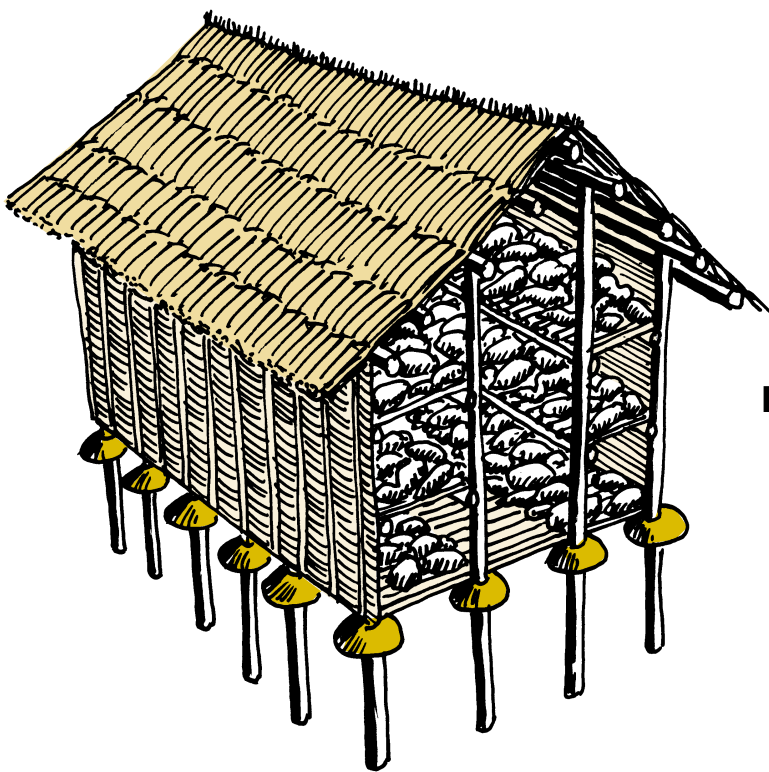
Discussion

G13

- Grain banks need to target carefully who their customers will be. They should not provide cheap grain to market traders or anyone else who may wish to sell the grain and make a profit.
- Long before the grain bank opens its doors, the committee members must decide on how grain prices will be set, on the amounts to be sold, on who can use the bank and how often.
- The profit made each year by a successful grain bank should be used first to pay back loans or credit and for any necessary repairs. The remainder should be banked so that it is available ready to purchase grain next harvest.
- It is a good idea for grain banks to try to build up a small fund to cover their expenses during years when the harvest may be so good that people use their services less.

Preserving other staple foods

Grains are a food source that can be preserved over many months. However there are other important foods that can be preserved for several months with care. These include yams, potatoes and cassava.



- These root crops cannot be dried out and need good ventilation during storage. To prevent rotting, great care should be taken during harvesting and transport to prevent causing wounds. Any damaged roots should be used immediately.

- Tubers can be 'cured' to help them store better. The newly harvested tubers should be placed out in the sun and covered with a thick layer of leaves. The high temperature and moisture cause a protective layer to form on the outside. After a few days, they should be moved to a cool store.



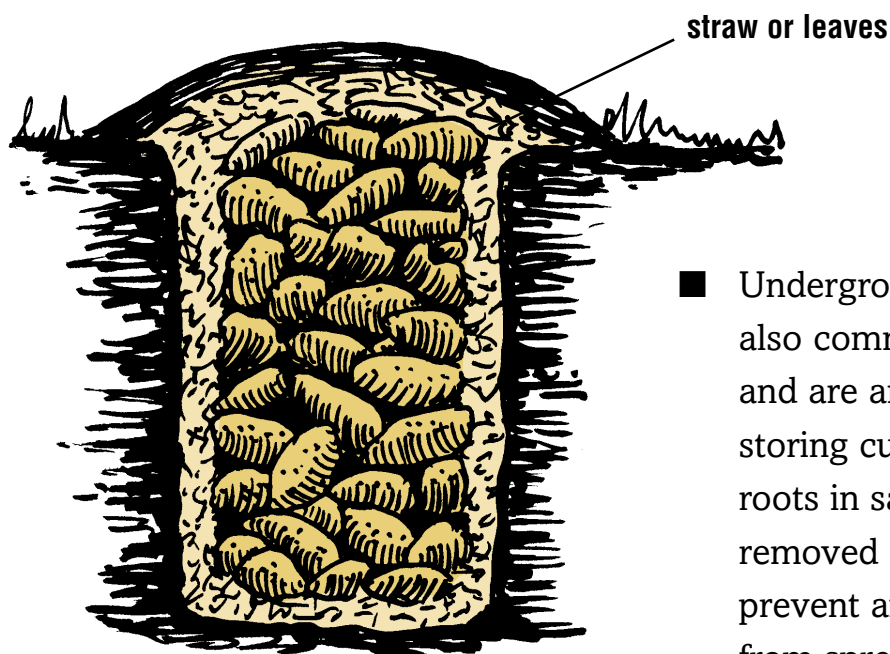
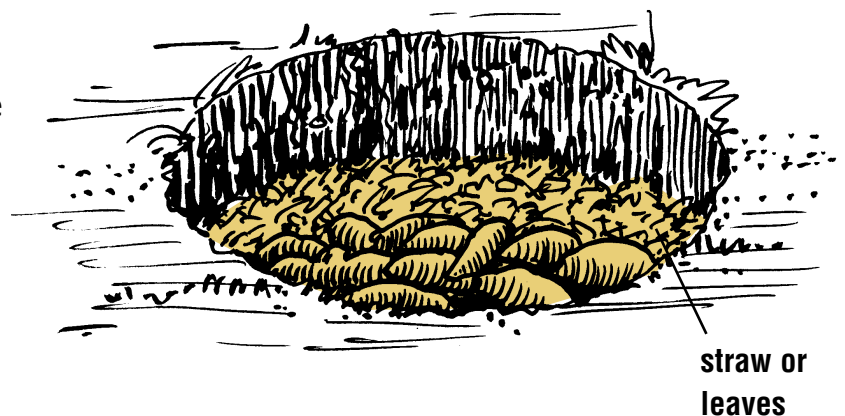
Discussion

