Solomon Islands

Kastom Gaden Association

Training Tools for

Pacific Island Communities

HOUSEHOLD GARDENING SKILLS

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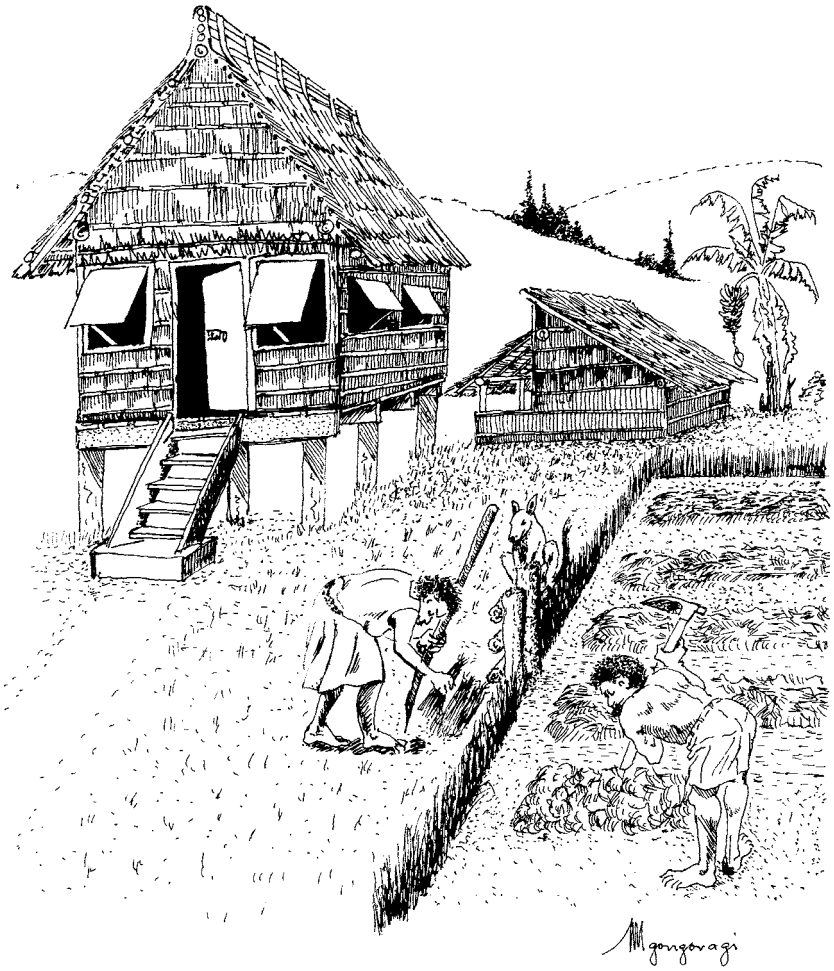
Russ Grayson + Tony Jansen

Training Tools for
Pacific Island Communities

Improved Household Gardening Skills



Kastom Gaden Association
SOLOMON ISLANDS

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Improved Household Gardening Skills

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Words from a wise gardener...

"Something must be done to save... agriculture in general, especially community and family gardening.

The answer lies in our knowledge of the situation, willingness to learn, kindness to act and simplicity to live with nature in a God-given natural world.

What this means is that we must come to work with the natural world and be part of it.

This way of life starts in the garden, where we grow food and tend the soil that sustains us".

Joini Tutua, Zai and Tina Organic Farm, Honiara/deputy premier Choiseul Province, Solomon Islands

Contents

Preface

This book has been written for community extension workers, government field officers and non-government organisations.

Production of the *Improved Household Gardening Skills* manual has been made possible through funding from APACE (Appropriate Technology for Community and Environment), an Australian non-government organisation which, after 20 years of involvement in the Solomon Islands and other South Pacific islands, ceased operations in 2002.

The manual describes how old and new techniques can be combined to provide Pacific island communities with an ecologically sustainable approach to subsistence home gardening. The techniques can also be used to grow crops for sale at markets.

The authors of the manual all have experience in growing crops using organic methods and of teaching the methods.

As well as work with the Kastom Gaden Association training program, members of the team based in the Solomon Islands have also worked with the Solomon Islands Planting Material Network. The Network is a seed exchange which produces and distributes seeds to Solomon Island farmers.

Cooperation between the Solomon Island staff and organisations such as APACE, the Seed Savers Network, Pacific Edge and other organisations and individuals based in Australia have made the Kastom Garden Program and its successor, the Kastom Gaden Association, an example of a successful regional development program. The program shows that small non-government organisations and individuals can make a difference.

...the authors

Note on terms

The terms **farming**, **gardening** and **home gardening** are used interchangeably in this manual.

All of the terms refer to the management of subsistence food gardens (sometimes referred to as **gardens**, **home gardens** or **farms**). The gardens or small farms are traditionally located in the bush surrounding permanent villages in the Pacific Islands.

The term **sup sup garden** refers to a small, family managed food production garden within the village boundaries, usually near the home, or on the edge of the village.

Tony Jansen

Improved Household Gardening Skills Manual—background:

This section provides an introduction to the importance of village food production in the South Pacific

- Background:
  - Village agriculture—an activity important to health
  - The importance of the home food garden
- The Improved Household Gardening Skills manual:
  - purpose
  - structure
  - innovative approaches
- Planning the training program:

Background

Village agriculture—an activity important to health

Subsistence gardening sustains the nutritional health of people throughout the South Pacific. Small scale cash cropping produces income for village gardeners who are able to produce extra crops for sale at local markets.

Gardening is mainly an activity of village women. In Melanesia, slash and burn, also known as swidden cultivation, remains the main type of gardening practiced by rural communities.

Food from many sources

Food production at the village level involves complex decisions about the use of resources in the local environment.

A range of foods are derived from the ecosystems that make up the environment of a village:

- bush gardens—where root crops, grains and vegetables are produced
- swamps—foods such as the giant swamp taro, which is several times the size of commonly used taro varieties, grows in swamps
- mangroves—mangrove seeds are cooked and eaten in Melanesia
- forests—provide a source of bush food, medicines, building materials and fibre and are cleared for swidden gardens
- nut groves—a variety of nuts are found throughout the South Pacific; the narli nut and cut nut are found in the Solomon Islands and varieties are used as food in PNG
- rivers
- marine environments such as beaches, lagoons and the deep sea provide the fish that brings protein to village diets
- the immediate village environment where nuts, fruit and other foods are often planted.

Gardening important to all

Village agriculture is important to people living in towns and cities.

The fresh food sold in town markets in the South Pacific comes mainly from farmers in the nearby countryside.

The farming techniques taught by Kastom Gaden Association (KGA) trainers are also useful for people who want to grow food in towns.

Influences on village food production

In the South Pacific, gardening for food production is influenced by:

- objective factors such as:
  - soil type and quality
  - the availability of seed and planting material
  - farmer knowledge and motivation
  - seasonal planting practices
- cultural factors such as:
  - land ownership
  - landuse traditions
  - the choice of crops
  - availability of time and labour
  - family and community responsibilities.

The importance of the home food garden

In the Pacific Islands, a well managed home garden can produce a year-round supply of nutritious food.

Combined with protein foods such as fish, the home garden can be a source of improved nutritional health for the whole family. If chickens are kept, they can provide additional protein food such as eggs and meat.

The improved home garden

The innovative home (or bush) gardener can add value to their garden and reduce the amount of food they buy through:

- collecting, drying and saving their own seed for replanting
- exchanging seeds with other gardeners
- making a nursery where they can grow new plants
- setting aside space in the garden where they can experiment with new ideas
- growing fruit trees
- making a small, fenced vegetable garden close to the house
- keeping chickens for eggs and meat in a simple pen made from bush materials.

Trainers working for government and non-government organisations can introduce these value-adding activities once training program participants have acquired the improved gardening skills described in this manual.

Small nutrition gardens

In some Pacific Islands, the idea of making small nutrition gardens in the village, close to the house, is becoming popular. On some islands, these are known as sup-sup gardens, so named because the vegetables can be cooked in a pot to make 'soup'.

The thinking behind sup-sup gardens is that, with the garden in easy reach of the house, vegetable crops will be used more frequently.

Combined with fish and staple root crops such as sweet potato, taro, cassava and yam, or combined with rice, nutritionally balanced meals are more likely to be prepared. Rice is bought from the trade store, however innovative farmers are now experimenting with the growing of upland (dry) rice.

In the Solomon Islands and Bougainville, Kastom Gaden Association trainers encourage the making of sup-sup gardens.

The home food garden is important to the production of a range of vegetable foods for Pacific Island families.

Increasing the productivity of home gardens without exhausting the soil, security of access to seeds and the saving and exchange of seeds are important for communities with a limited a supply of land to meet the challenges of a growing population.

Home sup-sup gardens promote a balanced diet

Traditional bush gardens are located at varying distances from the village and are managed by rotational fallow.

The gardens are cropped for perhaps a couple years, then left in fallow to recover their fertility for between one and twenty years. The villages are permanent and the bush gardens are cleared in the land surrounding the villages.

Most farmers visit their bush gardens only two or three times a week, depending on what stage of the cropping cycle they are at.

The root crops grown in the bush gardens—the crops that form the dietary staple of Solomon Islanders and other Pacific peoples—can be stored for a few weeks. Leafy greens and fruiting vegetables perish within one to three days.

It is for this reason that the growing of leafy greens and other vegetables in the home sup-sup garden, close to the house, is encouraged by Kastom Gaden Association trainers. Close to the house, the gardens can be harvested each day as needed.

Bush gardens produce a diversity of plants, including the staple root crops

Making a sup-sup garden requires skills

To make a successful and durable sup-sup garden, gardeners need to gain skills in:

- low cost fencing
- improvement and maintenance of soil fertility.

Nursery skills are useful for growing some vegetables, especially those started from small seeds. With these skills, villagers will be able to grow food close to the house. Without them, sup-sup gardens usually fail due to:

- the destruction of crops by domestic animals because of poor fence construction or no fencing at all
- garden abandonment because of poor soil fertility
- poor seedlings growth leading to poor harvests.

Bush gardens

The entire food needs of a family cannot be produced in a small sup-sup garden. Bush gardens will continue to play an important role in family nutrition.

It is in the bush garden that staple foods will continue to be produced—foods such as:

- taro
- sweet potato
- yam
- cassava.

Training village farmers in ecologically sustainable farming practices will help maintain the viability of bush gardens.

These practices include:

- the use of mulch to maintain soil fertility and to prevent soils drying out
- the prevention of soil erosion
- understanding the soil building process.

Two types of Pacific island garden...

The bush garden, supplemented by fishing and to a lesser extent by hunting, is the traditional source of sustenance for Pacific island rural communities.

In the Solomon Islands, bush gardens are sometimes made on steep land and may be some distance from the village.

The small nutrition garden near the dwelling in the village is comparatively rare in the Solomon Islands.

Because such gardens make the picking of a range of vegetables for a mixed family meal easy, they are promoted by KGA field staff.

Improved Household Gardening Skills manual

Purpose

The purpose of this manual is to assist agricultural extension workers from both government and non-government organisations to introduce methods of ecologically sustainable agriculture to Pacific Island communities.

The contents of the manual have been gleaned from the experience of the Kastom Garden Program (KGP) and the work of its successor, the Kastom Gaden Association (KGA), which have operated in the Solomon Islands since 1995. All of the methods described have been tested in the field by KGA staff.

Structure

The *Improved Household Gardening Skills* manual consists of three sections—a guide to assist trainers in their work, outlines of the training sessions including student handouts and attachments consisting of graphics for photocopying and enlarging for use as flip charts.

Introduction

This section provides an introduction to the manual, notes on the KGP approach to the planning of training programs and background reading on the importance to health of village-based food production.

Guide for trainers:

This section is about the training process and preparation for training:

1. Planning the workshop
2. Introductory session
3. Participants define expectations.

Trainers planning workshop sessions

Training session outline:

This section of the *Improved Household Gardening Skills* manual you will find lesson outlines that will assist you to organise workshops.

It will also help you to teach the skills of improved gardening and how to make and/or use:

4. Living and non-living fences
5. Basket gardens
6. Table gardens
7. Mulch gardens
8. Open air nursery
9. Using legumes
10. Safe management of garden pests
11. Keeping chickens
12. Nutrition and local food
13. Community food security assessment.

Attachments (flip chart graphics):

1. Living and non-living fences:
2. Basket gardens
3. Table gardens
4. Using mulch
5. Making a nursery
6. Legumes
7. Safe pest management
8. Keeping chickens
9. Nutrition and local food.

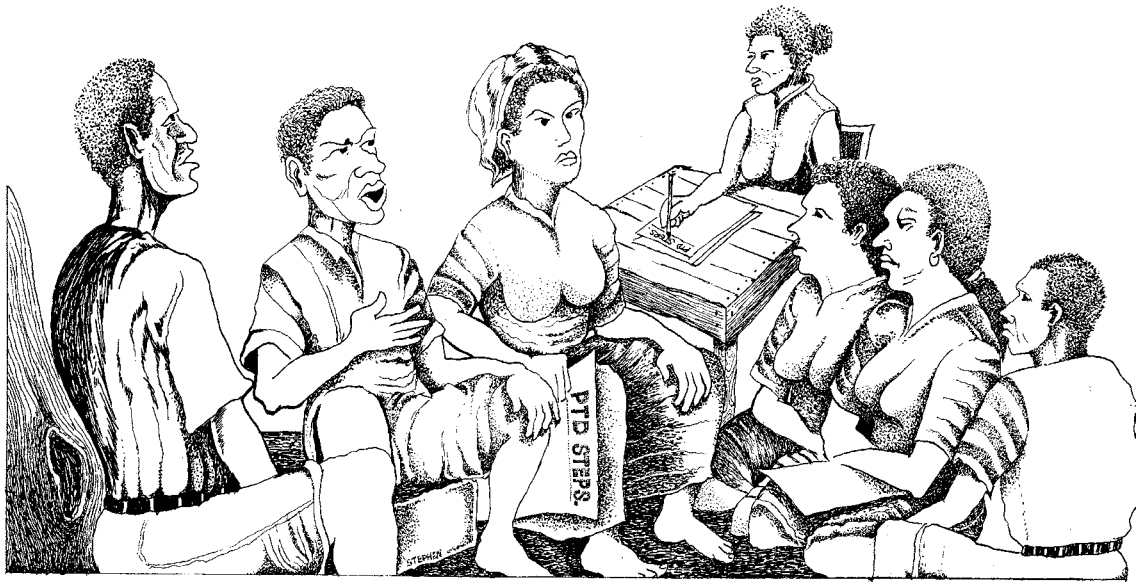
Innovative approaches

In the training of village farmers and community groups, the KGP and, since 2001, the KGA have made use of a variety of approaches. These include:

- Participatory Rural Appraisal (PRA)
- Participatory Technology Development with farmers (PTD)
- community food security assessment.

The methods featured in the manual are drawn from the practice of low-external-input sustainable agriculture which encourages farmer and regional self-reliance through:

- substitution of externally sourced agricultural inputs by locally produced inputs, as far as practical
- farmer innovation
- the use of relevant traditional knowledge.



Planning the training program

The Participatory Technology Development (PTD) methodology we use was modelled on the experience of farmer groups in Africa and other countries.

It has been reported in the reference journal *LEISA* (*Low External Input Sustainable Agriculture*) and in the book *Developing Technology With Farmers—A Trainer's Guide for Participatory Learning* (1997; van Veldhuizen and others; ETC Netherlands: Zed Books, London).

1. Preliminary workshop

The first stage in our approach to agricultural training is the community food security assessment.

Because this is an involved process, we might hold an **introductory workshop in gardening skills,** such as making a sup sup garden, with the farmers. The purpose of this workshop is to allow the farmers to:

- get to know the trainers
- gain some idea of the skills they can learn through the training program.

The workshop also allows the trainers to:

- get to know the farmers
- gain an idea of the food production situation in the village and the influences on it
- build a relationship with farmers.

Get to know our partners

During this stage, we get to know the farmers and other stakeholders involved.

These may include:

- community groups
- women's groups
- church organisations
- community leaders
- government personnel
- non-government organisations.

Our aim in doing this is to encourage stakeholders from the villages to tell us what they want to do and not what we want them to do.

Discovering problems and solutions

After getting to know the groups we can work with, we learn from them about agricultural problems in their communities.

After identifying the problems we investigate with those communities the potential solutions or alternatives to their situation.

All of this is done through the use of PRA processes such as focus group discussion, surveys, mapping and matrix scoring.

Kastom Garden Program regional coordinator, Roselyn Kabu (right) leads a process to collect information about crops grown at Takwa village, north Malaita Province, Solomon Islands

2. Community food security assessment

The process of agricultural improvement used by the KGA starts with the information gathering part—the **community food security assessment** (see workshop 13).

The assessment:

- identifies the needs of village farmers
- provides the basis for planning the training program.

3. Planning the training workshops

The next stage is to **plan the training program**. Here we plan the workshops through which the farmers will acquire skills.

Scheduling the workshops is done with the farmers so training does not conflict with times of intensified farming activity or cultural obligation.

4. Training program implementation and monitoring

Help farmers find solutions

To use the PTD process, we encourage farmers to try out some of the potential solutions and techniques in their fields.

We help farmers find solutions to their problems. We don't come up with the answers ourselves, instead we try to help farmers solve their own problems or find alternatives.

Farmer field trials

The farmer field trials allow farmers to assess potential solutions for themselves. On the basis of their experience during the field trials, they can decide for themselves whether they want to adopt the techniques and new ideas in their own gardens.

The farmer field trials can continue for some time. When the trainers return for follow-up visits, they organise a tour of the farmer field trials so the group learns how the trials went, what problems were encountered and what solutions were tried.

Innovative farmers are encouraged to discover their own solutions and then share their experience with others.

Monitor progress

While the program of workshops and field visits are being implemented, we **monitor** them so we gain some idea of how they are progressing and if there is a need to modify the program.

If necessary, the program can be evaluated after it has ended so we can improve on our work in future.

5. Sharing results

After all of the trials have been concluded, we organise workshops for the farmers where they share their findings. This way, we develop a group conclusion to the experimentation and assessment.

A series of workshops can be held in the local language and we can ask some of the experienced, innovative farmers to become involved in facilitation and to share their knowledge.

Farmers are encouraged to talk about their experiences with other farmers.

Sustaining innovation

Led by the innovative farmers and promising future leaders, the PTD process can be expanded into other villages. This is done through farmer tours and exchanges where groups of farmers visit each other's gardens to see the innovations being made there.

In this way, an expanding network is developed. This leads to the spread of innovation because the farmers become empowered to analyse, understand and find their own solutions to their own problems.

Participatory Technology Development (PTD) in agriculture is a process of interaction between local people and outside facilitators to develop more sustainable farming systems.

It starts with a joint analysis of the situation, an activity commonly know as PRA (Participatory Rural Appraisal). It continues by including participatory planning, implementation, monitoring and evaluation of local development activities.

The heart of PTD is experimentation with new ideas designed and conducted by farmers with the encouragement of PTD practitioners.

***...Developing Technology with Farmers*; Zed Books, London**

PTD approach to field assessment and training

identify project stakeholders who will be involved

↓

identify agricultural problems

↓

identify solutions through field trials

↓

share knowledge of successful field trials

Guide for trainers:

This section is about the training process and preparation for training.

1. Planning the workshops
2. Introductory session
3. Participants define expectations

1. Planning the workshops

Training should be practical

Kastom Gaden Association trainers have developed a three stage training approach that emphasises practical activities:

- talk about it—explain the technique and the benefits of using it
- see it—demonstrate the technique or skill so the trainees see it being done
- do it—assist the trainees to acquire the technique by doing it for themselves, under the supervision of the trainer.

Explaining and demonstrating a technique helps participants in workshops comprehend it and how it fits into the farming cycle. Then, when they practice what has been explained and demonstrated, they acquire the skills to make use of the technique in their own gardens.

Organising training sessions

A well planned training session is more likely to be successful, but no matter how well a training session is planned there are times when you will have to change from your plan to compensate for something unexpected. Your planning should allow for this flexibility.

Here are some things to think about in planning your training session...

List the key areas

Make a list of the key areas you want to cover.

How are they relevant to the people who will attend the training session?

Choose your outcomes

Work out the outcomes you want from the session. What will students be able to do at the end of the session?

Knowing the outcomes you want brings focus to your training and helps you decide what to include and what to leave out.

Keeping to the teaching principle of providing information in small, easy-to-comprehend blocks helps achieve our learning outcomes.

Achieving your outcomes

How will you achieve your learning outcomes?

Through:

- presentation of information
- games
- small group activity
- garden visits
- practicals
- some other technique.

How will you present the information and build on each step? You can use demonstration, practice and analysis of what has been taught.

Time your activities

When you have chosen the activities that will make up your training session, give them an estimated timing.

Try to keep as close as possible to this timing so your training session does not run overtime.

If you run overtime you might have to leave something else out later.

Summary and closing

At the end of each part of your training session, summarise the main points of what you have taught to help participants remember them.

When the session finishes for the day, summarise the main points of what you have covered over the whole day.

Use questioning to help the participants feed back what they remember—ask them what they remember about what was covered.

This is an important part of the day's training, so allow enough time to do it. Then, if training is to continue the next day, briefly preview that day's material.

After the first day, it is a good idea to do some revision exercises each morning. This refreshes people's memory of what was covered the day before.

Watch participant energy and motivation

To keep students interested and to maintain their energy, plan to use a variety of teaching methods such as:

- **presentations** with flip charts on brown paper (using diagrams and pictures as well as written words where literacy skills are low)
- **participatory activities** such as making maps and tables of information on the ground
- **questioning** to engage the participants in thinking and sharing their ideas and knowledge
- **role play** to illustrate an important point
- **site visits** to see and explain something and to learn about other people's experience
- **small group activities** in which the participants are divided into groups to work on something, then share their findings when the group comes back together
- **practicals**: always apply all of the methods you have talked about or explored; if people then go and practice the methods they are more likely to use them in their own gardens.

Throughout the session, monitor participant energy levels and, if they are becoming tired, change to a more participatory and active mode of teaching.

Plan breaks to divide up the day.

Whenever the group appears tired you can choose an 'energiser' activity that involves movement.

Prepare materials

Obtain and prepare any materials **before the training session**.

Flip charts should be drawn up after the lesson has been planned but before it starts and other materials gathered. Take extra flip chart paper and marker pens for participants to use.

When a person is facilitating a session, the other trainers should assist in preparing materials for the following session.

Meet to assess activities

The facilitation team should **meet in the evening** after the day's activities or in the morning before activities start to monitor how the training is going.

This is the time to allocate responsibilities for the next sessions and to ensure that materials are ready.

Sample training timetable

Following is a sample training timetable for a day.

The timetable you draw up will take into account:

- the time available to participants
- their other daily responsibilities such as family meal preparation, social activities and work commitments.

8.00am:	group introductions—who people are and what they hope to get from the day + introduction of the learning objectives
8.30am:	group activity, information collection, needs identification, problem identification etc + report back to main group
9.00am:	demonstration of some part of the training
10.30am:	break
11.00am:	presentation
12–1.30pm:	lunch break
1.30–2.30pm:	field visit or practical
3–3.30pm:	discussion about what was seen during field visit or learned during the practical
3.30pm:	summary of key points covered during the day
4pm:	conclusion; ask each person to tell the group one thing they have learned during the day.

The trainer

Trainers are very special people because they:

- are motivated to help others achieve their basic needs
- have enthusiasm for their work
- are patient
- continually seek out new information to pass onto participants in their programs—they are continually learning
- have an extensive knowledge of what they teach
- are good communicators, passing on knowledge in easy-to-manage pieces and in language that participants can understand easily
- are problem solvers
- practice what they teach and experiment with new ideas in their own gardens
- learn from the participants in their workshops
- seek feedback about their teaching from staff members, program participants and colleagues
- understand the limitations and opportunities of village life
- are good organisers of people, events and resources
- have a warm and friendly personality to create a relaxed learning environment
- network with their colleagues and contacts
- have skills in working with and organising people and have good group dynamics skills
- have skills in conflict resolution.

Checklist for trainers

Organising the training

- what negotiations/ arrangements are necessary with village decision makers to organise the training?
- will a translator be needed to translate into local language?
- has an appropriate time been chosen for the training—is the time free of work or cultural obligations?
- has an appropriately sized training venue been organised and has workshop space been selected?
- is it necessary to plan follow-up workshops?
- has a place been chosen to make a sup-sup garden?
- who will look after the garden following the workshop?

Planning the training

- how many participants are expected and who are they?
- what seating arrangements would be suitable?
- has time been allocated for the different sessions and workshops?
- have resources been gathered for each session or workshop? (flip charts/ blackboard/ colour marker pens/ string/ materials for PRA and practical sessions)
- what do you know about the food/ nutrition/ health and other circumstances of the community?
- what process will be used—small group activities/ lecturing/ case studies/ brainstorming/ role play/ garden visits/ practical workshop in the garden?
- what are the key issues to address?
- how will the material be brought together in a summary?
- who will make a written record of the workshop if needed?
- who will produce a written report?
- what are the key questions to ask to find out if the participants have understood the material?
- how will you obtain participant feedback?
- how will you identify your own learnings from the training?
- how will you make sure that women are free to express themselves and fully participate?
- who are the local experts or innovative farmers who will be resource people during the workshop and whose gardens can be used for visits?

Logistics

- what garden sites are available for field visits and workshops?
- what are the food arrangements for participants?
- are you using local food for catering?
- what are the arrangements for field worker accommodation and food if staying in the village?
- what transport arrangement are necessary?

2. Introductory session

Outcome

At the end of this session, workshop participants will have been introduced to each other and to the facilitators.

Key messages

Participants work together better when they know each other.

Approach

After the official opening, participants introduce themselves.

Facilitators introduce themselves after the participants.

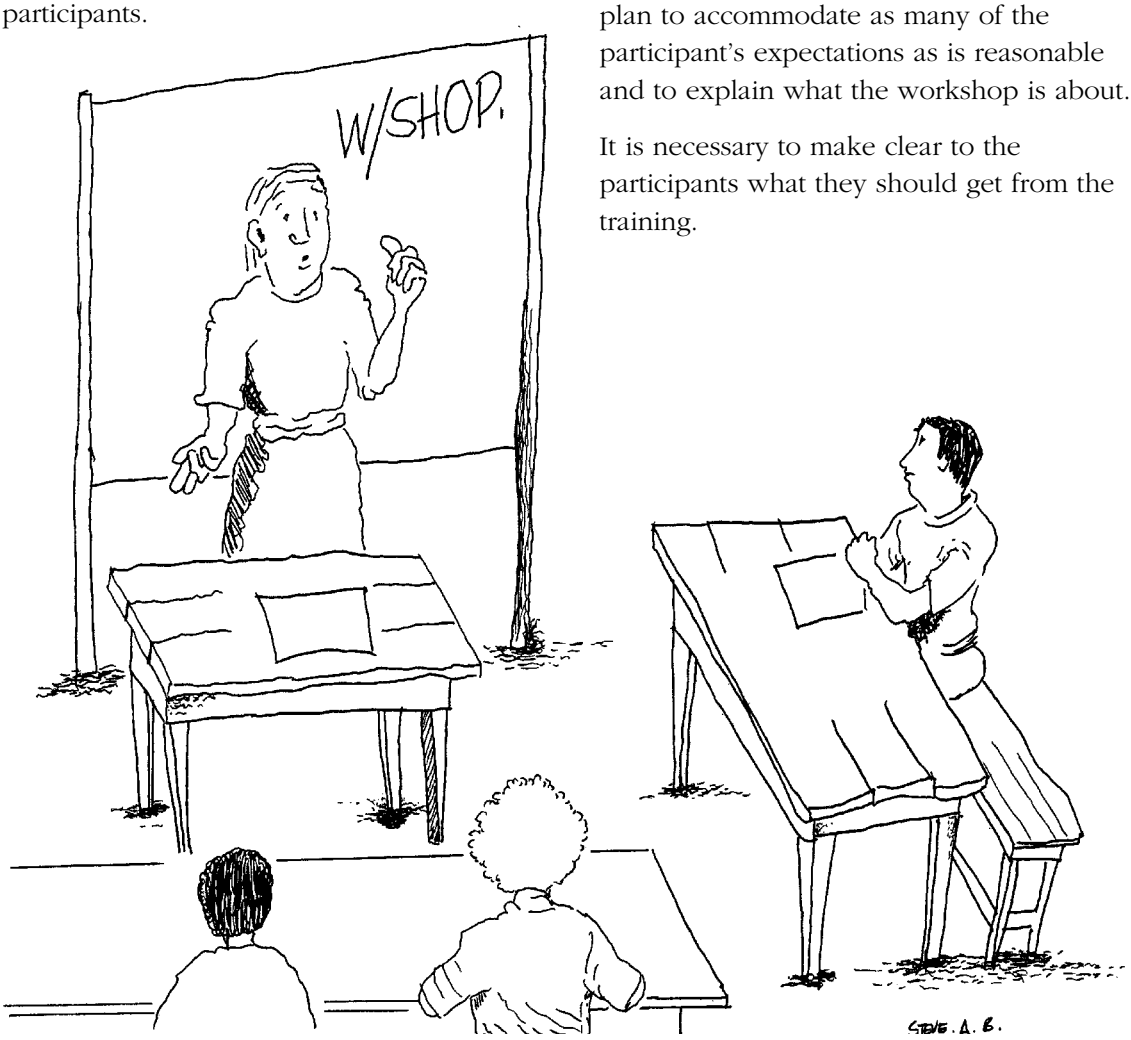
Procedure

1. **Break the group** into pairs
2. **The pairs** get to know each other—10 minutes
3. **Each person introduces** their partner and what they learned during the getting-to-know period.

The first day of a training workshop is a time when participants get to know each other (if they do not do so already) and the trainers and to clarify what they hope to get from the training.

For the trainer, it is a time to listen carefully, plan to accommodate as many of the participant's expectations as is reasonable and to explain what the workshop is about.

It is necessary to make clear to the participants what they should get from the training.



3. Participants define expectations

Outcome

At the end of this session, workshop participants will have made a list of their expectations for the workshops.

Key messages

Participant expectations are most likely to be met when they have been clarified and explained.

Approach

Participants identify, clarify and discuss their expectations of the workshop.

Procedure

1. **Facilitator explains** to participants that:
   - the workshop will be adjusted to accommodate as many of their expectations as possible within time and resource limits
   - it may not be possible to cover some expectations in the workshop
2. **Hand out three to five cards** to each participant and asks them to write or draw a picture of one of their expectations on each card
3. **Participants explain** the expectations on their cards to the group
4. **Facilitator sticks cards on a board**, trying to group them according to common expectations
5. **Facilitator summarises** the expectations presented
6. **The workshop then takes a break**. During the break the facilitators:
   - select the groups of expectations they can cover in the workshop
   - allocate time to each on a workshop timetable; any remaining time is used to cover standard improved household gardening topics
   - each group of expectations is assigned to a separate day.

Training session outline:

This section contains lesson outlines to assist you to organise workshops in:

4. Living fences
5. Basket gardens
6. Table gardens
7. Mulched gardens
8. Open air nursery
9. Using legumes
10. Safe management of garden pests
11. Keeping chickens
12. Nutrition and local food
13. Community food security assessment

4. Living fences

Outcomes

By the end of this session participants will be able to make a living fence to keep chickens and pigs out of their sup-sup garden.

Key messages

- animals can damage your garden
- a living fence keeps animals such as chickens, pigs and dogs out of your garden
- a living fence should be made so that it does not need much maintenance
- a living fence can be used for food and to produce mulch.

Approach

...discuss

- the benefits of making a living fence around the garden
- the best plants to use to make a living fence.

...practice

- take participants through the building of a living fence around a small garden.

Materials

...for discussion

- flip chart showing examples of living fences—see Attachment 1, Living and non-living fences flip charts graphics:
  a) Living fence of pineapple
  b) Living fence of Gliricidia trees and bamboo
  c) Living fence of vetiver grass
  d) Big bush garden divided by living fences
  e) Non-living fence of old fishing net and posts
  f) Non-living fence of logs

...for building a living fence

- seedlings or cuttings of plants suitable to use for a living fence
- hoe or digging stick for planting seedlings
- water for seedlings after planting.

...for making a gate

- strong sticks from bush to make a gate in the living fence
- bush rope to make gate.

A living fence of hibiscus encloses a garden planted to shallots.
Malaita Province, Solomon Islands.

Procedure

The trainer introduces the subject and explains the objectives of the session—5–10 minutes.

Stage 1

Explain why making a living fence is useful in protecting our gardens from animals:

- animals can damage our gardens and eat the food growing in them
- it is best to plant the living fence before planting vegetables.

Stage 2

Show what a living fence looks like.

- show flip chart graphics of living fences in attachment 1.

See Attachment 1 for flip-chart graphics that can be used in this stage:

1. Living and non-living fences flip charts graphics:
   a) Living fence of pineapple
   b) Living fence of Gliricidia trees and bamboo
   c) Living fence of vetiver grass
   d) Big bush garden divided by living fences
   e) Non-living fence of old fishing net and posts
   f) Non-living fence of logs

Trainers should enlarge the illustrations onto A3 size paper, if available.

Pineapple interplanted with hibiscus as a living fence. The hibiscus grows into a taller barrier. The pineapple fills the spaces between the hibiscus shrubs.

An advantage of this type of living fence is that the pineapple plants produce edible fruit.

Notice the participants from Sasamunga village dancing and having fun during the practicals.

Stage 3

Make a living fence

1. If planting material is not available to make a living fence, break the workshop into smaller groups to forage for suitable planting materials.
2. Use sticks to mark out the garden; leave a space for a gate.
3. Plant out the living fence.
4. Build a simple gate strong enough to keep out animals but that is easy to use.
5. Walk around the living fence with the group to inspect it; look for weak points; if there are places where the plants have been planted too far apart, fill in the spaces with more plants.
6. Discuss the use of other materials to make a fence, such as old fishing net and chicken wire.

Living fences

A living fence is a low-cost way to keep animals out of the garden. It is a border around your garden.

The living fence should be made so that it lasts a long time. It should not need much maintenance.

Keeping out animals

A living fence can keep animals such as chickens, pigs and dogs out of your garden.

Animals can damage a garden and eat your crops.

Plants for living fences

These include:

- pineapple
- gliricidia
- vetiver grass
- tea grass (lemon grass)
- hibiscus.

Vetiver is probably the best plant to use to make a living fence because the leaves are stiff and upright. The clumps of vetiver grass can be planted close together to form a dense barrier around the garden and will live for a long time.

How to make a living fence

1. Collect seedlings to make the fence from
2. Plant with equal spacing but close enough to form a solid barrier when fully grown; how close plants are planted depends on how they grow; vetiver and tea grass can be planted close and larger plants spaced further apart; larger plants might need vetiver or tea grass planted between them to form a dense barrier.
3. Water the plants regularly while they are growing.
4. Plant more plants where there is too big a gap between them.
5. Replace any plants that do not grow.

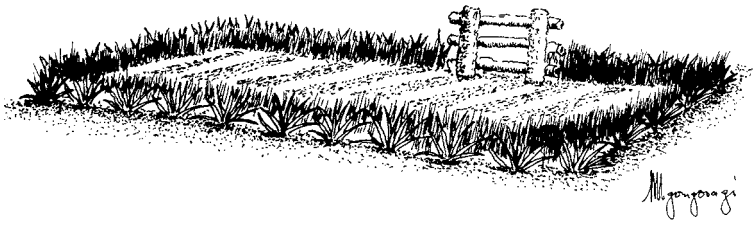
Some types of living fences:

Living fence of pineapple

The pineapple plants are placed close together so that their leaves touch when they have grown and they form a barrier.

Inside you plant vetiver grass close together to keep chickens from flying over the pineapples.

A gate has been built to provide easy access for people.



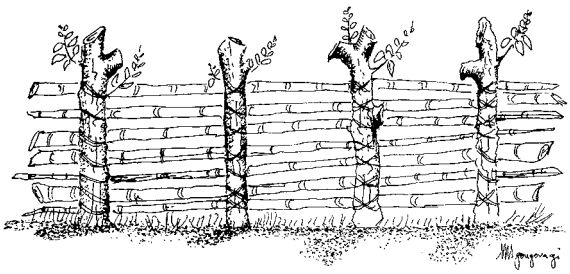
Gliricidia and bamboo fence

Large cuttings of Gliricidia trees are planted as posts.

Bamboo poles are cut and tied to the Gliricidia posts.

The bamboo poles are tied close together to stop chickens and dogs climbing between them and getting into the garden.

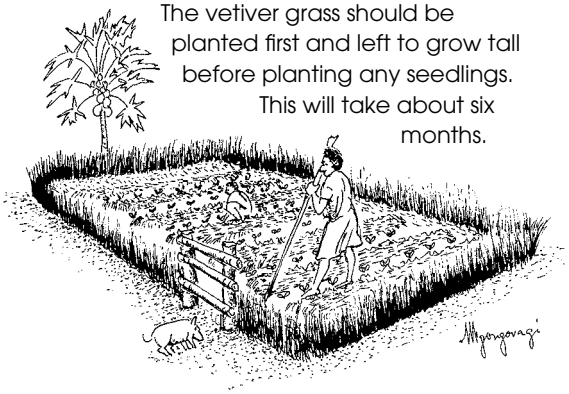
Slash the regrowth to stop the Gliricidia shading the garden. Use the foliage as mulch on the garden to improve the soil.



Living fence of vetiver grass

Vetiver grass is a stiff clumping grass which is planted close together to make a living fence.

Vetiver grass makes one of the most successful of living fences.

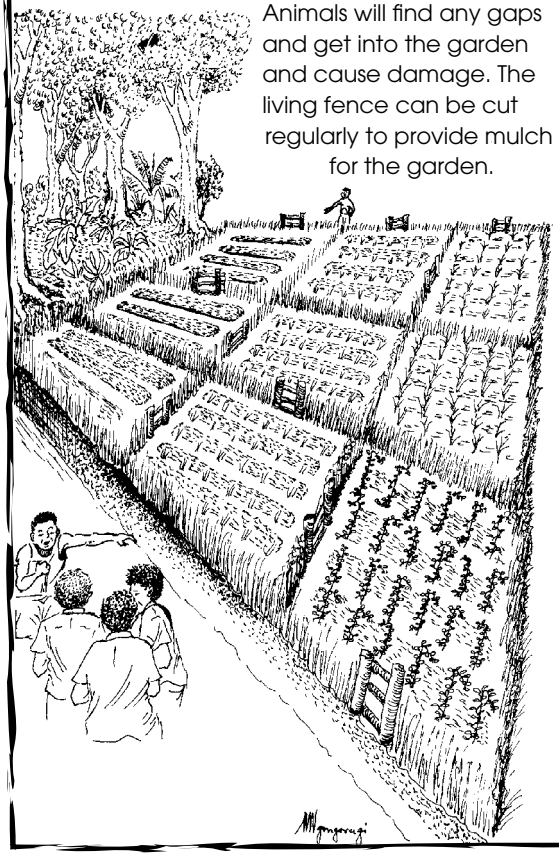


The vetiver grass should be planted first and left to grow tall before planting any seedlings. This will take about six months.

Big bush garden divided by living fences

A large garden can be divided into smaller gardens by living fences. Gates are made to allow the gardeners to move between the separate gardens. Different crops are grown in the smaller gardens.

The plants in the living fence must be planted close enough to grow into a thick barrier. Animals will find any gaps and get into the garden and cause damage. The living fence can be cut regularly to provide mulch for the garden.



Non-living fences

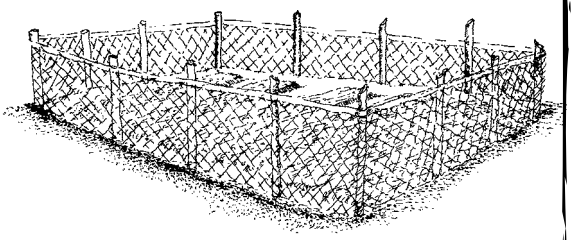
Non-living fences can be made from many materials.