G14

- Discuss present methods of storing different kinds of tubers. What useful ideas do participants have to share?
- Have people travelled to other areas and learned useful new techniques? What are these?
- If possible, put the new ideas for tuber storage into practice. Experiment to find the benefits of curing by leaving some roots to dry without 'curing'. What are the lessons to be learned from the results?

Building clamps for storing roots

- Tubers can also be stored in 'clamps'. These are holes dug in the ground, lined with straw or leaves, filled with roots and then covered with more straw and earth or sand.
- Clamps need to be checked regularly to make sure that any rotting roots are removed quickly before the rot spreads.



- Underground storage pits are also common in many dry areas and are an excellent method of storing cured tubers. Putting roots in sacks allows them to be removed easily and may help to prevent any disease and pests from spreading.



Discussion

G15

- What are the local storage practices? What are the most serious problems? Can they be solved? How do they compare with these methods?
- If plastic bags or sacks are used in clamps, they may cause the roots to 'sweat' and encourage rotting. Are cloth, jute or strong paper sacks available?
- Try building an underground 'clamp' and compare this storage method with those used at present. Clamps can vary in size, depending on the quantity of roots to be stored and the level of the water table. A depth of 1–1.5 metres is common.

Drying root crops

- Root crops can also be stored by drying them. Peel and cut into small pieces and dry, preferably in a solar drier.
- Roots can first be stored in clamps and then dried whenever there is time available.
- Sometimes dried roots can be ground into flour. Cassava makes good flour but other root crops can also be used. Cassava should be grated and washed before drying to remove the cyanide content.



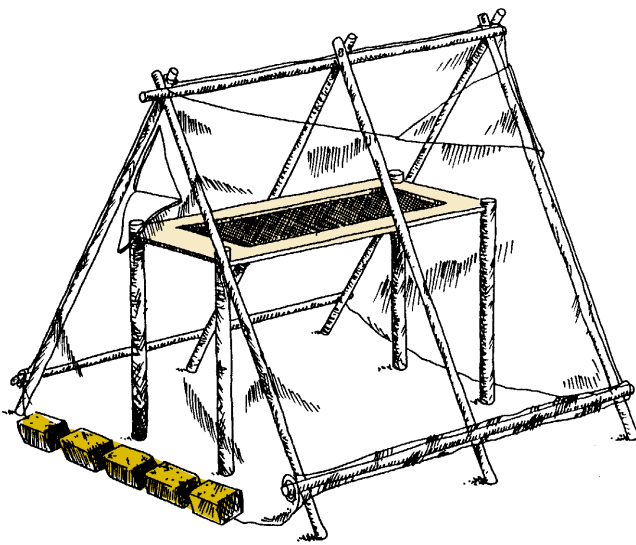
Discussion

G16

- How much time would be involved in drying root crops? Would the time spent be worthwhile since flour makes food preparation very quick?
- What kinds of root flour have participants eaten? Would it be easy to sell such flour in local markets?
- It is important to use varieties of cassava which have a lower cyanide content for drying. These varieties are often called 'sweet' varieties to distinguish them from 'bitter' varieties which are high in cyanide and better processed in other ways. What names do people give to different types of cassava in your area?
- How time consuming are some of these processes? Are there machines available locally which could be considered? Could the cost of purchase be covered by the sale of produce or by letting others pay to use them?