A disadvantage of non-living fences is that they need more maintenance than a living fence. Non-living fences may rot quickly in hot, wet climates. They will need rebuilding.

Non-living fences must be made of strong materials and must be well built.

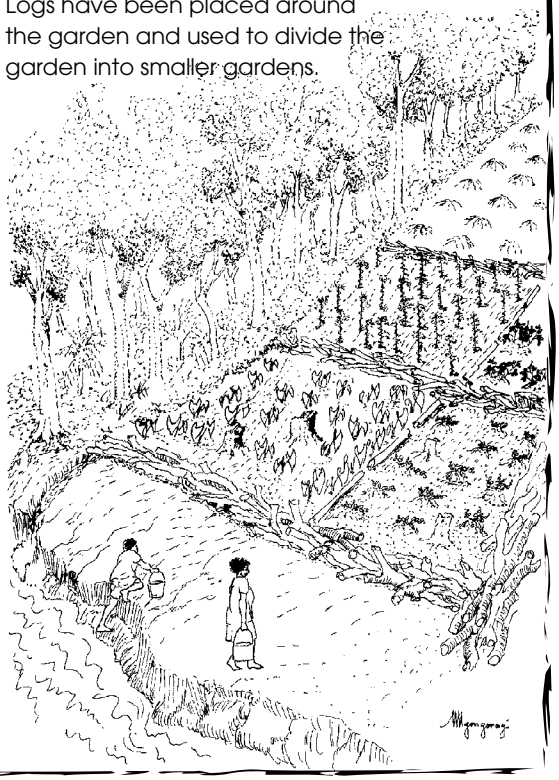
Non-living fence of old fishing net and posts

To make a non-living fence of old fishing net stretched between posts, pull the net tight and tie it to the posts with rope. Any holes in the net must be sewn closed to stop animals getting into the garden.



Non-living fence of logs

Logs have been placed around the garden and used to divide the garden into smaller gardens.



5. Basket gardens

Outcomes

By the end of this session participants will be able to make a compost 'basket' garden.

Key messages

- a basket garden are less likely to be damaged by chickens, dogs and pigs
- the use of organic matter is necessary to feed the soil.

Approach

...discuss

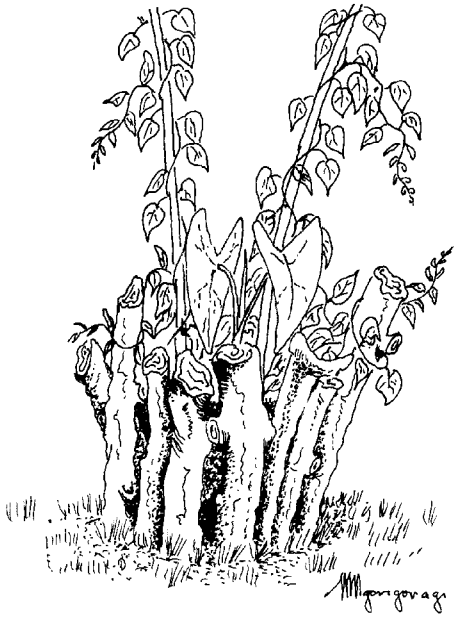
- advantages of using basket gardens.

...demonstrate

- take participants through the building of a basket garden.

...practice

- make compost baskets in each corner of the sup-sup garden.



Making a basket garden from bamboo, banana leaf and organic matter

Materials

...discussion

- flip chart graphic (see Attachment 2)

...demonstration

- bamboo
- dry banana leaves
- organic matter of different types
- soil
- seeds
- timber and nails.

Procedure

The trainer introduces the subject and explains the objectives of the session—5–10 minutes.

Stage 1: Description

1. Describe what a basket garden is (see Attachment 2).
2. Group discusses what the advantages might be of having basket gardens near their house.

Workshop participants making a basket garden

Stage 2: Making basket gardens

1. Demonstrate the building of a basket garden.
2. Break into groups to collect different materials:
   - bamboo
   - plenty of dry banana leaves
   - different types of rotting organic matter
   - soil—black and rich in organic matter if possible.
3. Break into four groups. Each group makes a compost basket in a corner of the sup-sup garden.
   - cut the bamboo into narrow stakes about 1-1.5 meters long
   - push the bamboo stakes into the ground in a circle 50-100 centimetres wide
   - weave the dry banana leaves in and out between the bamboo stakes; keep weaving until the leaves are close to the top or at least 50cm high
   - place layers of organic matter, soil then more organic matter until the basket is close to full
   - plant seeds inside a final layer of soil; it is best to plant climbers such as beans, snake bean, yam or pana (a type of yam)
   - place a long stick or piece of bamboo with branches for the plant to climb.

A woman shows banana fibre pots she has made. The planting boxes are part of an open air nursery on the island of Wagina

6. Table gardens

Outcomes

By the end of this session participants will be able to make a table garden to produce food without damage from domestic animals.

Key messages

- a table garden is a popular way to grow some vegetables safe from animals
- the use of organic matter is necessary to feed the soil.

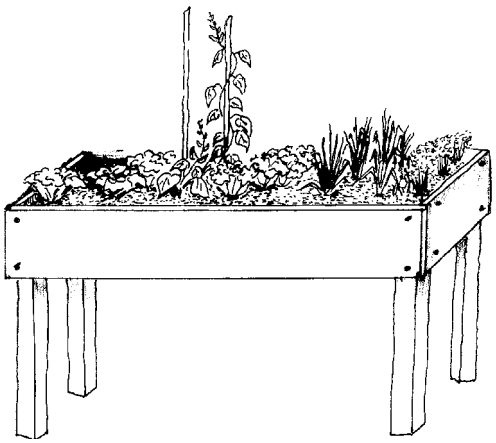
Approach

...discuss

- talk about some of the problems of sup sup and bush gardens
- discuss how table gardens are safe from chickens and dogs and how they are easy for older people to use
- look at flip chart graphic and discuss. (see Attachment 3).

...demonstrate

- guide participants through building a table garden.



...practice

This exercise can only be done if there is enough material available.

Materials

- collect timber 'flooring' and some posts
- rotted and fresh coconut husk
- soil—nutruent-rich if possible
- mulch—cut grass or similar
- seeds.

A raised garden bed out of reach of the chickens

Procedure

The trainer introduces the subject and explains the objectives of the session—5–10 minutes.

Stage 1: Description

1. Describe what a table garden is (see Attachment 3).
2. Group discusses what the advantages might be of having a table garden near their house.

Stage 2: Making a table garden

1. Using timber and posts collected, build a table the size of which will depend on timber available; ideally, the table should be 1.5 to 2 metres wide and 2 to 4 metres long.
2. Attach walling at least 20cm high to the sides of the table at the top.
3. Fill the inside of the walled area on top of the table with coconut husk; this can include grated fresh husk in a layer at the bottom then rotted husk on top.
4. Fill the rest of the box with good soil.
5. Place some light grass mulch on top of the soil.
6. Plant out—this type of garden is good for Chinese cabbage, shallots, pepper, tomato and other shallow rooted plants.

Training note

Both the basket garden and the table garden include the burying of organic matter under layers of soil.

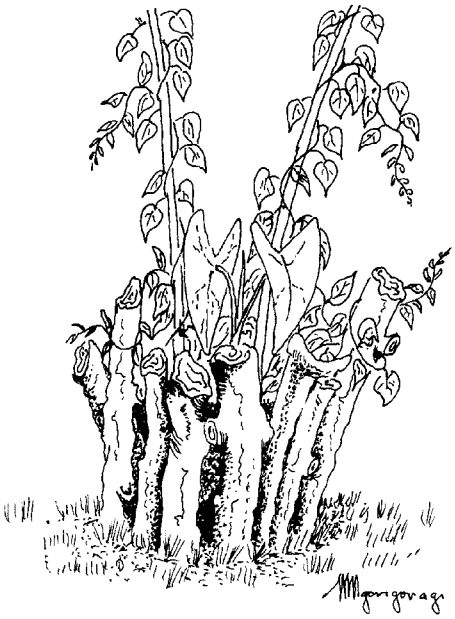
When you do that you should bury only organic matter that has started to rot.

An old canoe used to make a raised table garden

Basket gardens

Basket gardens are made from dry banana leaf woven between bamboo sticks placed in the ground. They are then filled with organic matter.

The plant or seed is planted into the organic matter.



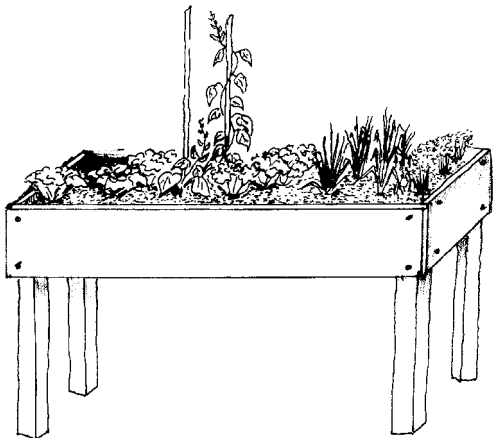
Materials

- bamboo
- dry banana leaves
- organic matter of different types
- soil
- seeds
- timber and nails.

Procedure

- cut the bamboo into narrow stakes about 1-1.5 meters long
- push the bamboo stakes into the ground in a circle 50-100 centimetres wide
- weave the dry banana leaves in and out between the bamboo stakes; keep weaving until the leaves are close to the top or at least 50cm high
- place layers of organic matter, soil, then more organic matter until the basket is close to full
- plant seeds inside a final layer of soil; it is best to plant climbers such as beans, snake bean, yam or pana (a type of yam)
- place a long stick or piece of bamboo with branches for the plant to climb.

Table garden



The table garden lifts vegetables above the reach of chickens, dogs and pigs.

Table gardens are used to grow shallow-rooted vegetables such as Chinese cabbage, tomatoes, pepper and shallots.

Materials

- collect timber 'flooring' and some posts
- rotted and fresh coconut husk
- soil—nutrient-rich if possible
- mulch—cut grass or similar
- seeds.

Procedure

1. Using timber and posts collected, build a table the size of which will depend on timber available; ideally, the table should be 1.5 to 2 metres wide and 2 to 4 metres long.
2. Attach walling at least 20cm high to the sides of the table at the top.
3. Fill the inside of the walled area on top of the table with coconut husk; this can include grated fresh husk in a layer at the bottom then rotted husk on top.
4. Fill the rest of the box with good soil.
5. Place some light grass mulch on top of the soil.
6. Plant out—this type of garden is good for Chinese cabbage, shallots, pepper, tomato and other shallow rooted plants.

7. Mulched gardens

Outcomes

By the end of this session, participants will be able to make a mulched garden and will be able to explain the role of mulch in feeding the garden soil.

Key messages

1. Using mulch on a garden helps plants grow stronger.
2. Mulch stops garden soil drying out quickly.
3. Mulch provides more food for plants that slash and burn farming.
4. Mulch reduces soil erosion during heavy rain.

Approach

...discuss

Talk about the benefits of using mulch.

See Attachment 4 for flip-chart graphics than can be used in this stage:

4. Using mulch
   a) Soil problems: no mulch
   b) Why use mulch?
   c) Making a mulched garden
   d) Materials for mulching
   e) Mulching with Gliricidia.

...demonstrate

Compare an unmulched garden with a mulched garden, if available.

...practice

- collect mulch from different sources
- make a mulched garden.

Materials

Gardening tools to make a mulched garden:

- bush knives
- hoe or digging stick
- seedlings/ seeds/ planting material
- organic material to use as mulch—cut grass, leaf litter, rotting coconut husks, kitchen waste, cassava peel, sea grass, mangrove mud, banana trunks.

A digging stick is used to make holes for root crops between lines of mulch.

The digging stick is a traditional gardening tool of the Solomon Islands. In some cases it is a useful replacement for the hoe.

Procedure

The trainer introduces the subject and explains the objectives of the session—5–10 minutes.

It is very important to use practical teaching methods.

Introduce village farmers to the use of mulch through a number of stages.

Stage 1

Discuss the benefits of using mulch on food gardens

Discuss the benefits of using organic materials as mulch:

- so that the mulch can break down to become food (nutrients) for our food plants
- to stop our soil being washed away during heavy rain
- to stop our soil being dried out by the hot sun

Refer to graphic in Attachment 4b) about how organic matter feeds the soil.

Stage 2

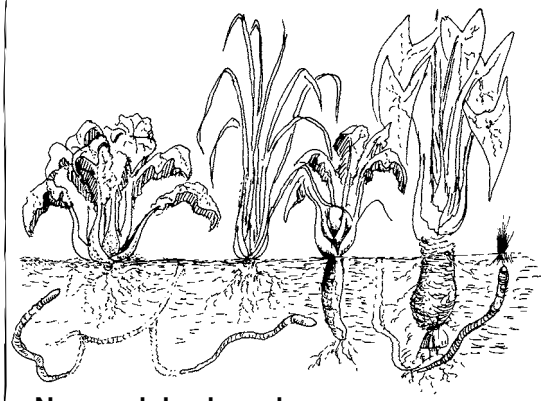
Demonstrate the benefits of using mulch

1. Find a garden where mulch has been used, if there is one:
   - ask the people to feel the temperature of the soil

   or:

   Go to the forest and see how the ground is covered in mulch:
   - ask participants to feel the soil under the mulch
   - discuss how the forest builds soil fertility.
2. Find an unmulched garden and ask the people to feel the temperature of the soil.
3. Ask the people to compare the difference in the temperature of the soil and ask them which garden would dry out the fastest.
4. Explain that
   - the unmulched garden will dry out faster because the soil is hotter and it is not protected from the sun by mulch
   - the soil will erode during heavy rain.
5. Explain how soil organisms are not fed or protected in unmulched gardens. This means that fewer nutrients are available for plants to absorb and grow healthy.

Compare non-mulched and mulched gardens



Non-mulched garden

Mulched garden

Stage 3

Compare soils

1. Collect soil from the forest and show people the organic matter content.
2. Compare the forest soil with soil from a bush garden which has been slashed and burned for some time.
3. Ask about and explain that the soil from the forest has more organic matter content because the fallen leaves have been allowed to break down into plant food instead of being burned.
4. Discuss how traditional farmers used organic matter. Use examples of the Tasimate slash and mulch and the Edu systems from the Solomon Islands, for example.

CASE STUDY

Asher Kula—Panarui, Choiseul Province

Asher used mulch in his new garden. He completely covered the soil with mulch.

The results with beans, chinese cabbage and kumera were very good.

Jean Garaba—Sasamunga, Choiseul Province

Jean did not burn her bush garden. She says her plants grew very well.

Esta

The Ferasubua Women's Group tried mulching in Esta's garden.

Esta reported that her garden was growing well.

Takwa village—Malaita Province

Results from mulching in the short fallow period are promising.

There has been no loss of production and the increased mulch helped keep plants alive during drought.

Mary Vule

Mary mulches all her gardens. She finds that the plants grow well.

In the drought she did not do much weeding because that would have left the soil bare. The soil would have dried out easily.

Stage 4

Make a mulched garden

1. Use the area fenced in an earlier session or mark out an area to make a garden.
2. Clear the area and line up the cut plants in rows; if the ground is steep make the rows across the slope instead of straight down; they will catch the soil washed down the slope when it rains.
3. Break the workshop into smaller groups and send them out to collect organic material to use as mulch.
4. Lay out the collected organic matter in rows. The piles of organic matter forming the rows should be very thick—about a third of a metre. You can use small sticks to hold up the mulch piles if needed. Lay different material in layers eg. banana trunks, dry leaves, coconut husk, kitchen waste.
5. Demonstrate how to plant food crops between the rows of mulch.
6. Explain that the next crop will be planted there the rows of mulch are now; show how the rows of mulch will be heaped up where the food plants are at present.
7. Explain that this method is similar to the traditional Tuku mulched gardening technique of Choiseul in the Solomon Islands.
8. Plant out he garden with a mixture of leafy green vegetables and beans.

Gardeners lay lines of mulch in their garden before planting seedlings. Although it looks like a lot of mulch, it will soon break down

Salathiel Sore, a gardener from Sasamunga village, Choiseul, Solomon Islands, with a garden in which he has planted vegetable seeds in the rows between the mulch strips.

The row of Gliricidia trees have been slashed and the foliage used for mulching the garden. New leaves can be seen growing from the slashed branches.

Mulch being placed on to a new garden where seedlings have been planted.

Mulch has been placed between the rows of crops in this bush garden on Malaita island in the Solomons.

The mulch will break down and improve the fertility of the soil.

Mulched gardens

Mulch

Mulch works like the leaf litter in the bush.

Mulching is a traditional gardening technique used in the Solomon Islands and in other countries.

Mulch in the forest

When leaves fall from the trees in the bush. They lay on the ground for some time. Soon, they break down into materials the trees use for food.

Mulch in the garden

When we put mulch on our gardens we copy what happens in the bush.

Over time, the mulch on our gardens breaks down just like the leaves in the bush. This broken down mulch is food for our crop plants.

- the mulch layer is made up of organic material such as cut grass and leaves placed on the soil in the garden
- the mulch layer needs to be replaced when it has broken down.

Why use mulch?

- **mulch help plants grow strong**

  when we use mulch on our gardens we help our plants to grow strong.

  mulch provides nutrients (food) for our plants to grow.
- **mulch protects our soils**

  mulch stops the soil being washed away during heavy rain.
- **mulch keeps water in the soil for the plant**s

  our plants do not dry out so quickly.
- **mulch cools the soil**

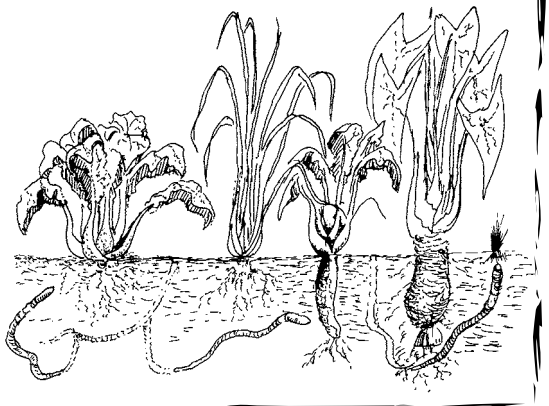
  roots don't get damaged.

Soil problems

No mulch

Soil without mulch:

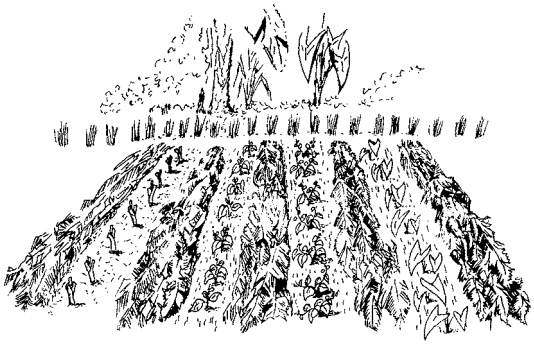
- dries out—no water for the plants
- gets hot—roots can be damaged
- has too little food for soil organisms–worms
- leave little nutrients for the plants



Mulched gardens

Making a mulched garden

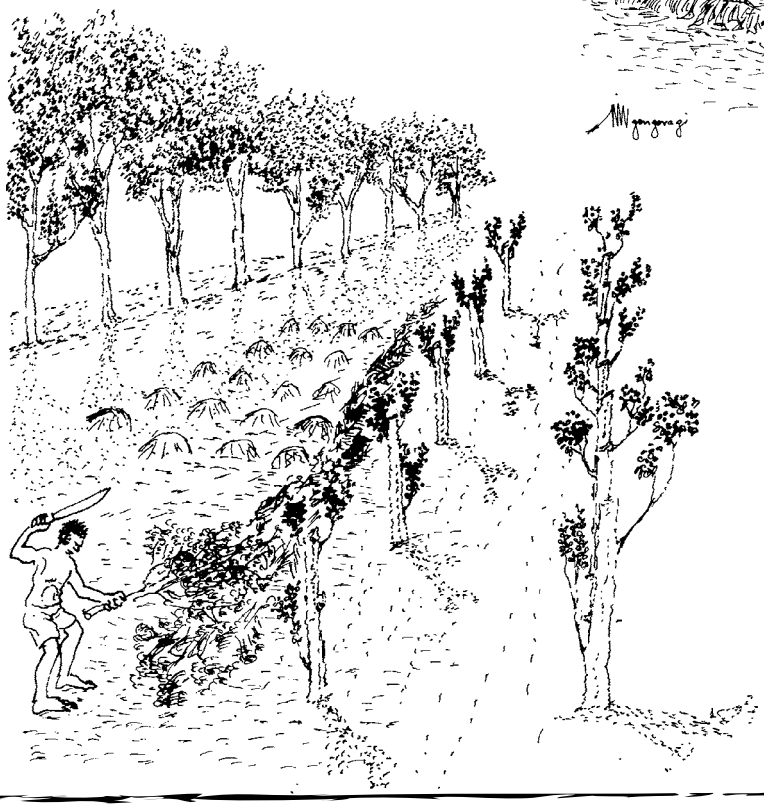
1. Mulch is laid out in rows in the garden.
2. Vegetable seedlings or seeds are planted in rows between the rows of mulch,as the mulch breaks down it feeds the growing vegetable plants.
3. After the vegetables have been harvested, the rows where they were grown are mulched; vegetables are planted in the rows where the mulch was first placed.