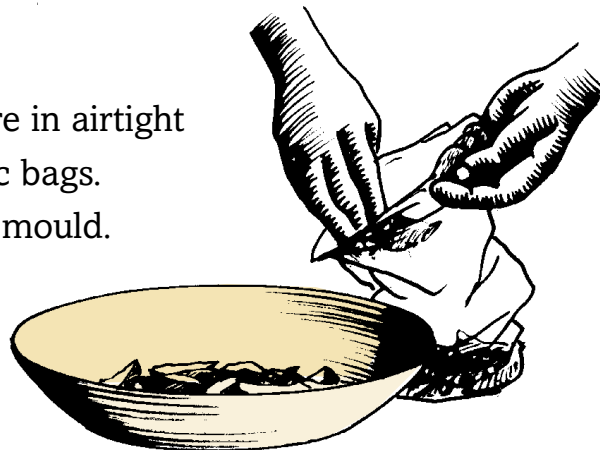
Drying fruit and vegetables

- When drying food, particularly if it is to be sold, it is important to keep food as clean as possible. To preserve the colour, fruit pieces should be dipped into boiling water containing lemon juice and preservative, if available. Vegetable pieces should be dipped in boiling water containing salt and preservative, if available.
- Dried fruit can be eaten directly. It can also be softened by soaking with water. Good quality fruit may also become a cash crop suitable for marketing and export. Dried vegetables can be added to stews and soups for flavouring.



- Many vegetables and fruits can also be preserved by drying. Tomatoes, herbs, mangoes and onions are examples of crops which can easily be dried and stored. Drying is a way of preserving good harvests instead of selling when market prices are low.

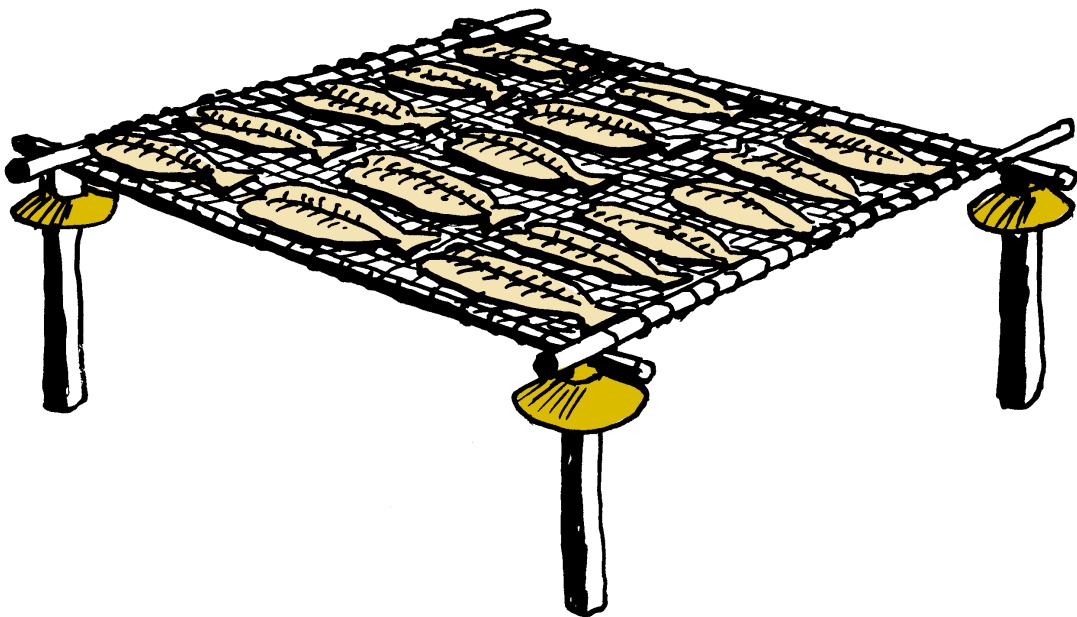
- When fully dry, store in airtight containers or plastic bags. Check regularly for mould.



- Discuss traditional methods of drying foods and their advantages and disadvantages. Would using a solar drier bring any advantages?
- What preservative is available in chemists? Potassium metabisulphite is recommended.
- Build a solar tent drier with a drying frame of wire raised about half a metre above the ground. Use clear plastic on the sunny side and ends, and black plastic on the shady side. One end is left loose for entry and closed with stones or brick. The sides can be rolled over a pole to control the temperature.
- Here is an example of how to dry mangoes. If they are dried well and have a good colour, dried mangoes can often be sold in markets or to exporters:
Peel good quality, large, half-ripe mangoes and cut into thin slices (6–8 mm thick) with a stainless steel knife.
Soak the slices in a bowl containing one litre of boiling water, 700–800 grams of sugar (five small teacups), two large spoons of lemon juice and three grams (one heaped teaspoon or soda bottle top) of potassium metabisulphite (a preservative which can be bought in chemists).
After 18 hours, drain the slices and dry them.
Store the dried fruit in plastic bags.
- For vegetables, it is recommended to dip sliced vegetables into a pan containing one litre of boiling water, 50 grams (two large spoons) of salt and three grams of potassium metabisulphite. Place in a thin layer to dry on the rack.
- Experiment with fruit and vegetables available locally and find which method works best.