Materials for mulching

USE: plants, leaves, grass, food scraps

DON'T USE: tins, bottles, plastic.



Mulching with Gliricidia

Gliricidia trees can be slashed and the leaves used on the garden as mulch. The trees will grow again.

Gliricidia can be grown in rows with crops planted between the rows.

8. Making an open air nursery

Outcomes

By the end of this session, participants will be able to:

- build a small nursery
- describe the importance of the nursery.

Key messages

- a nursery allows us to produce a continuous supply of food plants for transplanting into the garden
- young plants are easily protected and cared for in the nursery
- building a small nursery makes our garden more productive
- a nursery is useful for plants like Chinese cabbage, pepper, tomato, eggplant.

Approach

...discuss

- talk with the participants about the benefits of making a nursery
- discuss the types of seeds you plant in a nursery.

...demonstrate

Production of growing mix:

- demonstrate how coconut is scraped for use as a growing medium
- visit a nursery nearby, if available
- demonstrate how to mix the coconut husk and soil to make a growing mix.

...practice

- collect rotting coconut husks for grating
- collect soil
- build nursery boxes from timber or bamboo
- scrape rotting coconut husk for growing medium.

Materials

Nursery construction materials

- bamboo or timber of different lengths
- saw or bush knife to cut timber
- hammer and nails or thin rope to hold nursery seedling trays together
- seeds
- stiff chilli wire for grating coconut husk
- milo or milk can with holes and a bucket for watering.

Coconut scraper

- timber for framework
- stiff wire mesh for coconut grating surface

or:

- cassava grater or old tuna cans with holes punched in them.

Organic market gardener, Joini Tutua, plants seeds into a seed tray

Procedure

The trainer introduces the subject and explains the objectives of the session—5–10 minutes.

Stage 1

Discuss why a nursery is useful and how it can help produce enough food for family nutrition and health. See Attachment 5 flip chart graphics:

a) Making a nursery: planting mix
b) Making a nursery: planting seeds
b) Transplanting seedlings.

Stage 2: Nursery needs

Discuss the needs of a nursery. Ask the group:

- what they think the needs of a nursery are
- how they could supply these needs
- to make a list of materials needed to make a nursery and grow plants in it
- discuss examples of nurseries for the practical.

Stage 3: Collecting materials

- break the workshop into small groups to forage for materials to build the nursery with—timber/ bamboo for planting boxes and table, old coconut to scrape for growing material, a tin to use as a watering can, soft soil.

Stage 4: Build the nursery

- guide the group through the building of the nursery—scrape the old, rotting coconuts into growing material using a cassava grater or taiyo (tuna) cans with holes punched in them—or stiff wire mesh on a wooden frame, see flip chart graphic: Attachment 5a)
- locate the nursery in open sun with some trees on the west side for afternoon shade.

Stage 5: Plant the seeds in seed boxes

Mix the coconut husk and the soil growing medium before planting.

There are two types of mix:

1 for germinating seed—use more coconut husk than soil; three times as much coconut husk as soil (3:1 ratio)
2 for growing seedlings—this mix has two times as much soil as coconut husk (2:1 ratio).

Process:

- fill the seed boxes with the shredded coconut husk and soil mix—sterilise the soil before planting with boiling water poured into the box; leave to cool before sowing seed; this is important to prevent fungal disease
- demonstrate how to plant seeds into the seed boxes, how to work out the depth to plant the seeds and how far apart to space them—Chinese cabbage is a good seed with which to demonstrate planting as it germinates quickly—see flip chart graphic Attachment 5b
- ask the group to practice planting
- water the planted seeds
- cover the seed boxes with a hessian bag soaked in water.

Stage 6: Discuss suitable plants

- discuss the types of vegetables grown from seed, especially the more delicate vegetables such as tomato, eggplant and Chinese cabbage.

Stage 7: Review results

- take hessian off the seed boxes after three days or, if it goes long enough, at the end of the workshop—check how many seeds have germinated.

Stage 8: Transplant seedlings

- transplant the three day old seedlings into a seedling box with a mixture of two parts coconut husk to one part soil
- space the seedlings the width of two of the knuckles of your index finger—see flip chart graphic: Attachment 5c
- press the soil firmly then water with a milo/ milk can with holes punched in the bottom for a gentle stream of water.

Building a nursery

A nursery is a place where we plant the seeds of our food plants.

Building a nursery makes sure you have a continuous supply of the more delicate vegetables throughout the year.

After the seeds start to grow, keep the young plants in the nursery for a few weeks to look after them, protect them from insect pests and give them enough water. Then, plant them in the garden.

Planning the nursery

Make the nursery close to the house so we can visit it every day. A good place is to make it between the house and the garden so we walk past it every day.

The nursery should be as close to water as possible.

Setting up our nursery

1. **Choose a suitable place** to build the nursery where there is no shade from the morning sun.
2. **Make planting boxes** of wood to plant the seeds in; after the plants start to grow in the seed boxes they are transplanted into seedling boxes and, when they have grown, into the garden; you might like to build a table to put the planting boxes on so they are at a comfortable working height. Seedling boxes should have space under the box to allow for drainage of water.
3. When the seedling boxes are ready, prepare some **material to plant the seeds into**; to make this material collect old, rotting coconuts from the ground or from a coconut plantation; scratch these on a stiff wire frame to shred them.
4. Put the shredded coconut husk into the **seed boxes** and level flat.

   Note: sterilise the soil with boiling water poured into the seed box before planting seed; leave to cool before sowing seed; this is important to prevent fungal disease.
5. **Plant the seeds** into the shredded coconut husk which has been put into the seed boxes; the seeds are planted about twice as deep as they are wide.

   With the open air nursery you do not need shade because the coconut husk will hold water and keep the seeds moist all day in the sun. The coconut husk holds a lot of water.
6. Gently **water the seeds** every day until they start to grow—a can with small holes in the bottom can be used as a watering can.
7. After the seeds start to grow, water them for three days to a week.
8. **Transplant the seedlings** into the seedling box. They will grow here for another two to four weeks before transplanting to the garden.

   After two weeks you can sprinkle some poultry manure mixed with sawdust between the rows of seedlings. This will boost their growth.

   It is useful to gently cultivate and aerate the soil in the seedling boxes. Do this with a small stick between the rows of seedlings.
9. Now **transplant seedlings into the garden**, water the plants regularly while they are young; use branches to shade them from the sun.
10. Remove the branches after three days.

Breaking open a rotting coconut to scrape for growing mix

Starting a nursery for family food production

Starting a nursery in which to grow our seedlings ensures the family a year-round supply if nutritious vegetables.

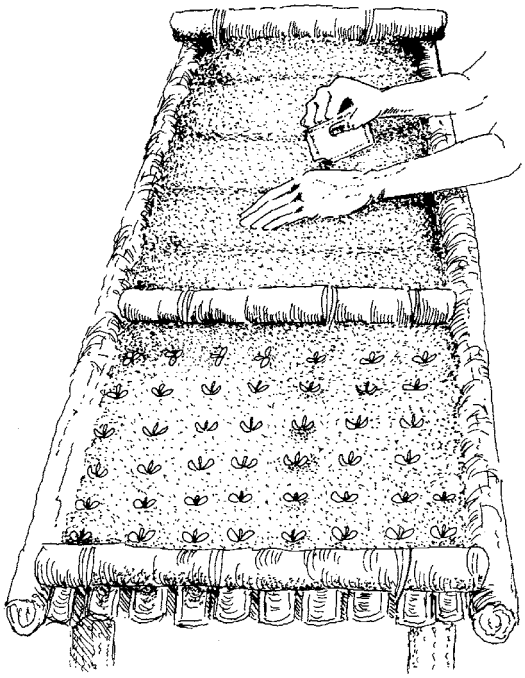
If we include vegetable foods—leafy greens such as Chinese cabbage, slippery cabbage, shallots and others such as tomatoes—in meals with fish, rice, kumera, yam or taro, our family will remain healthy and strong.

Planting mix

Old coconuts are picked up from the ground and the husks shredded to make planting material for our seeds.

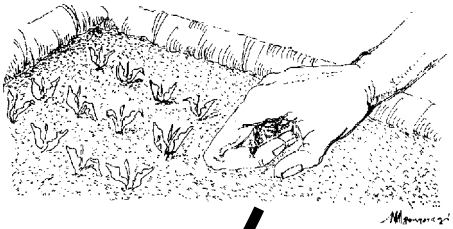
Planting seeds into seed box

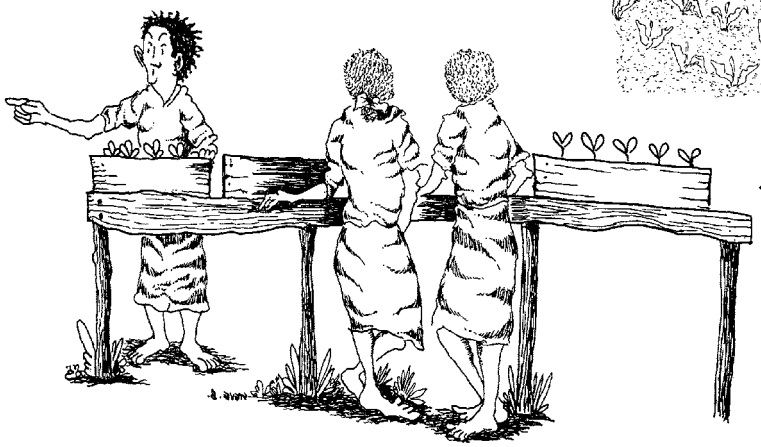
Planting seeds into the seed boxes. The seeds are planted at a depth twice their width.



Transplant seedlings into seedling box

Transplant germinated seed into the seedling box. The right distance apart to plant our seedlings is as wide as the distance between two knuckles.





Making a seed tray from bamboo. The bamboo on the bottom of the tray has been cut into strips.

Seed trays can also be made from wooden planks.

Seed trays can be made separately—as in this picture— or as one long tray divided into smaller trays.

Tony Jansen demonstrates how to use stiff wire mesh on a wooden frame to scrape rotting coconut husk to mix with soil for the nursery.

Rotting coconut can be collected from a plantation.

Filling the seed trays with growing mix made from scraped coconut. The trays are filled almost to the top.

The picture shows one long tray divided into smaller trays.

Participants in a training workshop plant seeds into seed boxes filled with scraped coconut husk.

Joini Tutua shows visitors to his Honiara organic farm how seedlings grow in planting boxes in an open air nursery.

Joini and his family start most of the vegetables grown at their Zai and Tina Organic Farm in seedling boxes.

When the seedlings in the nursery have grown big enough, they can be transplanted into the garden.

In this garden, small branches cut from a Gliricidia tree have been used to shade the seedlings from the heat of the sun. The branches are removed after three days.

9. Using legumes

Outcomes

By the end of this session, participants will be able to:

- describe the importance of the legumes
- demonstrate the use of legumes in the garden.

Key messages

- legumes fix nitrogen in the soil
- legumes benefit other plants
- we should include plenty of legumes in our garden
- there are many ways to use legumes to fertilise our garden.

Approach

...discuss

- nitrogen is an element that plants need to grow; we can think of nitrogen as being like protein for plants;
- nitrogen occurs naturally in the air and is found in pockets of air in the soil
- legumes put the nitrogen from the soil air into plants
  - they do this through a special relationship with nitrogen-fixing nodules that look like small lumps
  - the lumps are nodules that contain tiny bacteria that turn the nitrogen into plant nutrient
  - the bacteria that live in the nodules are so small they cannot be seen
  - the bacteria supplies nutrients to the plant and receive sugars they need to live from the plant in return.
- demonstrate that when the nodules are broken they should be red or pink; this shows that nitrogen fixation is at work.

...demonstrate

- how to interplant legumes and vegetables (eg alley crop), to benefit plants.

Materials

- fresh legumes pulled from the ground showing nodules
- pictures of cropping systems using legumes—see Attachment 6a alley cropping with Gliricidia.

A child with an arm full of winged beans, a legume grown in the Pacific and Asian tropics.

Legumes can feed people as well as the soil and are one of the 'body building' or protein foods we need to keep us healthy.

After the beans have been picked for food, the leaves and stems of the bean plant can be used in the garden as mulch.

Procedure

The trainer introduces the subject and explains the objectives of the session—5–10 minutes.

1. Collect and pass around legumes on which nodules are visible or draw a diagram illustrating the nodules on the roots—**describe how legumes fix nitrogen** and make it available to plants; explain that the nodules work in partnership with the legume plant but they are actually a separate lifeform
   - pass the plant with the nodules around ensuring that all participants examine it and can identify the nodules.
2. Describe how to **identify legumes** by pod and leaf shape; explain that legumes produce seed in pods.
3. Use role play to **describe alley cropping** (a method of planting alleys of crops between lines of legumes; the leaves of the legumes are slashed and used to mulch the crop alleys).
4. Break into groups to develop ideas on how participants could include **legumes in their gardens**; the groups present their findings to the workshop.
5. Describe **different cropping systems** that make use of legumes.
   - green manures: used as soil improvers such as velvet beans and cowpeas
   - crop rotation with legumes helps improve the soil
   - Gliricidia used to shade plantations of cocoa and coffee
   - soy beans and mung beans grown for their seed, plants such as winged bean and long beans are grown for their pod.

Teaching notes

Use drama or role play to reinforce the information about how nitrogen fixation and legumes work and their importance in the garden.

All legumes have pods. Some grow as twining vines, like the winged bean (above). Others grow as shrubs or as trees, like the Gliricidia (below) planted in an alley cropping system.

Mung beans grow as a small shrub. Here they are seen growing at the Planting Material Network garden at Burns Creek, Honiara, in the Solomons.

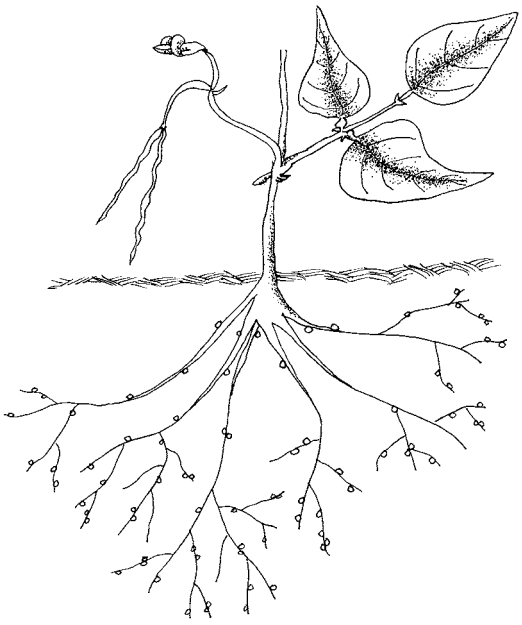
Identifying and using legumes

How do legumes fix nitrogen?

In the air spaces between the soil particles you will find nitrogen.

Small bacteria that live on the roots of legumes take the nitrogen from the soil air and turn it into proteins in the plant.

These bacteria form nodules on the roots.



Identifying legumes

Legumes can have their leaves in groups of three, such as beans.

Gliricidia has a different type of leaf pattern.

All legumes have a fruit which is called a pod.

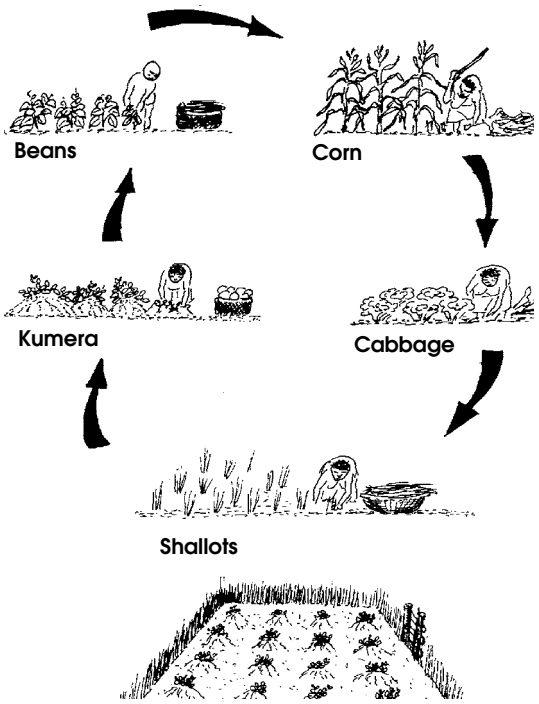
Legumes also have white, pink or brown nodules on their roots. In these root nodules nitrogen is taken in by the bacteria and turned into plant protein.

Different cropping systems

- alley cropping, a method of planting alleys of crops between lines of legumes; the leaves of the legumes are slashed and used to mulch the crop alleys
- crop rotation with legumes helps improve the soil
- green manures: used as soil improvers, such as velvet beans and cowpeas
- Gliricidia used to shade plantations of cocoa and coffee
- soy beans and mung beans grown for their seed, plants such as winged bean and long beans are grown for their pod.

Crop rotation

Crop rotation avoids depleting the soil of nutrients.



Alley cropping with Gliricidia

Gliricidia can be grown in rows with crops planted between the rows.

Gliricidia trees can then be slashed and the leaves used on the garden as mulch. The trees will grow again.

10. Safe management of garden pests

A three staged approach

There are three stages to introducing safe insect pest management to village farming communities:

1. **Identify the insect pests** occurring in the farmer's gardens.
2. **Identify existing pest management methods** used by farmers, including new methods used by innovative farmers.
3. **Make botanical sprays and using other methods of pest management**: share the farmer's knowledge and teach farmers how to make natural sprays and how to hand-remove pests to manage the number of insects.

These stages can be the focus of a series of workshops with farming communities.

The workshops involve:

- **meetings** where discussion takes place and where methods of insect pest management are described and demonstrated
- **visits** to farmer's gardens to identify insect pests and to see pest management techniques in use.

During the workshops and the field visits, appoint someone to take notes so a report can be produced later and a copy given to the participating village communities.

Flip chart graphics

See Attachment 7 for discussion graphics that can be used in this section.

7. Safe pest management
   a) Insect life cycle
   b) Identifying insects in the garden
   c) Plants used to make botanical sprays for pest management
   d) Using botanic sprays
   e) Benefits of botanic sprays
   f) Crop rotation.

Further workshops

This workshop is an introduction into safe pest management and some simple, effective techniques to be used to manage pests.

Further pest management workshops can be arranged and more detailed information can be found in the *Integrated Pest Management* manual in this training series.

Chillies can be grown in the sup-sup garden and made into a botanical spray to deter insect pests

Stage 1: Identify insect pests

Outcomes

By the end of this session, participants will be able to:

- explain the importance of safe pest management in the garden.

Key messages

- pest management is important to the control of insect and other pests and plant diseases
- look at the whole garden system including soils and plants
- some insects found in the garden are beneficial.

Identify insects in the garden:
Walk a transect through the garden to collect and identify insects

Approach

...discuss

- what is a garden pest (brainstorm)
- what is safe pest management
- ask the group about the types of insects that are pests in their gardens. Ask for:
  - the names of the insects
  - what plants they eat
  - what part of the plant they attack (leaf, stem, roots)
  - what times of the year they are found
  - what they look like (ask participants to draw a picture of the insect on the board or on flip chart paper or to draw a picture on the ground; ask them to show how long the insect is).

...practice

If appropriate go to the garden to identify pests before discussion on safe pest management and insect identification:

- walk through a garden to collect insect specimens
- break into small groups to discuss the insects and the plants they eat; groups report back to workshop what they know.

Workshop participants search for insects in the garden

Stage 2: Identify existing pest management methods

Outcomes

By the end of this session, participants will be able to:

- list traditional approaches to insect pest management.

Key messages

- pest management is important to the control of insect and other pests and plant diseases
- look at the whole garden system including soils and plants
- some insects found in the garden are beneficial.

Approach

...discuss

Using the names of the insect pests identified in Stage 1, ask participants:

- what management methods they now use for these insects; these might include hand removal (picking the insects off plants), natural sprays (these are also called botanical sprays because they are made from the parts of plants)
- how effective they judge the different methods to be
- whether farmers already make and use botanical sprays, ask them to demonstrate how they are made and used; it will be necessary to gather together the ingredients to make the sprays.

A two-column table is a useful graphic means to record this information.

- draw a two-column table on the ground, flip chart page or blackboard
- on the horizontal axis write the heading 'insect pests'
- on the vertical axis write the heading 'management method'
- against the names of the insect pests write the management methods found to be most effective.

Materials

...for discussion

- flip chart paper for listing farmers pest management techniques
- marker pens and paper for small group work.

Stage 3:
Make botanical sprays and use other methods of pest management

The purpose of this workshop is to share the management methods identified in Stage 2.

Outcomes

By the end of this session, participants will be able to:

- demonstrate how to make botanical sprays from plants (botanical sprays are insecticides made from plants such as chilli and tobacco).

Key messages

- botanical sprays made from natural ingredients such as plants are safer than chemical sprays and preparations
- the use of natural sprays comes after you have tried other methods such as hand picking.

Approach

...discuss

- explain why you would use botanical sprays as a pest management strategy
- explain any safety precautions necessary for preparing and handling botanical sprays (such as avoiding contact with the eyes when preparing and using chilli spray)
- talk about the sprays participants have used.

...practice

- have knowledgable farmers demonstrate the production of different botanical sprays
- produce botanical spray/s that you can treat pests with in the garden at that time
- go into the garden and demonstrate how the sprays are applied safely and any other methods that could be used.

During this workshop, the trainer may introduce pest management methods unknown to the farmers.

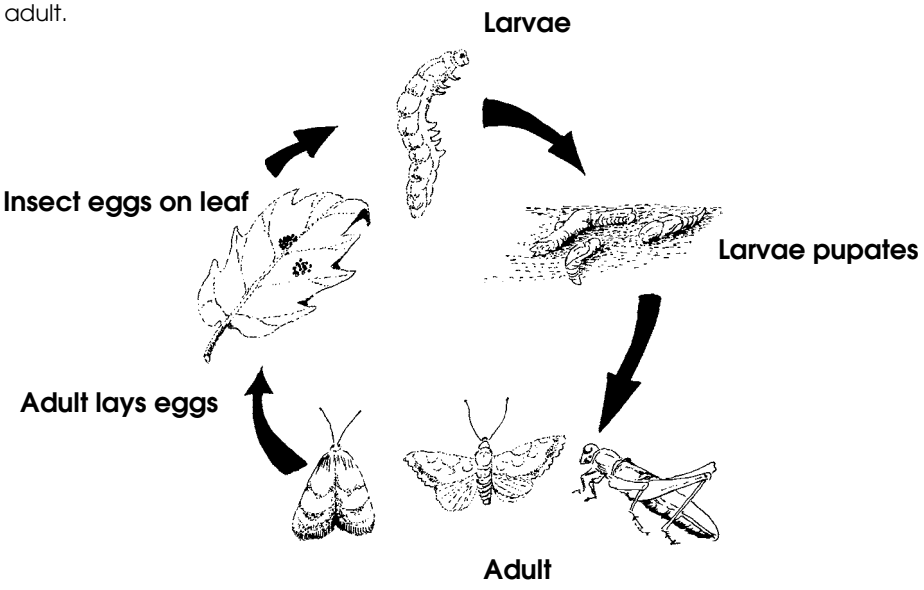
Materials

- flip chart paper/ blackboard
- plants from which botanic sprays are made
- containers for mixing sprays.

Safe pest management

Insect life cycle

Insects take a variety of forms from egg to adult.



Identifying insects in the garden

Walk a transect through the garden to collect and identify insects

Pest management technique: botanical sprays

Plants used to make botanical sprays for pest management:

Tobacco Ginger Chilli Marigold

Making botanical sprays

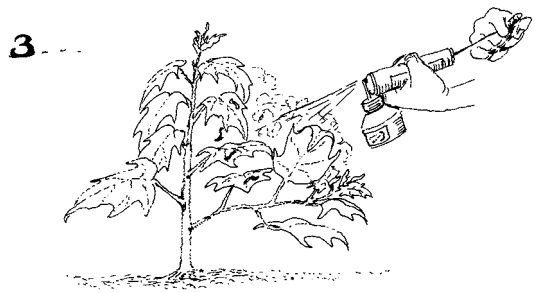
Chilli

Soap and water

Using botanic sprays

Take care when using botanical sprays. Do not breath the spray if possible and do not spray it on yourself. Wash your hands when you have finished spraying.

Spraying pest:



Wash your hands when you are finished spraying:

Benefits of botanic sprays

Use botanic sprays carefully and only when insect pests are in large numbers.

The careful use of botanic sprays reduces insect pest damage and leaves more food plants for you.

Crop that was sprayed

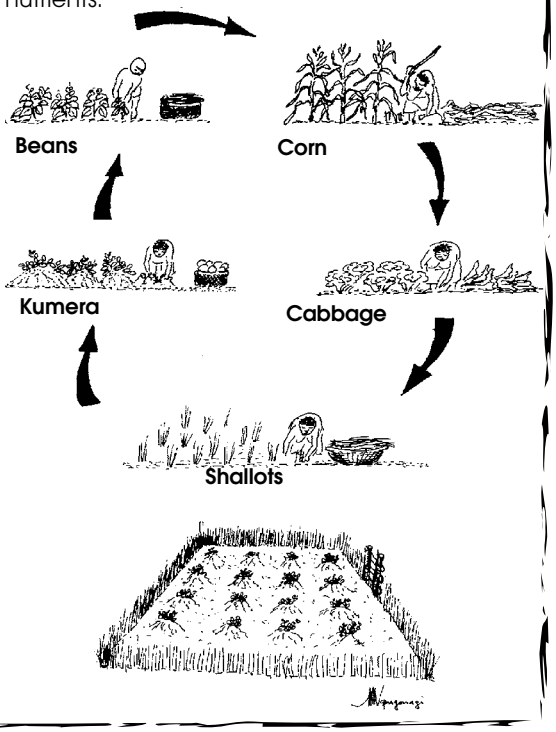
Crop that was NOT sprayed

Other pest management techniques

Crop rotation

Planting different crops in the garden, one after the other, breaks the life cycle of insect pests that might live in the soil.

Crop rotation avoids depleting the soil of nutrients.



11. Keeping chickens

This section has been produced by **Russell Parker** from Armidale, Australia. Russell offers a consultancy service to Pacific Island and Australian communities through Kai Kokorako.

Russell writes: "Kai Kokorako was developed as a slogan to encourage people to 'eat chicken' and the name **Perma-Poultry was** linked with it because my concepts are closely tied to permaculture and village food gardens.

Personally, I have been obsessed with both the Pacific Islands and poultry keeping all my life. These two passions existed in parallel for about thirty years until I became involved in village poultry keeping in the Solomon Islands.

I consider myself very fortunate to now be able to indulge both my lifelong passions in the one place."

Improving family diet through chicken farming

Keeping chickens is a much-neglected part of life in island villages but it has great potential to help improve village lifestyles.

Even though chickens, or kokorako as they are known in the Solomon Islands, have been known to islanders since their ancestors paddled their canoes from mainland Asia thousands of years ago, in most villages the kokorako are left to wander freely and are not cared for properly. They search for food where ever it can be found and they are also at the mercy of both the weather and predators like cats, dogs and hawks.

With a small amount of effort and inexpensive inputs most villages can establish a small kokorako farm which will produce valuable food items like eggs and chicken meat. The kokorako will also provide manure and compost for the food garden. As the farm grows, surplus eggs and kokorako can also be sold to raise much-needed cash.

Outcome

By the end of this session, participants will be able to describe:

- how to feed chickens
- how to breed chickens
- different types of chicken houses
- how to care for and manage chickens.

Key messages

- chickens can supplement the family food supply and contribute to a nutritionally balanced diet
- chickens can be kept successfully by villagers if they provide a few simple necessities and manage the chickens
- excess chickens and eggs can be sold or traded
- there are four main points to successful chicken keeping in the village—feeding, breeding, housing, care and management.

Approach

...discuss

- explain the four main points of chicken-keeping—feeding, breeding, housing, care and management.

...demonstrate

- foods that chickens eat
- building a simple chicken house.

Materials

- examples of chicken food
- flip chart graphic in Attachment 8
  8. Keeping chickens
  a) the needs and functions of chickens
  b) the mobile chicken house
  c) moving the mobile chicken house
  d) feeding and caring for chickens.
- sticks, poles, wire or netting for making a chicken house.

Procedure

The trainer introduces the subject and explains the objectives of the session—5–10 minutes.

Break into small groups and discuss:

- how to feed chickens—what do participants feed to chickens
- show examples of chicken food

Discuss:

- how to breed chickens—participants encouraged to share experiences

Visit:

- different types of chicken houses to see what works and how to build them
- show examples of building materials

Break into small groups and discuss:

- how to care for and manage chickens—participants describe how they keep their chickens safe and healthy.

A permanent chicken house raised above the ground as protection from predators

A mobile pen made with timber and bamboo

Chicken keeping survey

Village trainers can collect baseline data with participants for their village group that wishes to improve their kokorako keeping.
Ask the following questions:

Number of chickens

1. How many chickens are in the village now?
2. How many hens, how many roosters are there?
   NOTE: only one young rooster is needed for ten hens—
   there are usually too many roosters competing for the hens
3. Are there already enough chickens to start a small chicken farm?

Type of chicken

1. Are they village chickens or imported?
2. Are they old or young fowls?
3. Do you think your adult fowls are too old to produce eggs?

Chickens

1. How many hens have chickens?
2. How many chickens does each hen have?
   NOTE: there will most likely only be one or two survivors from a batch

Eggs

1. Do you know of any nest where a hen is sitting on some eggs?
2. How many eggs does she have?
3. Is it easy for you to find eggs that your hens have laid?
   NOTE: it is easier inside a proper chicken house
4. how many eggs does a village hen usually lay?
   NOTE: this can be improved with better feeding
5. How long does it take for those eggs to hatch into chickens?
6. When a hen hatches chickens how many does she hatch at first?
7. How many chickens survive to grow up?
8. Do you know why only one or two chickens survive?

Feeding

1. Do you notice when some chickens are really sick?
2. Does someone give proper food to your village chickens?
3. Does the hen with the new chickens get special food for her babies to eat?

Village chickens

1. Do you notice if cats, dogs, hawks or snakes kill your chickens?
2. Does every family keep chickens?
3. Do they produce enough eggs and meat for the whole village?
4. Does your village keep both village and imported chickens?
5. What colours are these chickens?
   NOTE: this usually indicates whether they are imported or local.

Keeping chickens

Chickens have a number of uses in the garden. They provide:

- food
  - eggs
  - meat
- garden functions
  - clean up garden of old plant material
  - fertilise garden with their droppings
  - eat some insect pests
  - loosen the soil in the garden; we can plant seedlings in the soil
  - when the chickens are kept in a permanent house, their houses can be cleaned out and the old grass put on the garden to help our crops grow.

Chickens need:	Chicken functions:	Chickens provide:
food	clean up gardens	eggs
shelter	fertilise gardens	meat
water	eat insect pests	
protection from predators		
health care		
place to lay eggs		

Improving chicken keeping

There are four main points to improved chicken keeping in the village:

1. Feeding
2. Breeding
3. Housing
4. Care and management

1.Feeding

The feeding program is designed to be as simple as possible so that it can be continued and not fail.

- villagers should be encouraged to think of the kokorako as an extension of their family; when a meal is prepared for the family the kokorako feeding should be done as well
- kokorako should be fed a small, balanced diet everyday
- imported processed commercial feeds are too expensive for most village farmers and locally grown grain of any sort is not plentiful in many island villages.
- the diet for poultry is therefore closely linked to existing village food gardens and based on common, locally available produce
- the feed should be provided in three groups:

  a) body-building foods—protein

  b) energy foods

  c) protective foods

  so the kokorako can choose their own needs

  NOTE: it is very important that at least one item from each of the three groups is provided every day.

a) Body-building foods—protein

The chicken's protein needs can be taken from:

- fishing waste when available
- earthworms
- insects
- beans
- peas and
- peanuts.

Worms and insects are found by kokorako when they are allowed to wander freely each afternoon. Beans and peas of different varieties can be grown easily in food gardens.

b) Energy Foods

The most commonly available will be:

- **fruits and vegetables** including sugarcane
- **coconut**: both fresh and dried (copra) can form the major basis of the food as it is readily available on most islands. Care should be taken that the copra is of good quality otherwise it can be toxic and will kill your kokorako
- **yam + potatoes**: potatoes, yams, taro and cassava should be boiled for better use as a kokorako feed
- **grain and seed**: corn or maize, sunflower seeds and sorghum are good grains for chickens if they are available
- **grasses, leaves, insects**: poultry will be allowed to free range after the middle of the day so they will have access to leaves and grasses as well as the insects
- **rice**: when available, or grated coconut can be fed as an evening encouragement for the kokorako to return to their house.

c) Protective Foods—greenfood and minerals

- **calcium**: most villages have access to seashell which can be burnt and crushed to provide calcium and grit for the poultry
- **crushed animal bones** provide calcium and phosphorous
- **salt**: salt is available from seaside pools or seaweed
- **grit**: gravel and sand should be made available to kokorako so they can use it to help digest their food
- **greenfood**: greenfood is provided to the pens in the form of green leafy vegetables, cut grass and access to grass yards in the afternoon
- **Leucaena branches** are good greenfood and can be hung in the kokorako pens for the kokorako to eat
- **paw paw, chilli and Japanese cabbage**.

Feeding baby chickens

The first two or three weeks

The diet for chickens in the first two or three weeks of life should include boiled eggs—either hen, turtle, megapode or other bird—depending upon availability.

The other food should be the same as for fully-grown kokorako. All food provided in the chicken's diet should be finely chopped so it is easier for them to eat.

You can start to feed small grain like corn, rice, sorghum and sunflower as soon as you can as this will help the chickens stay healthy and fight off disease.

For all kokorako it is better to feed whole grains rather than crushing them which destroys the food value of the grain.

Special care in the first 6 weeks

As it is too expensive and difficult to obtain special medicines which the baby chickens need, you have to take special care with their feed. You should include lower-energy foods, which are high in fibre, for the 0 to 6-week chicken age group to help the chickens fight common poultry diseases like coccidi.

Fruit such as pawpaw, banana and melon are good low-energy foods for baby chickens.

2. Breeding

Management is necessary to make sure the best results are gained from existing village kokorako. This is based on building up the numbers and quality of the local poultry quickly through:

1. Selective breeding
2. Correct feeding
3. Captivity in simple houses made from local materials.

1. Selective breeding

Every effort should be made to obtain young male breeders from areas where there is a possibility of jungle fowl (also called Mendana or Santa Cruz chicken) existing in the rooster's breeding background.

In the past, the various importations of kokorako have resulted in village fowls carrying a good mixture of both laying and local strains in their bloodlines.

Characteristics to look for

If you select surviving village birds to use in the breeding program the following characteristics may be found in the new chickens:

- more active forager and hardier birds
- more aggressive and not such easy prey for predators such as cats, dogs and snakes
- the ability to fly well and roost higher at night than other introduced birds
- smaller so therefore a better converter of feed to eggs
- females from the improved breeding line will make very good broody hens and very protective mothers.

Semi-feral chickens

With their tight feathering and more active nature semi-feral chickens appear to be more successful breeders than many soft feather fowls and usually continue to breed to a greater age.

Interbreeding

In the long term, interbreeding with village fowls will ensure that the kokorako will change to the natural colours of the jungle fowl and therefore provide some camouflage, especially for nesting females. The natural brown striped colouring of the chickens from the moment of hatching also provides camouflage and protection from predators.

If possible, always try to use younger breeding birds

2. Feeding

Correct housing and feeding develops good breeding chickens. If the project owners lose interest, the improved fowl, with some feral bloodline included, should still cope well if they return to free range.

Not only is the present village fowl a very active forager by necessity, it also shows great interest in any food scraps thrown to it. Therefore it will adapt well to the proposed free choice feeding system of locally based produce.

3. Simple houses made from local material

See next page.

3. Housing

Use bush materials

Kokorako should have a separate house made of bush materials. The materials are available in most villages and the people already have the skills to use these materials.

For good kokorako houses you need:

- weather proofing, with a strong leaf roof
- strong stick or bamboo walls to keep out pigs, dogs and cats
- windows to let air come inside
- drains around the outside with the floor inside raised to keep out water.

Chicken houses for breeding

To be able to keep lots of kokorako successfully you will need the following:

- **a main breeding house** of a size to suit the number of kokorako you wish to keep
  - parts of this main house need to be divided into separate rooms with:

    nests for hens that are hatching eggs

    when the chickens have hatched you need **a room for each hen and chickens**
- once the chickens have grown good feathers they need to be separated from their mother and then kept in a **small grower room**
- later, you will divide the growers into male and female so they can be fed separately and properly for meat or eggs.

For **one kokorako project** you will need:

- **one big house** with four or five separate rooms
- **nests** for layers and sitting mother hens

which can be constructed of bush materials.

Roost

Chickens naturally like to perch as high as possible to keep away from predators, especially at night.

You should erect the roosting pole inside the kokorako house at the back and as close to the roof as possible but still leaving enough room for the chickens to stand.

Chicken houses

There are two types of chicken house:

- **mobile houses**—small houses that are moved around the garden; these house up to four chickens
- **permanent houses**—these are larger and stay in the one place in the garden; they house more chickens than mobile houses.

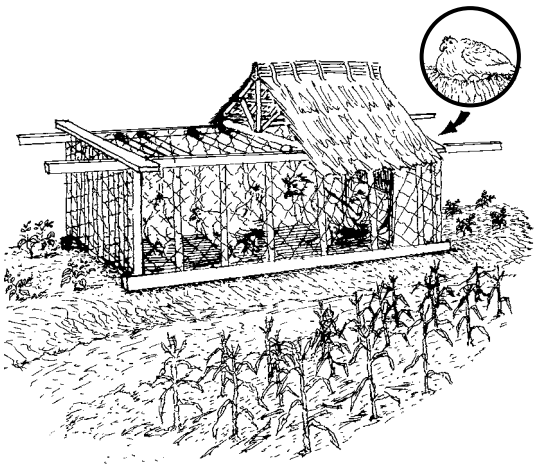
Using mobile houses

The mobile house can be moved by two people.

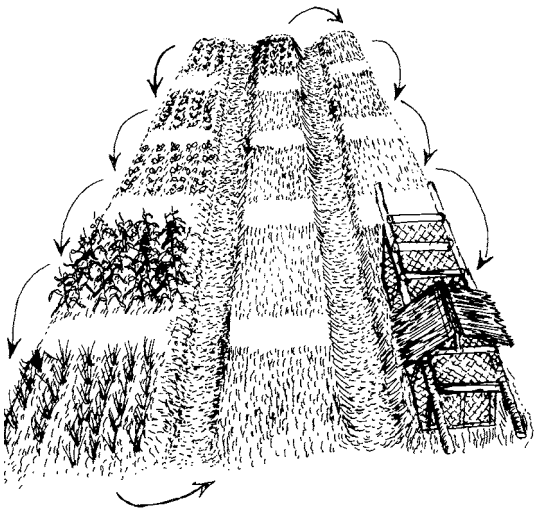
To use a mobile house to help prepare your sup sup garden for planting:

1. Place the mobile house on a garden bed from which the vegetables have been picked.
2. Wait until the chickens have eaten the remaining plant material and have scratched up the soil; their droppings will have fertilised the soil.
3. Move the mobile house to the next area of the garden to be prepared.
4. Plant seeds or seedlings into the garden that the chickens have scratched up.