Preserving fish by drying

- Drying is a good way of preserving fish that cannot be eaten or sold fresh. Larger fish should be split to remove the guts and large bones and then washed in fresh water before being dried. Fish should be dried on racks above the ground. A tent drier would help protect the fish from flies. Oily fish do not dry well.
- If the sun is very hot, it is important not to let the fish get too hard on the first day. It may help to begin drying fish in the shade for the first day.
- Place the fish in boxes overnight after the first day.
- When the fish are thoroughly dried, store them in tins, cloth sacks or plastic bags. Check them regularly for signs of mould.



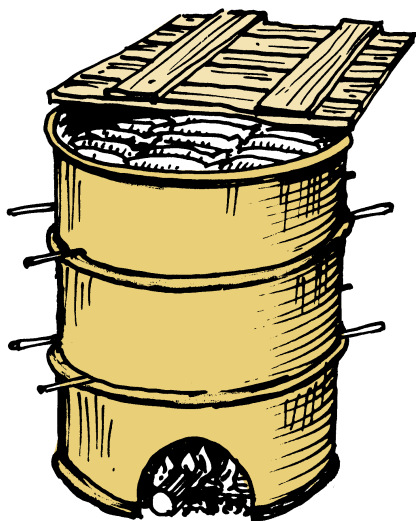
Discussion

G18

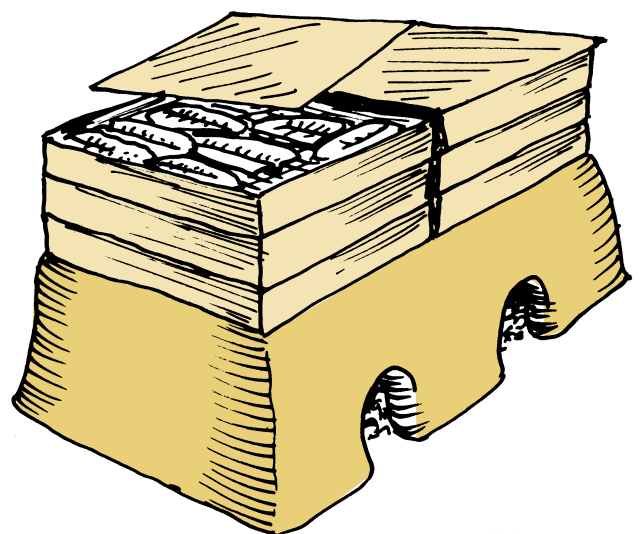
- Discuss the present methods used to preserve fish. Do they include drying?
- How might dried fish be used in cooking?
- Would there be a demand for good dried fish in the local market?
- If fish is available and drying is not used yet, try it out. What are the results?
- If fish that is not fully dried is kept in plastic bags, it may encourage mould. Only use plastic bags for fully dried fish.

Preserving fish by smoking

- Smoking is a traditional way of preserving fish. It cooks and dries the fish at the same time. There are many different types of smokers but each needs a source of smoke and somewhere to hang or place trays of fish in the smoke.
- Simple kilns can be made out of oil drums or built using brick or mud walls. Inside the smoker, fish can be hung on bars with hooks or laid on trays. The trays have wire or slatted wood bases so a number of trays can be placed on top of each other.
- Before smoking, split the fish to remove the guts and wash in clean water. Move the trays around regularly so all fish are smoked evenly. Smoking takes between 14 and 24 hours. Other kinds of meat can also be smoked after first cutting into thin strips.



drum cut into 3 sections with handles to lift each section



Discussion

G19

- Are there any traditional types of smokers in your area? If not, what kind of materials could easily be found to build one. If possible, visit anyone operating one nearby and learn from their experience.
- Is there a good supply of wood available to use for smoking? Are new trees being planted to replace those being used for fuel?
- If possible, put the ideas into practice and build and use a smoker.
- Remember that the fire needs an entrance for air at the bottom and an exit for smoke at the top. This may simply be through gaps in the layers of trays or may be a chimney. There needs to be a good flow of air moving through the smoker. A chimney will help this.
- Different wood fuels have different properties and may give different flavours to the fish, so experiment to find the best mixture and flavour.
- What other things could be smoked besides fish? What kind of meat might taste good smoked?

Processing food – jam making

- When fruit is plentiful, some of it is often wasted. All kinds of soft fruit can be used to make jam if plenty of sugar is available. Use ripe soft fruit, chopped into small pieces – for example guava, mango, cape gooseberries and strawberries all make good jam. Try mixing them to give different flavours.
- Jam is best kept in clean glass jars with lids. Jam will bubble up a lot as it boils, so a large pan is needed.
- Don't make large quantities until you have perfected the technique!



- Why is it essential to practice very good hygiene for all processed foods – such as dried fruit, jam, chutneys or juices? What sort of care should be taken?
- Do local people use jam? Would there be a good market for jam?
- If possible, use a recipe book which will tell you exactly how much fruit, sugar and water to use for each different fruit.

For every two cups of chopped fruit, use just a 1/2 cup of water (less if the fruit is very juicy like pineapple).

Cook the fruit in a large pan until very soft – usually about 15 to 20 minutes. Then add one cup of sugar for every cup of fruit. Stir well and allow to boil for 15 to 20 minutes until it will set. If there is a lot of froth, add a small spoon of butter or margarine.

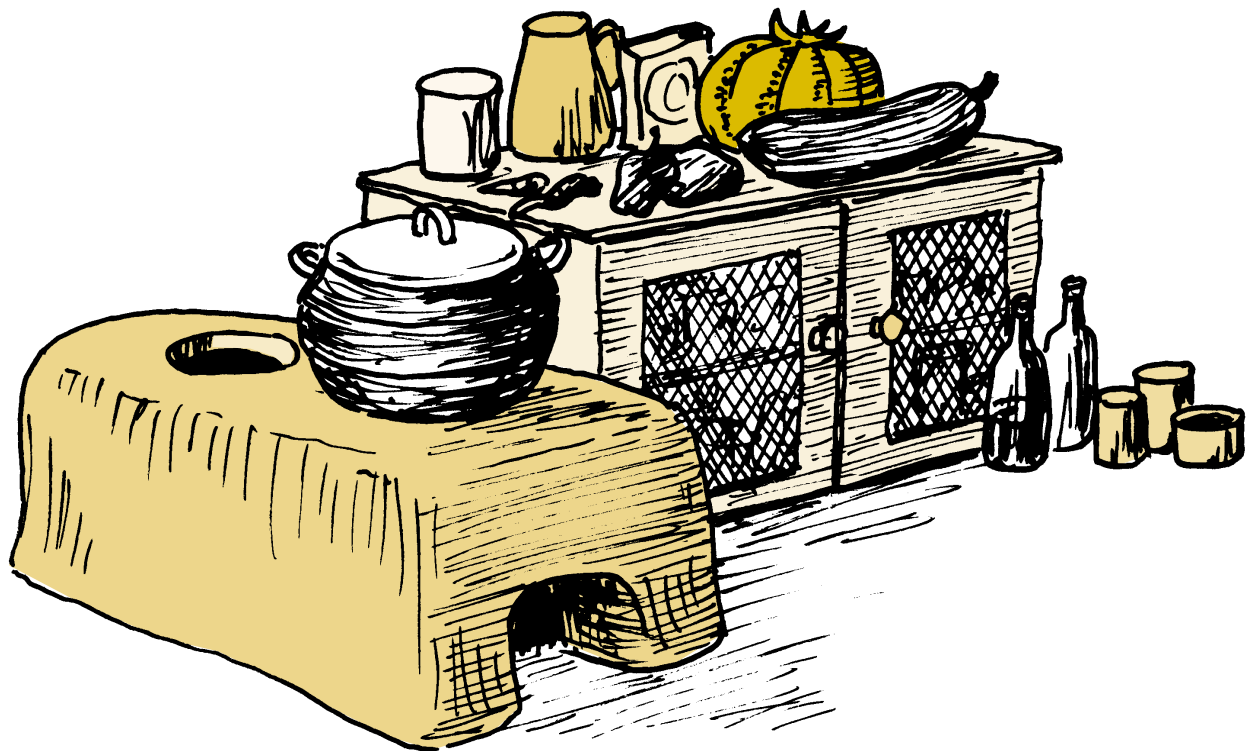
Test for setting by dropping a small amount of jam onto a cool plate. After a few minutes push it with your finger. If it wrinkles and forms a skin, it is ready. If it does not, continue boiling and add some more sugar.

Pour the hot jam into very clean, dry glass jars, first wrapping each jar in a damp cloth to prevent cracking. Cover with a clean lid.

- This recipe is just a guide. Generally, soft fruit needs a shorter cooking time and less water. It is better to use refined sugar. However unrefined sugar can be used for strong tasting fruits such as orange and lemon. Citrus fruits need longer cooking. For every two cups of chopped citrus fruit add 1/2 cup water and 1 1/2 cups of sugar. Tie the citrus seeds into a piece of cotton and cook with the jam to improve setting.

Processing food – making pickles and chutneys

- In some cultures, making pickles or chutneys is very common. In others it may be a new idea. It is a good way of preserving vegetables and can add flavour when they are eaten with staple foods. Chutney is a sweet, spicy preserve. Pickles are usually less sweet and more spicy or hot.
- Foods such as tomatoes (red or green), onions, carrots, green mangoes, green beans and pumpkins all make good chutneys or pickles.



- If possible, obtain a recipe book to get more accurate quantities of vegetables and spices. If one is not available, then experiment with these guidelines and what is available locally.
- Encourage each participant to try making one variety, using different mixes of vegetables and spices and noting the ingredients. Afterwards have a meeting to taste all the different products.
- Invite others to taste these products to encourage their interest.
- What possibilities are there for selling chutneys and pickles locally or in nearby towns?
- Chutney recipe...