Chickens sleeping on the roost inside the chicken house



Mobile chicken house showing nesting box where eggs are laid



Moving mobile chicken house around the garden

Using a permanent chicken house

The permanent chicken house is not moved around the garden.

The house:

- must be made large enough for the number of chickens you will keep
- must be strong enough to keep out predators such as dogs
- has lying boxes in which the chickens lay eggs
- has perches above the ground where the birds sleep.

Some chicken houses are raised above the ground to keep dogs out.

Spread grass on the ground

Cut some long grass and spread a thick layer of it on the ground inside the permanent chicken house.

The grass will break down inside the chicken house. More grass is added every week. The old grass is cleaned out every week and put on the garden.

Sawdust can also be used on the ground in the permanent chicken house.

Materials for building the chicken house

Use strong materials to build your chicken house so dogs do not break in and eat the chickens.

Poultry wire is good but it is expensive. Instead, use bamboo, planks of wood and strong bush poles.

Make your mobile chicken house strong but light weight because it has to be moved around the garden.

A small permanent chicken house reinforced against dogs with wooden planks

4. Care and management

When you provide good feeding, breeding and housing for your kokorako you are also already working on good care and management. However there are a few other things you need to do.

Protect your chickens

Rat control: rats will be a major problem because of the lush undergrowth in most island areas; the only solutions to this problem will be the removal of all rubbish and bush near the pens and the use of poultry-friendly dogs and cats to catch the rats.

Do not over feed the poultry and remove uneaten food at the end of the day so rats won't be encouraged to visit at night.

Hawks and snakes: these will also be a problem but the people will usually be made aware of such predators by the noise of the kokorako.

Dogs: protect your chickens from predators such as dogs that can .

Villagers will need to ensure that there is always someone left in charge when the majority of the population is away working in the gardens.

Natural bush medicine

Disease control by imported medications and vaccines is cost-prohibitive for most villagers so greater emphasis should be placed on hygiene and the proper care and feeding of the kokorako.

Natural bush medicines presently used by people should also be investigated for applications to kokorako health. As the breeding development proposal is extended over wider areas the investigation of the applications of these bush medicines will become an important part of the concept.

Provide good drainage

Many island villages are located close to lagoons or beaches so good drainage for the kokorako houses and fenced areas should be possible through the sandy soil.

Drains should be dug around the houses to stop flooding and floors should be made from gravel material to help drainage and drying out.

Don't overcrowd chickens

Attention should be paid to the size of the houses and yards or fenced areas to ensure there is no overcrowding and the ground around these facilities does not become stale and unhealthy.

Always try to avoid overcrowding in the houses which can cause illness and cannibalism.

Clean floor regularly

The floor of the houses should be cleaned regularly and the manure and other material placed on the compost heap for later use on the gardens.

Let your chickens out

By allowing free range after midday to most kokorako they should remain healthy by allowing them to find more food.

It is very important to learn that correct feeding is a major part of the good health of your kokorako.

Everyday activities

There are a number of everyday activities for improving your kokorakos care and management

Early morning:

- give the kokorako their food for the day
- make sure they have fresh drinking water
- Check kokorako nests for eggs

Mid afternoon:

- collect all the eggs
- allow the kokorako to run out free in their grassed yard or fenced garden area
- provide fresh greenfood to those kokorako which can't be let run free in yards.

Evening:

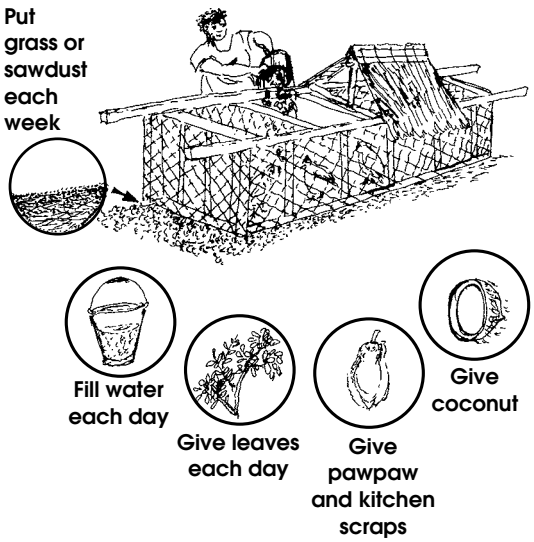
- make sure all kokorako have drinking water
- shut all kokorako safely in their houses for the night
- collect any late eggs from the nests so rats don't steal them during the night
- make sure there is no food left in the houses which will encourage rats to come at night
- watch for any broody hens which want to sleep on their nest instead of the perch or roost.

Night time:

- this is the best time to catch any kokorako you want to move to another house or if you want to move a broody hen to her nest of eggs that you have ready.

Other considerations

- at different times every day you should check that your kokorako are healthy and happy
- make sure the kokorako are not sick or fighting
- it will help to tame the kokorako if you offer small amounts of special food like weeds from your garden or a sprinkling of cracked grain each time you visit the kokorako.
- make sure that drinking water is not spilt or made too dirty by scratching fowls.



Feeding your chickens

Store food for your chickens is expensive. Instead of store food,

Feed your chickens on plant material grown in the garden:

- pawpaw
- coconut—break coconut open
- leaves from vegetables.

Food scraps from the kitchen can be fed to the chickens.

Place a large container of water inside the chicken house and fill up daily. Keep the water in the container clean.

Use a smaller container for water in the mobile house.

12. Nutrition and local food

It is very important for young children to eat nutritious food. When they are healthy they do not get sick as much and do not become slow learners at school.

We must give children the **right food at the right time** so they will grow up to be healthy.

It is also important for adults to eat nutritious food—not too little or too much. That way we will stay healthy and will be able to work well.

A four staged approach

Introducing nutrition is done in four stages. These make use of a number of posters (see Attachment 9 for posters):

1. **Baby book**
2. **How to feed children** - five posters
3. **Making mixed meals and good snacks** - seven posters
4. **Nutritious meals in the home**: carry out an analysis of food available in the home; prepare mixed meals and nutritious snacks.

Poster graphics

See Attachment 9 for discussion graphics that can be used in this section.

9. Nutrition and local food:

a) How to feed children:
   1. 0–4 months
   2. 4–6 months
   3. 6-12 months
   4. 1-2 years
   5. from 2 years up

b) Mixed meal
   1. A mixed meal is a healthy meal
   2. Start to make a mixed meal
   3. Add beans, peas or nuts
   4. Use an animal food instead
   5. Add vegetables to the mixed meal
   6. Use fruit instead of vegetables and greens
   7. Healthy snacks

Maria Zabel, who wrote this unit in *Nutrition and Local Food*, with daughter and husband Peter.

In the late-1990s, Maria (from Finland) carried out nutritional education and child health monitoring at Sasamunga Hospital on Choiseul, Solomon Islands. Peter (from Germany) served as hospital doctor.

Target group:

- mothers attending anti-natal and post-natal clinics
- parents at child welfare clinics
- parents with underweight children
- women's groups.

Outcomes:

Parents will be able to:

- make a mixed meal and good snacks
- feed their small children nutritious food
- describe why it is important to bring their children to the child welfare clinic once a month until they are five years of age.

Materials:

- the baby book and the child's health record
- posters about how to feed children
- posters about mixed meals and snacks.

Stage 1: The baby book

Discussion:

- explain that participants should bring their children to the child welfare clinic once a month until the child is five years old
- describe how to read a child growth chart.

If the child is not active:

- it may be sick
- it might not be getting enough food.

An inactive child:

- will often be sick and apathetic
- might not have proper brain development and will be a slow learner
- is in bigger danger of dying before reaching the age of five years
- will be weaker and suffer from diseases later.

Stage 2:
How to feed children

Outcomes

By the end of this session, participants will be able to:

- feed their small children nutritious food.

Approach

...discuss

- using poster graphics, discuss the feeding of small children with the participants
- encourage parents to describe how they feed their children and their experiences
- if there are a lot of participants, divide them into small discussion groups.

Materials

Poster graphics.

Note:

- encourage participants to ask questions
- be sympathetic and understanding.

1. Breast feeding

Key messages:

- mother's milk is a perfect food for children
- babies should be breast fed 10 to 12 times every 24 hours
- no additional food is necessary, even when the weather is hot; this is because the baby's stomach is not yet developed enough to take other foods and babies can get infections from eating other foods.

2. Feeding at 4 to 6 months

Key messages:

- start with a food you can get easily, such as sweet potato (kumera)
- start with one food and give one to two spoonfuls each time, one to two times a day
- always mash the food you are feeding the baby
- add small amounts of new foods slowly
- try potato, banana, cabbage, pawpaw, pumpkin, young coconut; do not give the baby any hard or strong-tasting foods
- if the baby does not accept new foods, mix it with the foods the baby already eats
- you can a little breast milk on top of the food to get the baby to accept it
- always feed the baby with a clean spoon from a clean cup.

Regular weighing of young children can show up nutritional deficiencies.

Sasamunga Hospital Primary Health Care Unit, Choiseul, Solomon Islands.

3. Feeding at 6 - 12 months

Key messages:

- this is an important time because many babies stop growing well at this age
- until the child is six months old, breast milk is the most important food; now the child should eat five times a day; the young child's stomach is small and cannot get much food in it so it becomes empty in a short time
- feeding five times a day does not mean that you have to cook five times a day; you can give a good snack two times a day—try coconut, pawpaw and banana
- in the morning you can cook a pot of potato, cabbage and beans in coconut milk and serve it to the child two or three times during the day; before serving, always heat it until it bubbles; do not heat the same food twice; if food is left over, give it to someone else or throw it away
- you can now add foods such as fish, beans, egg and coconut milk to the child's diet
- you can also start to feed the child mashed and cooked nuts (raw nuts can be given when the child is two years old; the child will be able to eat them without choking)
- do not add salt or spices before the child is one year old; if you give the same food to the rest of the family, first take the child's portion out then add the spices for the family
- you do not need to add sugar to any of the foods; sugar could spoil the child's teeth
- you can clean the child's first teeth with water and with a brush such as a hibiscus stick, at least in the evening
- we will explain later how to make a mixed meal and a healthy snack.

4. Feeding at 1-2 years

Key messages:

- at this age the child can eat normal family food
- too much salt in the food is not good for the child or adult's health
- feed the child five times a day
- local foods are always more nutritious and are cheaper than store foods
- if your child is underweight feed six times a day
- keep breast feeding until the child is two years of age; remember that breast milk cannot replace the mixed meal or snack but it helps the child grow well and stay healthy
- remember that children, especially those under three years of age, need fat in their diet; in the Pacific islands, coconut is a good source of fat.

5. Feeding at 2 years of age and older

Key messages:

- if your child is underweight feed six times a day; otherwise, feed five times a day with two to three mixed meals and two to three snacks
- make sure your child eats a good breakfast, especially when he or she starts school; give the child a good snack to take to school
- if you follow the feeding schedule we have talked with you about you should notice that your children grow well, are sick less often and eat well and without problems
- it may sound like a lot of work to make sure your children eat well, are healthy and do well at school, but you do not have to stay up at night and take them to the clinic all the time.

Stage 3: Making mixed meals and good snacks

This stage can be covered in two or more sessions.

Outcomes

By the end of this session, participants will be able to:

- describe the foods that make up a mixed meal
- describe why local foods are better than foods bought in the store
- cook a mixed meal.

Approach

...discuss

- describe how local food is always better than store food that has been processed, that loses nutrients and might have added chemicals; for example, potato is better than rice; banana is a better snack than biscuits
- describe how fresh food is always better for the child and parent's health
- talk about how tinned fish and meat have a lot of salt that is not good for the body
- explain how you can grow all your good foods in a garden near the house
- explain how children six months and older, as well as adults, need two to three mixed meals and two to three snacks a day
- explain that a plateful of rice is not a mixed meal and biscuits are not a good snack.

Food for adults

To avoid becoming overweight, when preparing mixed meals and snack food for adults:

- use less coconut—half a coconut is enough for a pot
- eat a bit less each time if you eat more often.

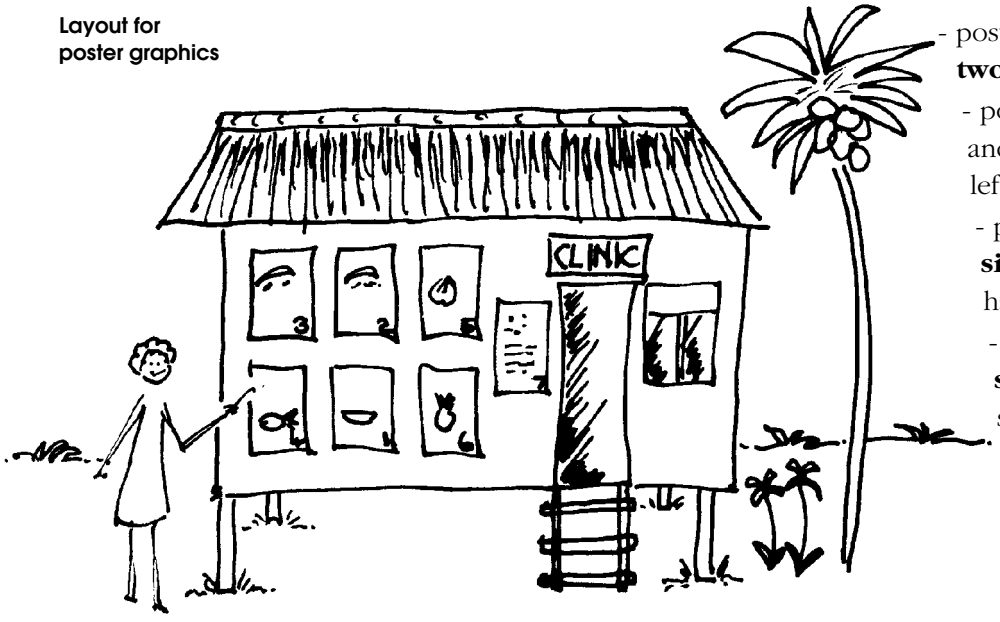
Making meals and snacks

Trainers: use the next seven posters to discuss with parents how to make mixed meals and healthy snacks.

Procedure:

- posters one to six shows how to make a mixed meal
- poster seven shows how to make a good snack
- set up the posters one by one
- explain each poster in this order:

Layout for poster graphics



- posters **one** and **two** in the middle
- posters **three** and **four** on the left hand side
- posters **five** and **six** on the right hand side
- place poster **seven** to the side of the other posters.

Revise

Revise the messages from the first set of posters on feeding babies and young children:

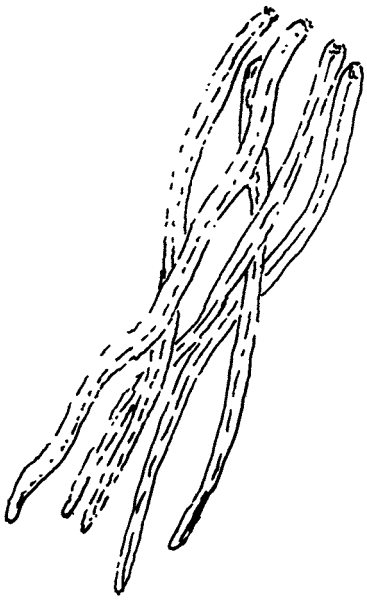
- children are likely to grow well if they eat nutritious food
- good feeding means giving breast milk until the child is two years old and providing mixed meals and snacks after six months.

Use words people understand

Do not use words that people might have difficulty understanding such as protein, energy-rich foods and so on.

It may be difficult to find useful local words to explain these terms. We want parents to understand our message.

For each poster use the messages that follow.



1. A mixed meal is a healthy meal

Key messages:

- to make a mixed meal we need to put at least three different foods on the plate
- if we give the child only rice, that is not a mixed meal
- children under the age of three years need fat in their diet; coconut milk is a good source of fat; food for small children can be cooked in coconut milk.

2. Start to make a mixed meal

Key messages:

- start to make a mixed meal by choosing one of the foods in the poster (potatoes, taro, cassava, yam, pana, banana, corn, rice, noodles, biscuits)
- local food is more nutritious and costs less that food from the store
- rice is one of the last foods to choose; noodles and biscuits are the very last we choose
- store foods can be used if you have nothing else.

3. Add beans, peas or nuts

Key messages:

- to the foods in poster 2 (attachment 9b2), add one of the foods from this poster 3 (attachment 9b3) (which is placed on the left hand side of your poster display)
- if you have your own home vegetable (sup sup) garden you can grow these foods year-round
- plant a few beans in your garden every three weeks; this will provide beans all the time.

Procedure:

- choose one of the foods from poster 3 on the left side of your poster display; this might be beans, peas or nuts.

4. Use an animal food instead

Key messages:

- instead of beans, peas or nuts you can use one of the animal foods such as eggs, fish or meat
- fresh food is always better than tinned food
- tinned food contains other things like chemicals and too much salt that are not good for our bodies
- if you do not have animal food, then you can use beans, peas or nuts.

5. Add vegetables to the mixed meal

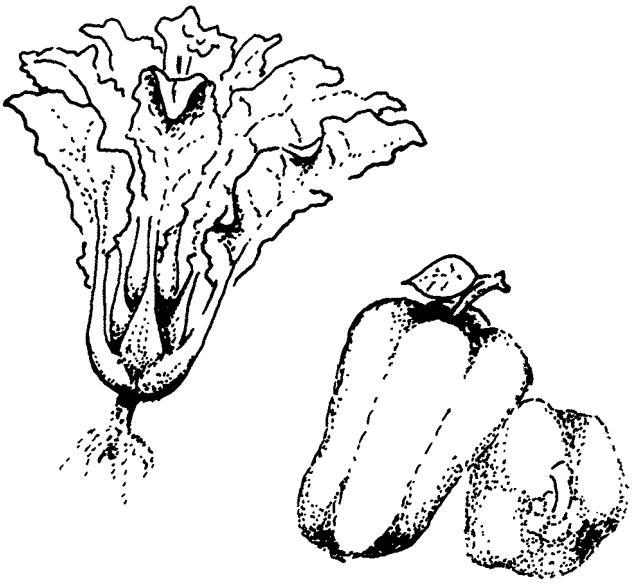
Key messages:

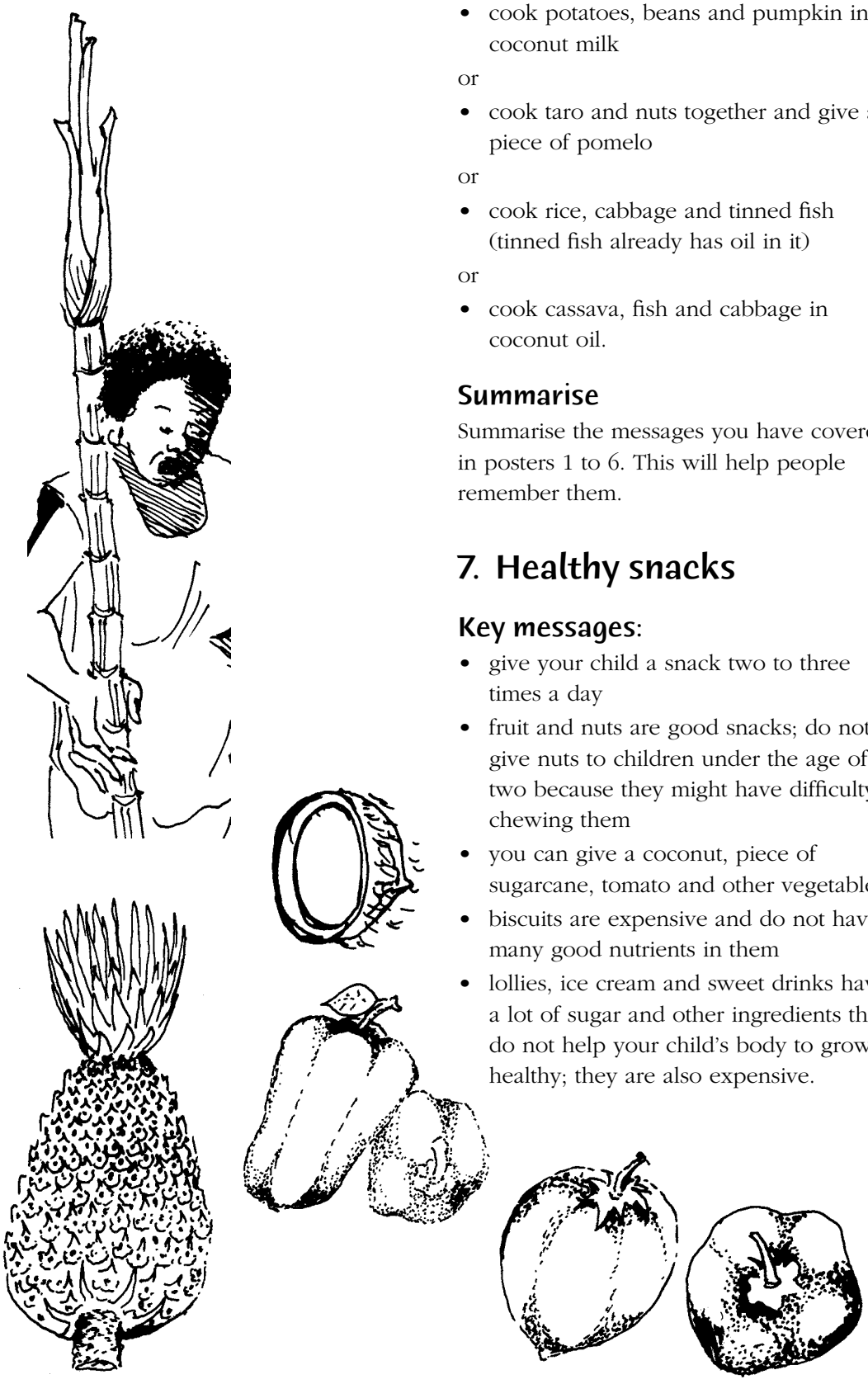
- if you have selected one of the root crops and beans or peas or an animal food, then you add one of the vegetable foods or greens
- children can eat many of the vegetable foods raw, such as cucumber or tomato
- when you cook vegetables remember not to cook them too long or the food will lose all its nutrients.