- *Ten cups of chopped vegetables (use a mixture of several)*
- *One to two cups of chopped onion*
- *Three cups of vinegar*
- *Three cups of sugar*
- *Three teaspoons each of ground ginger, mustard seeds, cinnamon or other similar spices*
- *Salt and pepper*

Cook in a large pan.

Bring to the boil and cook for 30–50 minutes, stirring regularly.

Cool a little and pour into clean jars, first wrapping each jar in a damp cloth to prevent cracking.

Use undamaged lids and, if possible, first cover with plastic to prevent the vinegar damaging the metal lids.

For pickles add the same amount of vinegar but just one to two cups of sugar and plenty of chilli, mustard seeds, and other similar available spices.

Processing fruit – making juice

- Another way of preventing fruit from being wasted is to make it into juice. Again, good hygiene is very important.
- Citrus fruits are very good and easy to make into juice. Other good sources are passion fruit, pomegranates and baobab fruit.
- In order to preserve fruit juice, a preservative is essential unless the juice is to be used immediately or frozen to sell in the market as a fruit ice.



- Do local people use any kind of fruit juice at present? How is it made and preserved? What kind of interest and demand might there be for such juice?
- Without preservative, fruit juices must be used within a few days. Even with preservative, they will only keep for a few weeks before fermenting.
- How could fruit juices be marketed locally? Can juices be made into frozen sticks and sold in the market for example?
- Suggest all participants try making some kind of juice, taking careful notes of what quantities of fruit, sugar and preservative they use and how they extracted the juice. Set aside a time to sample each others' produce and compare them.

*To make **juice from citrus fruit**: cut the fruit into half and squeeze by hand or with a press. Bring the juice nearly to the boil (90° C) but do not boil. Cool quickly and add preservative (potassium metabisulphite) – 1/2 flat teaspoon or soda bottle top for every 10 lemons/16 limes. While still hot, pour into clean bottles (wrap in damp cloth to prevent cracking) and put on clean caps.*

Add sugar and dilute with plenty of water to drink. Try other fruits to make juices.

*A **sweet fruit juice** can be made using sugar. Peel off a thin layer of the skin (without the bitter white pith) from 5–6 citrus fruits. Bring this to the boil for 3–4 minutes in one litre of water. Do not boil for longer or the flavour changes. Remove from heat and stir in one kilo of sugar, all the juice from the fruits and add 1/2 teaspoon of preservative and 2 teaspoons of citric acid (usually obtained in chemists). Cool, strain and bottle. Dilute with clean water.*

- If it can be obtained, a small quantity of citric acid gives a sharp, tangy flavour to less sharp fruit juices – such as orange or mango.

Bible studies

These Bible studies are designed to use in small groups. They may provide a useful introduction to a meeting where different topics from the Guide are being discussed. Choose a study that will be linked to the topic you plan to study or that is relevant to your situation. During the studies, encourage people to reflect on what they read, to discuss the meaning and the implications of what they learn and, finally, to pray together about what they have learnt.

BIBLE STUDY 1

God's provision for the future

Read Genesis 14:17-41 where Pharaoh's dreams are described.

- What happened in Pharaoh's dream (14:17-24)?

Joseph explains that God has shown Pharaoh what he is about to do (14:25-32).

- What is going to happen?
- Why is the dream given in two forms (verse 32)?
- What actions does Joseph recommend in verses 33-41? Note the steps involved.

This plan seemed good to Pharaoh and all his officials, though storing sufficient grain to last a whole nation for seven years is a massive undertaking.

- What qualities are we told the person in charge needs (verses 33, 38, 39)?

Joseph is chosen for the position; the years of abundance – Read Genesis 41:46-49.

- What does Joseph do in the years of plenty?

The famine – Read Genesis 41:53-57

- How widespread was the famine?

Many lives were saved through God's merciful warning, Joseph's openness to God and Pharaoh's correct response.

- Are you open and responsive to God?
- Are you using wisely all that God has given you to provide for the future for yourself, your family, your community and others?

BIBLE STUDY 2

Trusting in God's provision

Read Matthew 14:13-21. Jesus has withdrawn to a solitary place on hearing of John the Baptist's death (Matthew 14:6-13) but the crowds follow him. Rather than sending them away, Jesus has compassion for them and heals their sick. Evening has come, it's late and it's a remote place. The disciples suggest Jesus sends the crowds away to the villages to buy food.

- What is Jesus' reply (verse 16)?
- What quantity of food is there available (verse 17)?
- How many people are fed (verse 21)?

All ate and were satisfied and twelve basketfuls of broken pieces were left over. 'Gather the pieces that are left over. Let nothing be wasted.' (John 6:12)

- Compare Luke 12:22-26 (or Matthew 6:25-27).

Jesus is not saying that we should not sow or reap or store food. Rather, we are called to be good stewards of all he has given us. He is saying that we should not worry about these things. God, our Father, knows our needs (Luke 12:30 or Matthew 6:32) and will supply them. Jesus promises us: 'But seek his kingdom (that is the kingdom of God) and these things will be given to you as well.' (Luke 12:31 or Matthew 6:33)

- Do you trust that God will supply your needs?

Philippians 4:19 tells us: 'And my God will meet all your needs according to his glorious riches in Christ Jesus.'

BIBLE STUDY 3

Stewardship: using what we've been given

Read Matthew 25:14-30 – A man is going on a journey so he asks his servants to care for his property while he is away.

- What guides him in how he distributes his money (verse 15)?

The servants with five and two talents use what they have been given and double them but the servant with one talent buries it in the ground.

- Why does this servant not use the talent he was given?

The master judges the servant on his own words. If he knew that his master harvests where he hasn't sown, he should have banked the money so that he could have given it back with

interest. This servant effectively had nothing in the first place, not because he wasn't given anything but because he chose not to use what he was given. His master calls him a wicked, lazy servant and he is thrown out into the darkness.

The two servants who used what they'd been given well, go to be with the master and share his happiness. Because they were faithful with a few things, they are put in charge of many things.

- To whom does the earth and everything in it belong? (Exodus 9:29; Deuteronomy 10:14; Psalm 24:1-2)

Everything that we have comes from God. He trusts us to care for what he gives us (Genesis 2:15; Genesis 9:3) and to use it well (1 Peter 4:10).

- What has God given you and how are you using it?

BIBLE STUDY 4

Stewardship: greed and generosity

Read Luke 12:13-21 – Jesus warns us to avoid all kinds of greed. 'A man's life does not consist in the abundance of his possessions.'

- What happens to the rich fool in the parable?

The man had prepared many things for himself but was not 'rich towards God'. Similarly, Proverbs 21:13 tells us: 'If a man shuts his ears to the cry of the poor, he too will cry out and not be answered.'

We are encouraged to be generous with what God has given us. We should be open-hearted and willing to lend to the poor (Exodus 23:11; Deuteronomy 15:7-8). We are also told to be eager to share and give to one another (Acts 4:34-35; 1 Corinthians 16:2; Galatians 2:10).

Read 2 Corinthians 9:6-11 – God loves a cheerful giver and we will reap what we sow. He promises us: 'You will be made rich in every way so that you can be generous on every occasion.'

- In what ways might this generosity be expressed (verses 11, 12)?

Jesus also says: 'Give, and it will be given to you. A good measure, pressed down, shaken together and running over, will be poured into your lap. For with the measure you use it will be measured to you.' (Luke 6:38)

- Are you listening to the cry of the poor?
- How as a group could you do more for needy people, both within your community and outside your community?

BIBLE STUDY 5

Pest control: the problem of sin

When even the tiniest insects multiply, they can destroy a whole store full of grain.

- What other examples do the following verses give of small things having great consequences? Song of Songs 2:15; 1 Corinthians 5:6; Galatians 5:9; James 3:5b

The Bible tells us that sin can be the same. Though it begins small and may seem insignificant, if it is not dealt with, it will ultimately lead to the destruction of our lives.

- For each of the following verses or passages, notice the types of sin that have crept in and grown:
 - Jealousy: Genesis 4:2b-8; Genesis 37:3,4, 17b–20
 - Idolatry: 1 Kings 16:31; Hosea 13:2
 - Ignoring God's plans: Isaiah 30:1
 - Lying: Jeremiah 9:3
 - Disobeying God and serving other gods: Jeremiah 16:11-12
 - Sexual immorality: 1 Corinthians 5:1-2, 6
 - Ignoring God's grace: Galatians 5:4-9
- What is the ultimate consequence of giving in to our sins? Romans 6:20-21, 23a; James 1:13-15
- Ask God to show you today if you are guilty of any 'small' sins, remembering his word: 'If we claim to be without sin, we deceive ourselves and the truth is not in us. If we confess our sins, he is faithful and just and will forgive us our sins and purify us from all unrighteousness.' (1 John 1:8, 9)

BIBLE STUDY 6

Pest control: control and protection

In this PILLARS Guide we look at some ways to stop insects living and spreading in the grain store (G6–8). Similarly, we are told to protect ourselves against sin and stop it spreading further in our own lives or into the lives of others.

Read Ephesians 6:13-18 – This passage tells us of a protective coating of armour that we can use against the devil's schemes.

- How do the following things protect you?
 - The belt of truth: verse 14
 - The breastplate of righteousness: verse 14

- The readiness that comes from the gospel of peace: verse 15
 - The shield of faith: verse 16
 - The helmet of salvation: verse 17
 - The sword of the Spirit, which is the Word of God: verse 17
 - Prayer: verse 18
- How are we encouraged to keep our minds free of sin? (Philippians 4:8 and Colossians 3:1-3)
 - What else are we told to do in James 4:7? What does this mean in practice?
- Finally, we have a great helper to aid us – the Holy Spirit (Ephesians 5:18; Galatians 5:16).
- What fruits does he produce in us? Galatians 5:22-23

BIBLE STUDY 7

Pest control: cleansing and forgiveness

On sheet G10 (p22) we learn about the need to clean out stores thoroughly before refilling them and that we should carry out regular inspections and take immediate action if damage is seen.