6. Use fruit instead of vegetables and greens

Key messages:

- instead of vegetables or greens you can choose one or more fruits
- it is good to have fruit growing around the house so you can pick it easily for a meal or snack.





Summarise posters 1 to 6

Key messages:

To make a mixed meal you—

- cook potatoes, beans and pumpkin in coconut milk

or

- cook taro and nuts together and give a piece of pomelo

or

- cook rice, cabbage and tinned fish (tinned fish already has oil in it)

or

- cook cassava, fish and cabbage in coconut oil.

Summarise

Summarise the messages you have covered in posters 1 to 6. This will help people remember them.

7. Healthy snacks

Key messages:

- give your child a snack two to three times a day
- fruit and nuts are good snacks; do not give nuts to children under the age of two because they might have difficulty chewing them
- you can give a coconut, piece of sugarcane, tomato and other vegetables
- biscuits are expensive and do not have many good nutrients in them
- lollies, ice cream and sweet drinks have a lot of sugar and other ingredients that do not help your child's body to grow healthy; they are also expensive.

How to feed children:

1. 0–4 months

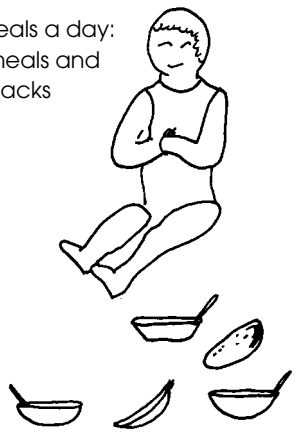
- breast feed only

2. 4–6 months

- breast feed
- start soft foods:
  - potato
  - pumpkin
  - coconut
  - cabbage
  - banana
  - pawpaw

3. 6-12 months

- breast feed
  - 5 small meals a day:
    3 mixed meals and
    2 good snacks



4. 1-2 years

- 3 mixed meals
- 2 good snacks
- breast feed

5. from 2 years up

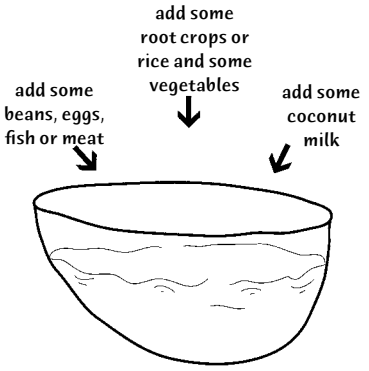
- 2-3 mixed meals
- 2-3 good snacks

Mixed meal

Mixed meals make healthy families

Vegetables for mixed meals can be grown in our sup sup garden

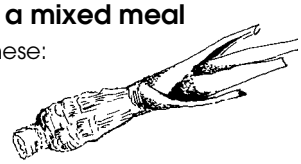
1. A mixed meal is a healthy meal



2. Start to make a mixed meal

Start with one of these:

- potato
- taro
- cassava
- yam
- banana
- corn
- rice
- (noodles or biscuits)



3. Add beans, peas or nuts

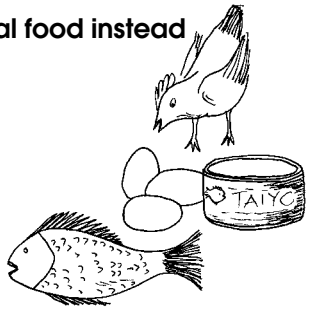
Then add one of these:

- beans
- peas
- nuts

4. Use an animal food instead

Add one of these:

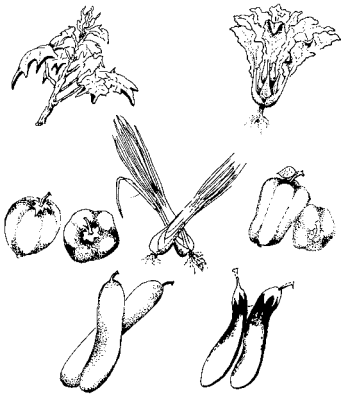
- egg
- fish
- seafood
- meat
- milk



5. Add vegetables to the mixed meal

Add:

- greens
- vegetables

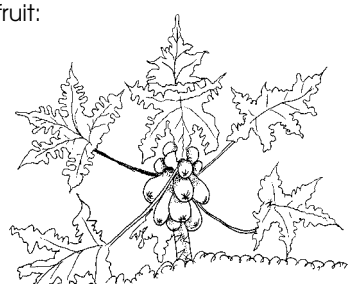


6. Use fruit instead of vegetables and greens

Add 1 or more fruit:

- pineapple
- paw paw
- banana
- apple
- banana
- star fruit

Grow fruit trees around your house



7. Healthy snacks

Have 2-3 snacks a day:

- coconut
- sugar cane
- banana
- paw paw
- pomelo
- nuts
- tomato
- pepper
- pineapple
- corn

Stage 4: Nutritious meals in the home

Outcomes

By the end of this session, participants will be able to:

- list foods in the home
- assess whether the foods in the home can make a mixed meal
- describe the preparation of a mixed meal.

Approach

...discuss

- the benefits of having the right foods to make a mixed meal
- some foods for a mixed meal can be grown in a home sup sup garden or in the bush garden
- the value of good local food (freshness, nutrition, no additives, low cost)
- short cooking times for vegetables
- hygiene in the kitchen
- the importance of each family member having their own plate and cup and eating enough food.

...demonstrate

- how to prepare and cook a mixed meal for the family.

...practice

- complete a food in the home worksheet.

Materials

- Food in the Home worksheet
- food and cooking utensils to demonstrate [preparation of a mixed meal
- poster graphic showing mixed meal and good snack foods.

1. Assess food at home

These are the foods that the family has available in the home now.

If the family has a home sup sup garden it may be useful to assess what is growing there. Food from the sup sup garden can be used to supplement food stored in the house in the preparation of mixed meals and snacks.

This information will inform you whether the family will be able to prepare mixed meals and good snacks from the food in the home. It will also help you to revise information about mixed meals and good snacks.

Outcomes:

By the end of this session, participants will be able to:

- list the foods the family has available in the home and/or the sup sup garden
- determine whether they have a sufficient variety of foods to prepare mixed meals and snacks.

Materials:

- enough copies of the Food in the Home worksheet to give each participant to use at home.

Using the Food in the Home Worksheet

Refer to the Food in the Home worksheet.

- the left hand box lists legumes, some vegetables and animal foods.
- the left-centre box lists root crops and banana, corn and foods made from grain (bread, noodles, biscuits)
- the right-centre box lists vegetables and fruits
- the right hand box lists coconut and sugarcane; these are snack foods.

Procedure:

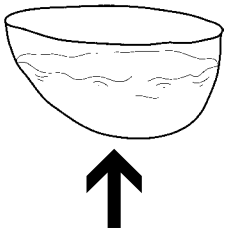
1. Participants **complete** the Food in the Home worksheet.
   - ask what foods the participants have at home now; tick off on the Food in the Home worksheet
2. **Assess** the completed worksheets.
   - check if the participants have foods from all three boxes at home; if they do not, discuss what they could do.
3. Review the information about making a **mixed meal**.
   - discuss with participants whether they have the foods in the home to make a mixed meal; if they do not have the range of foods, discuss what they might add.
4. Review information about **snack foods**.
   - go through the snack foods parents have at home and write them down; good snacks are foods like fruits and cucumber that do not need preparation and are easy to serve; if there is nothing else, you can give leftover food from the main meal as a snack; remind the parents that local fruits are better for them than biscuits and other store food.
5. Facilitator **gives examples** of the types of foods that can be combined into mixed meals and good snacks daily.
6. Participants form into small groups. Facilitator lists the foods available. Each group writes down an outline of meals for one day.
7. **List foods** that could be produced close to the house, such as vegetables in a sup sup garden, fruit planted around the house or eggs from a chicken house.
8. **Summarise** how to make a mixed meal by using the three types of food.
   Explain that if none of the foods contain fats, add coconut milk.

FOOD IN THE HOME ANALYSIS

Food analysis of:.....

WHAT FOODS DO YOU HAVE IN THE HOME THIS WEEK?

MIXED MEAL



add coconut milk (especially if the child is under 3 years)

GOOD SNACKS

- beans ☐
- peas ☐
- nuts ☐
- egg ☐
- fish ☐
- seafood ☐
- meat ☐
- canned fish ☐
- canned meat ☐
- milk ☐

- potato ☐
- taro ☐
- cassava ☐
- yam ☐
- banana ☐
- corn ☐
- rice ☐
- bread ☐
- (noodles) ☐
- (biscuits) ☐

- cabbage ☐
- taro leaves ☐
- fern ☐
- bush leaves ☐
- pumpkin ☐
- pepper ☐
- tomato ☐
- cucumber ☐
- eggplant ☐
- pawpaw ☐
- pomelo ☐
- orange ☐
- five corner ☐
- guava ☐
- mango ☐
- pineapple ☐
- watermelon ☐
- bush apple ☐

- coconut ☐
- sugarcane ☐
- banana ☐
- pawpaw ☐
- pomelo ☐
- nuts ☐
- tomato ☐
- pepper ☐
- pineapple ☐
- corn ☐
- other ☐

Give 3 good meals and 2-3 good snacks every day

Give an example of food for one day:

1. Mixed meal—morning ....
1. Good snack—mid-morning .....
2. Mixed meal—midday ....
2. Good snack—late afternoon .....
3. Mixed meal—evening ....

(3) Good snack—before sleeping .....

2. Cooking demonstration

Outcome:

By the end of this session, participants will be able to:

- describe the preparation of a mixed meal.

Key messages:

- mixed meals and good snacks are best for family health
- local foods are fresher, more nutritious and cheaper than store food
- keep cooking times for vegetables and greens short
- fat in the form of coconut milk is important for children
- practice hygiene when cooking; keep cooking and eating utensils clean
- eat enough food
- many of the vegetables that go into the meal can be grown near the house in a sup sup garden.

Approach

...discuss

- the value of good healthy local food (freshness, nutrition, no additives, low cost)
- hygiene in the kitchen.

...demonstrate

- cook a pot of nutritious soup

or

- get some five corner (carambole), pawpaw, pineapple, bananas, cooked corn or other foods to share at the workshop.

If you have no time to demonstrate cooking at the workshop, cook earlier by yourself or ask some of the parents to help you.

Bring the prepared food to the workshop and have examples of the ingredients you used displayed on the table.

Materials

- food and cooking utensils.

Procedure

1. Discuss value of healthy food.
2. Discuss hygiene.
3. Demonstrate how to make a nutritious soup.

   Ingredients:
   - sweet potato
   - beans
   - cabbage, pumpkin or pawpaw
   - cooked eggs
   - coconut
   - water.

...process

1 Take the same amount of potatoes, beans and cabbage, pumpkin or pawpaw.

2 Cut them into small pieces.

3 Cook the vegetables in coconut milk
   - start by cooking the potatoes
   - greens and pawpaw need only a short time to cook.

4 You can add cooked, mashed eggs at the end of the cooking.

5 Do not make the soup too watery because it will be low in nutrients and energy; make it thick.

Children should eat the solid bits first.

13. Community food security assessment

Outcomes

By the end of this session, participants will be able to describe:

- changes taking place in the village food production system
- issues affecting food production
- the security of the village food supply at the present time and into the near future.

Key messages

Explain:

- that the workshops will identify what changes are taking place to the village food supply
- how changes to population numbers can affect the availability of land for farming and the amount of food that can be grown
- how soil improvement can increase soil fertility
- how reducing the number of insect pests that eat our crops can increase the amount of food available
- explain how cash cropping, such as plantation crops, can affect how much land is available for farming
- villagers can influence the effect these changes have on their food production.

Approach

...discuss

- set up a discussion to identify the trends affecting the village's food supply; these might include the declining availability of farming land, the expansion of cash crops into areas used for subsistence gardening, declining soil fertility, rapid expansion of the village population, the increasing consumption of store food
- encourage participants to make deductions about the future of their food supply from the information gathered about changes that have occurred, current trends in food production and the main issues facing food production

...practice

Select the techniques most relevant to your circumstances.

- use matrices or other techniques to gather information about how farming and the amount of land available for farming changed over time
- if it will provide useful information, use transects to identify how land is used in the village surroundings or in bush gardens; use information gathered during the transects to make sketch maps showing land use
- make a written record of the sessions and produce a written report for use by the project team and villagers.

A mapping exercise in the sand

Materials

- found objects such as coconut shells, clams, small sticks and shells to use as markers in the matrices
- flip chart paper and marker pens to record information.

Information is important

Reliable, cross-checked information is critical to assessing village food security. Cross-checking can be done by:

- asking for the same information from different people at different times
- observation in the field
- talking to people with knowledge of food production and community health, such as nurses and clinic staff.

To build up a picture of how the availability of food has changed over time and led to the present situation, we collect three types of information:

1 **historic information**—how food production has changed over time; this information identifies significant events and trends affecting food production and agricultural landuse

2 **the present situation**—
   - what food crops are most important to village families?
   - what is the trend today in food production— increasing? decreasing? stable?
   - how reliant is the village on imported, store-bought food?
   - what is the condition of the village's farming soils?
   - what crops are being grown?
   - what new crops have become popular and why?
   - is there a reliable source of vegetative planting material (cuttings and tubers) and seeds?
   - what is the extent of insect pest damage and plant disease?
   - what are the most important insect pests and diseases?
   - how is food stored after harvest and how effective is this?
   - are there nutrition-related health disorders?

3 **issues**—what are the most important issues facing food production? What can be done about them?.

Assessment provides information for training

Information discovered during the community food security assessment provides the basis for the planning of future training activity.

The information might show:

- the overall health of a community and any nutritional deficiencies
- the farming cycle—planting and harvesting times, periods when the demand on the villager's time is high or low
- the role in the village food economy of fishing, hunting and the keeping of domestic animals such as chickens and pigs
- whether there is a 'hungry period' when food is in short supply, causing a drain on family funds for the purchase of food
- the most important crops
- what crops are grown, their varieties and what crops are sold to generate income
- the condition of farm soils
- where villagers obtain seed and vegetatively reproduced planting material such as cuttings and root divisions
- changes to cropping patterns and crop availability over time
- shifting cultivation patterns and the length of fallow periods
- any issues with concerning access to land.

Information collection techniques

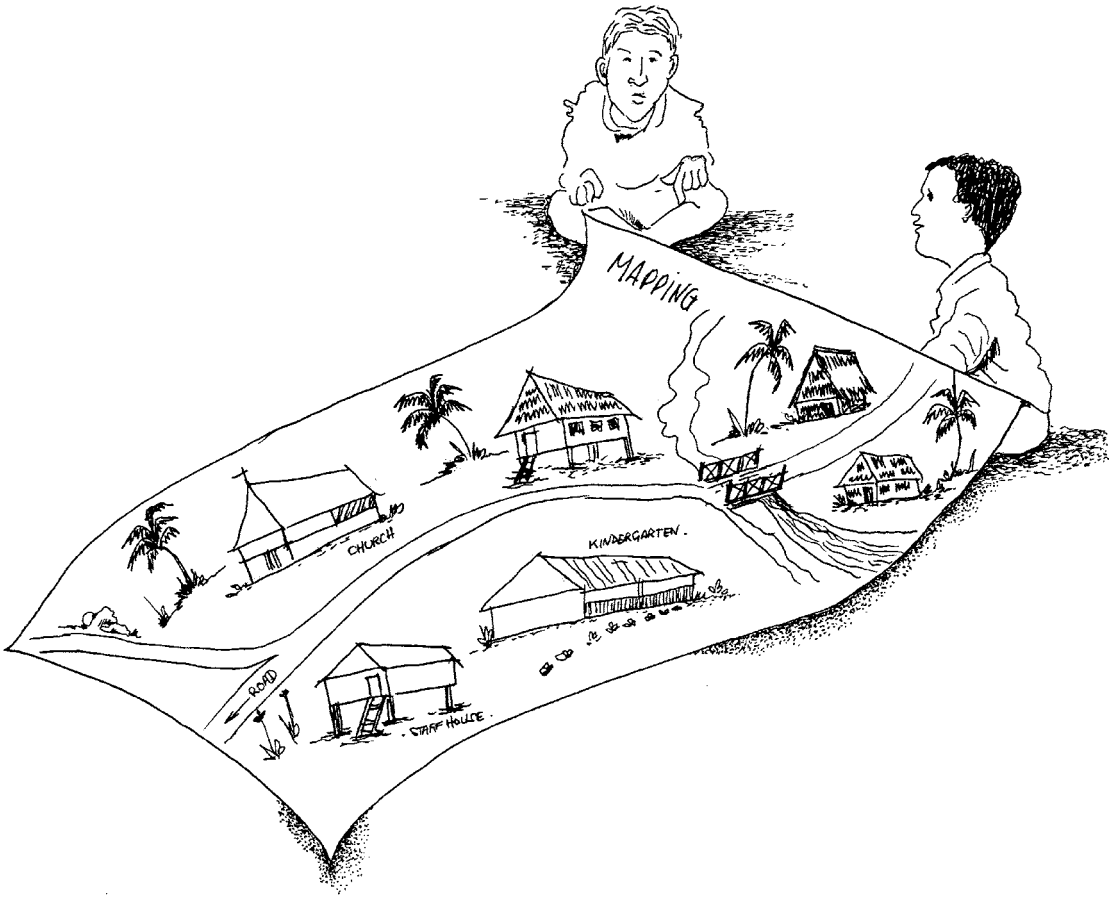
The techniques we use to collect information comes from the Participatory Rural Appraisal (PRA) approach.