The Bible tells us that ‘all have sinned and fall short of the glory of God’, (Romans 3:23) and that if we claim to be without sin we are lying (1 John 1:8-10). We all need to be made clean.

Read John 13:2-11 – Here we read about Jesus washing the disciples’ feet. God is the one who makes us clean and forgives us (Isaiah 53:4-6; Ezekiel 36:25; Ephesians 1:7; 5:25-26) through the sacrifice of Christ on the cross, when he shed his blood for us.

We receive that forgiveness by confessing what we have done wrong in our lives and believing in God’s power to make us clean (Psalm 51:4, 7; Acts 2:38).

- Why does Peter refuse to let Jesus wash his feet (verse 8)?
- What is Jesus’ answer (verse 8)?
- How does Peter then respond? What is he really saying (verse 9)?
- What reassurance does Jesus give him (verse 10 – compare with 1 Corinthians 6:11)?

Those who have turned away from doing wrong and who come to Christ can receive his forgiveness and then their whole body is clean. But our feet still get dirty and need washing: we need to examine ourselves regularly and confess our sins to each other and to God so that we keep clean (James 5:16).

BIBLE STUDY 8

Pest control: filling with the Holy Spirit

Once the store is cleaned it is ready to be filled with new grain. In the same way, once we are cleaned, God can fill us with his Spirit (Matthew 3:11; Acts 2:1-4, 38; Acts 10:44-46).

■ The Holy Spirit brings:

- entry into the kingdom of God (John 3:5-6)
- eternal life (John 4:14; 6:63)
- power and ability to witness (Acts 1:8) and proclaim God's word (Acts 4:31)
- wisdom and revelation (1 Corinthians 2:9-10)
- counsel – teaching us all things and reminding us of Christ's words (John 14:26)
- truth (John 14:17)
- his fruits (Galatians 5:22)
- gifts to use for the common good (1 Corinthians 12:7-11)
- unity (Ephesians 4:3).

The Bible tells us that the Spirit will come and live in us (Luke 11:9-13; John 14:15-18).

■ What do these two passages suggest we need to do in order to receive the Holy Spirit?

Paul asks the Corinthians: 'Don't you know that you yourselves are God's temple and that God's Spirit lives in you?' (1 Corinthians 3:16)

■ Does he live in you?

BIBLE STUDY 9

Living in obedience: doing what is right

■ Read Deuteronomy 28:1-14. These verses tell us that if we obey God and follow carefully all his commands we will be blessed:

- wherever we live (verse 3)
- with children (verse 4, 11)
- with crops (verse 4, 11) and in their storage (verse 8)
- with livestock (verse 4, 11)
- in our journeys and travel (verse 6)
- with the defeat of our enemies (verse 7, 13)
- with rain (verse 12)
- and in all we do (verse 8, 12).

Proverbs 3:9-10 also tells us that if we honour the Lord with our wealth and the first fruits of all our crops, then our barns will be full.

We read in Luke 12:31; Matthew 6:33 and Philippians 4:19 that God promises to supply our needs. However, the Bible also warns us that we will forfeit these blessings of his provision if we do not obey him.

We read in Deuteronomy 28:15-24 that if we do not obey God we will be cursed. He will send us confusion and troubles in everything we do, until we are destroyed (verse 20). Choosing to obey or disobey God can have far-reaching consequences.

- Why do you think that whether or not we obey God can have such an impact on our lives?
- How can we know what God is telling us to do?
- Are you doing what is right?

BIBLE STUDY 10

Treasures in heaven

Read Matthew 6:19-24 and 1 Timothy 6:6-10. Jesus himself tells us that rather than storing up treasures on earth, we should store up treasures in heaven:

- What happens to earthly treasures? (Matthew 6:20; 1 Timothy 6:7)
- What is the danger for those who are wealthy? (Matthew 6:24; 1 Timothy 6:9, 10, 17)

In Matthew 19:16-22, Jesus is asked by a rich man what he must do to get eternal life.

- The rich man is keeping all the commandments, but what else does Jesus tell him to do in verse 21?

We are told the man goes away sad – it is hard for him to choose between his wealth and Jesus. Others, however, realise that nothing can be compared in value to the kingdom of heaven (Matthew 13:44-46).

Paul says in Philippians 4:12: 'I know what it is to be in need, and I know what it is to have plenty. I have learned the secret of being content in any and every situation, whether well fed or hungry, whether living in plenty or in want. I can do everything through him who gives me strength.'

And in Philippians 3:8: 'I consider everything a loss compared to the surpassing greatness of knowing Christ Jesus my Lord, for whose sake I have lost all things.'

- Where are you storing your treasures?

Notes

Notes

Improving food security

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