PRA offers techniques that:

- are participatory—that involve the workshop participants who do the actual work of information collection
- give to participants a measure of control over what information is collected
- are applicable to participants with low literacy skills
- are simple—they require little by way of equipment and are simple to carry out.

The techniques consist of:

- **mapping and modelling**—drawing a map on the soil, flip chart or blackboard or making a model in the soil of the countryside surrounding a village; this makes a picture of landuse surrounding a village
- **matrix**—a row of columns and rows drawn in the sand or soil, on flip chart paper or a blackboard and filled with information; we use matrices to collect different types of information such as history of food production, importance of food crops, planting and harvesting calendars



Information collection techniques (cont.)

- **tables**—a number of columns in which information with some characteristic in common is written
- **mind map**—a diagram showing ideas, presented in graphical form, brainstormed around a theme; the brainstorm ideas are written down without analysis or discussion; analysis follows, links between ideas may be made in the mind map
- **transect**—groups walk a predetermined path over the land to identify and note what the land is being used for or to gather relevant information, such as soil condition or the incidence of insect pests in fields
- **discussion**—groups discussion is important to determine the relevance of information and to agree on issues facing food production; private discussion may be used for the same purpose and to cross-check information already collected.

For use in discussion, hand drawn graphics present information in a simple way.

This graphic shows what food plants are grown inside and close to the village as well as the bush garden.

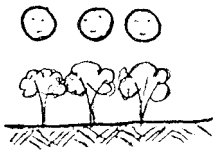
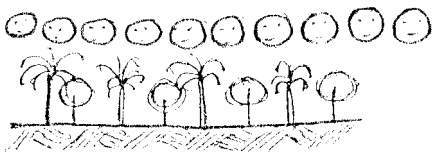
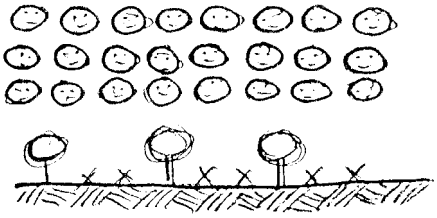
The facilitator:

- familiarises participants with the process
- assists participants identify relevant information.

If need be, information may later be verified through facilitator or group observation in the field or by other processes.

Developing a crop importance matrix, Solomon Islands.

The matrix shows the most important crops to the villagers and what crops are grown for sale at the local market.

BEFORE WAR	
Population	Fewer people.
Soil fertility	→ → → 
Crops	Small gardens, more land, big bush. edu, taro, yam, pana–main foods. Ngali nut.
AFTER WAR	
Population	More people.
Soil fertility	→ → → 
Crops	Coconut cropping introduced. Cassava, corn introduced.
NOW	
Population	Staka tumus (too many people).
Soil fertility	Not enough land - soil not fertile. 
Crops	Pana, yam , edu, taro, kumera, cassava, kakana, cabbage.

Residents of Takwa village drew up this table to track changes in population, soil fertility and crops since the Second World War.

COMMUNITY FOOD SECURITY ASSESSMENT

Identify the trend in food production in the recent past

↓

Identify the existing situation regarding food availability and food production in the village

↓

Make decisions about the security of the village food supply in the future

↓

Use the information collected to identify priority areas on which to focus the training program

↓

Design and implement training in selected areas (refer to Planning the Training Program page 13)

Procedure:
1. Collecting information

The first task of our three stage process is to collect historic information that will tell us about changes in the past leading to the situation we find today.

Trend analysis

This matrix:

- tracks changes to a resource or a community over time and identifies the trend taken by the resource—such as declining, increasing or stable
- is useful for identifying trends affecting crops grown, food available and village population changes.

This process can be led by the project facilitator or by a villager trained in what to do.

Process:

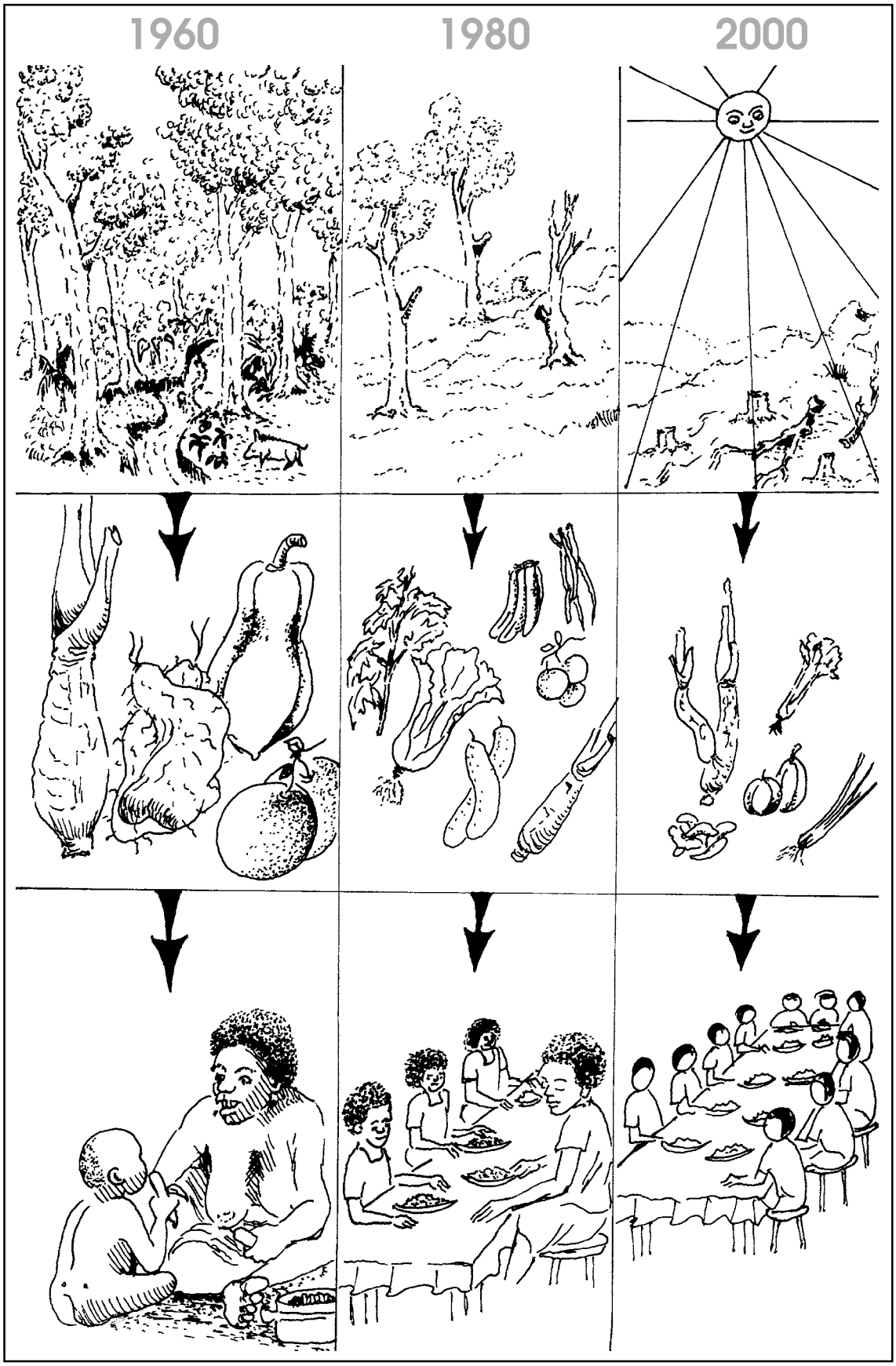
- draw a matrix on the ground or on paper
- across the top of the matrix, on the horizontal axis, break the period being examined into relevant shorter periods such as years
- on the vertical axis a list of events affecting food production is listed, such as weather events like drought, and cyclone; conflict, war and refugee inflow; cash cropping and so on
- ask participants to start at the earliest period for which information is being collected and to list information relevant to all the categories listed on the vertical axis
- when the matrix is finished, the facilitator uses questioning to summarise the information, identifying the main influences on village farming, which of them are still having an effect, the main trends in farming over time and whether food production is declining, stable or increasing.

The historic data matrix has identified the main influences affecting farming, whether food production is growing or declining and how changes have occurred over the time span selected.

An example of a trend analysis using a table.

For the period before World War Two, after the war and for the present time, the table identifies changes over time in village population, the extent of natural environments, soil fertility, distance from village to garden, the amount of food produced and the crops grown.

Developing the table provided the stimulus for participants to reflect on the extent to which conditions had changed and to think about the future.



A graphic developed from a trend analysis matrix similar to the table shown in the photograph on the previous page. Covering the 40 years since 1960, the graphic represents in pictures how forest cover has declined, food production has fallen and population has increased.

2. The present situation

In this stage, the facilitator again uses the matrix to identify:

- the importance of different crops the villagers grow for subsistence or for sale at the market
- what crops they would like to grow but do not have seed, cuttings or tubers to grow
- what foods are bought in from outside the village and how reliant village families are on store-bought food.

If necessary, a transect across a representative sample of farmland can be made to identify areas used for different crops and crop loss to insect pests. This shows the things that affect crop production.

Food crop importance and availability matrix

This matrix identifies the relative importance of food crops and their availability through the year.

Process:

- draw up a matrix
- list crops grown and main foods eaten by families down the vertical axis
- list headings across the horizontal axis: plenty available from garden/ little available from garden/ bought from store/ would like to grow but do not/ grown for market/ high food importance/ low food importance
- participants place a marker in the relevant boxes in the matrix
- the facilitator draws the information together to create a picture of what foods are the most important, how reliant families are on store foods, the crops the project might be able to assist farming families acquire and the division of food production for subsistence and the market.

Templates cut from paper or cardboard provide an alternative to the use of the matrix and tables for the collection of information.

Here (above), participants group crops according to whether they grow them or buy them from the store.

(left)... templates showing food bought from the trade store.

3. Cropping calendar

The cropping calendar tells us about the distribution of farm work through the year:

- when different crops are planted, harvested and processed
- busy and less busy times of the year
- the workload of men and women where cropping entails gender-specific activities
- labour needs and availability at different periods of the cropping cycle
- the existence of any 'hungry period' during which village food production is low, food has to be bought from the store or people have reduced food consumption.

Process:

- draw a matrix
- on the vertical axis write a list of crops grown
- on the horizontal axis write the months of the year
- select markers (such as coconut shells, seashells, clamshells, fruit) to represent planting and harvesting times
- ask participants to place markers representing planting and harvesting times for cash crops
- use another marker to represent crops that are continually planted and harvested through the year.

A village farmer places a marker in a planting calendar matrix.

The matrix is drawn in the sand. Objects such as clam shells, coconuts, sticks and shells are used as markers.

A facilitator or note-taker draws and writes the information in a notebook. This is later documented (as shown next page) and used in the planning of the training program.

Planting calendar

Many crops can be continuously planted in Takwa.

This includes important root crops like edu and kaiai. Bibi and kusaia are other crops we can plant and eat all year.

This planting calendar shows us when plants are planted and harvested in Takwa.

Takwa planting and harvest calendar...

PLANT	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Kakama (Swamp Taro)												
Alo (Taro)												
Karofera (Kang Kong Taro)												
Fana (Pana)												
Kai (Yam)												
Kai Roki (Kumera)												
Kaiai (Cassava)												
Bou (Banana)												
Niu (Coconut)												
Edu (Alocassia Taro)												
Kusaia (Slippery Cabbage)												
Bini (Bean)												

SCORING

- Coconut–harvest
- Clamshell–planting
- Stick–growing time
- Leaf– continuous planting and harvest

Heavy Rain Wet Season — Dry Season — Wet Season

Bad time for vegetables- best later

Good bearing Kumera

Less fruit on Kumera

Kai Roki good planting

Kai Roki good harvesting

Busy planting Yam, Pana

4. Soil condition matrix

If needed, an estimation of the fertility and condition of village farming soils can be made by walking a transect.

A transect is a type of map:

- teams walk a preselected course to identify a common set of information
- a note taker with each team draws a rough sketch map of the course walked, marking in relevant facts such as soil condition, crops grown, insect damage visible, buildings, waterways or whatever information you want to collect.

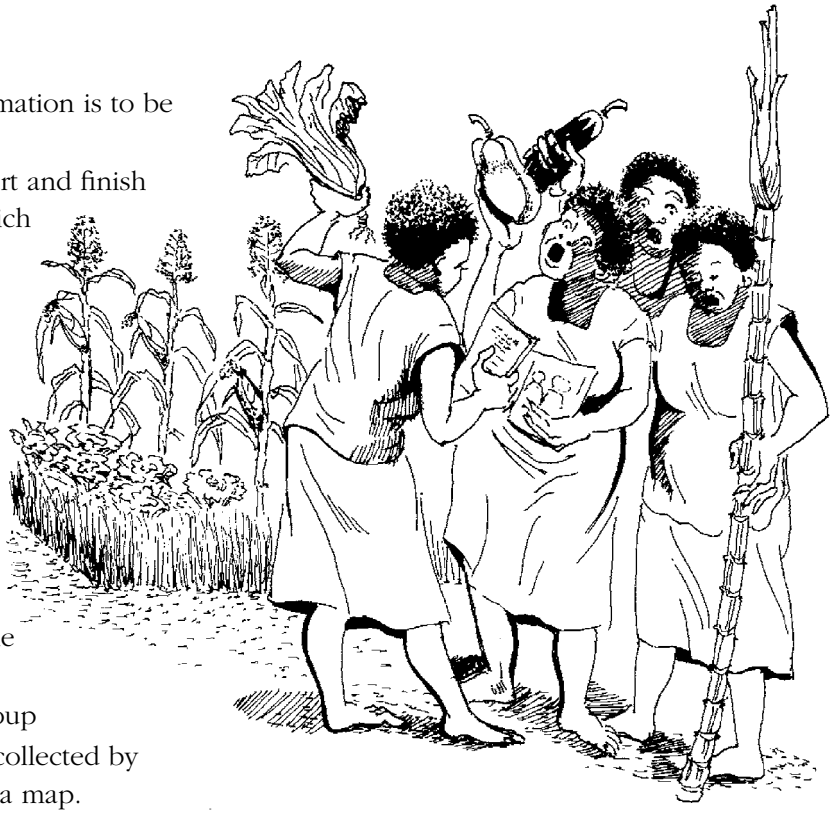
If all farming areas cannot be assessed, then the help of the participants will be necessary to select a representative area.

Another approach would be to divide the workshop into groups of three to five and do transects over different areas.

Be sure to include a literate person in each team to record and draw up what the teams discover.

Process:

- decide on what information is to be collected
- decide on transect start and finish points and routes which will provide the information sought
- divide group into teams of three to four and include a note-taker in each team to record the information collected
- walk the transects, identify and record the information
- report back to the group
- compile information collected by different teams on to a map.



5. Combine information

A picture of the present situation affecting farming in the village is created when the information collected during this stage is brought together by the facilitator and participants.

We have identified:

- the foods most important to villagers
- whether the foods are plentiful or in short supply
- the potential to grow extra food to generate income at market
- the potential for farmland soils to sustain increased farming
- the trend in food production, diversity and crops over time.

We have the information that we now use to identify the most important issues affecting food production.

6. The future

With our baseline information having identified trends in the past that have led to the present farming and food supply situation and what the characteristics of that situation are, we can now identify the major issues facing village food production and, if they are negative, look to solutions to solve them.

The process:

1. Explain that we are going to find out what the big issues that support or limit food production are at the present time.
2. Summarise the information collected about historic trends and the present situation.
3. Using questioning, help the participants draw out information about issues such as land availability or tenure, soil fertility, insect pests, drought, population increase, availability of seed, competition from plantation crops and other factors influencing farm productivity, including crops and domestic animals (such as pigs) as well as hunting and fishing, if these are important sources of food.
4. The facilitator or note taker makes a list of these things on the board or on a flip chart.
5. The facilitator then explains how to use the brainstrorming technique to suggest solutions to these issues and writes the ideas on the board; discussion of the points written up during the brainstorm produces a shortlist from which areas can be selected for priority training
6. The facilitator then helps the participants determine which of their ideas are achievable and which of them the project could assist the villagers with; these become the focus of future workshops.

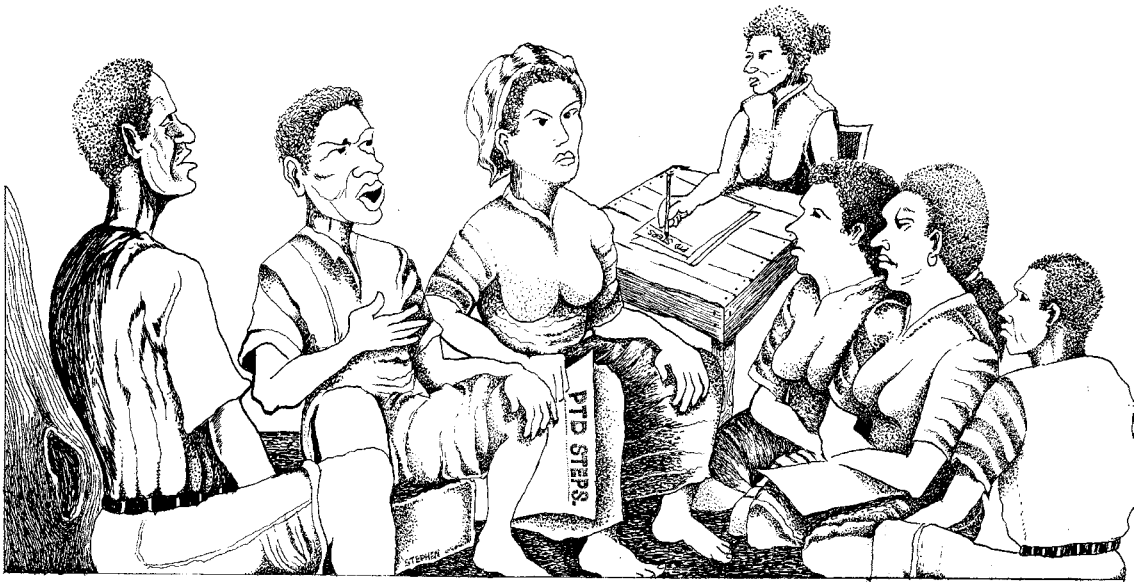
Plan the training program

The information collected is used by project staff to plan a training program with the villagers, now that they have identified the areas of greatest need.

After the facilitators return to their project base, a written report is produced, summarising the techniques used and the information collected.

A copy is supplied to the villagers to provide them with a record.

Now that the training needs of the villagers have been identified, the next phase is to plan a sequence of workshops that make up the training program.



Attachments:

Flip chart graphics:

1. Living and non-living fences:
    a) Living fence of pineapple
    b) Living fence of Gliricidia trees and bamboo
    c) Living fence of vetiver grass
    d) Big bush garden divided by living fences
    e) Non-living fence of old fishing net and posts
    f) Non-living fence of logs
2. Basket gardens
3. Table gardens
4. Using mulch:
    a) Soil problems: no mulch
    b) Why use mulch?
    c) Making a mulched garden
    d) Materials for mulching
    e) Mulching with Gliricidia
5. Making a nursery
    a) Making a nursery: planting mix
    b) Making a nursery: planting seeds
6. Legumes
    a) How do legumes fix nitrogen?
    b) Identifying legumes
    c) Alley cropping with Gliricidia
7. Safe pest management
    a) Insect life cycle
    b) Identifying insects in the garden
    c) Plants used to make botanical sprays for pest management
    d) Using botanic sprays
    e) Benefits of botanic sprays
    f) Crop rotation

FLIP CHART GRAPHICS (continued):

8. Keeping chickens
    a) The needs and functions of chickens
    b) The mobile chicken house
    c) Moving the mobile chicken house
    d) Feeding and caring for chickens
9. Nutrition and local food
    a) How to feed children:
        1. 0–4 months
        2. 4–6 months
        3. 6-12 months
        4. 1-2 years
        5. from 2 years up
    b) Mixed meal
        1. A mixed meal is a healthy meal
        2. Start to make a mixed meal
        3. Add beans, peas or nuts
        4. Use an animal food instead
        5. Add vegetables to the mixed meal
        6. Use fruit instead of vegetables and greens
        7. Healthy snacks assessment

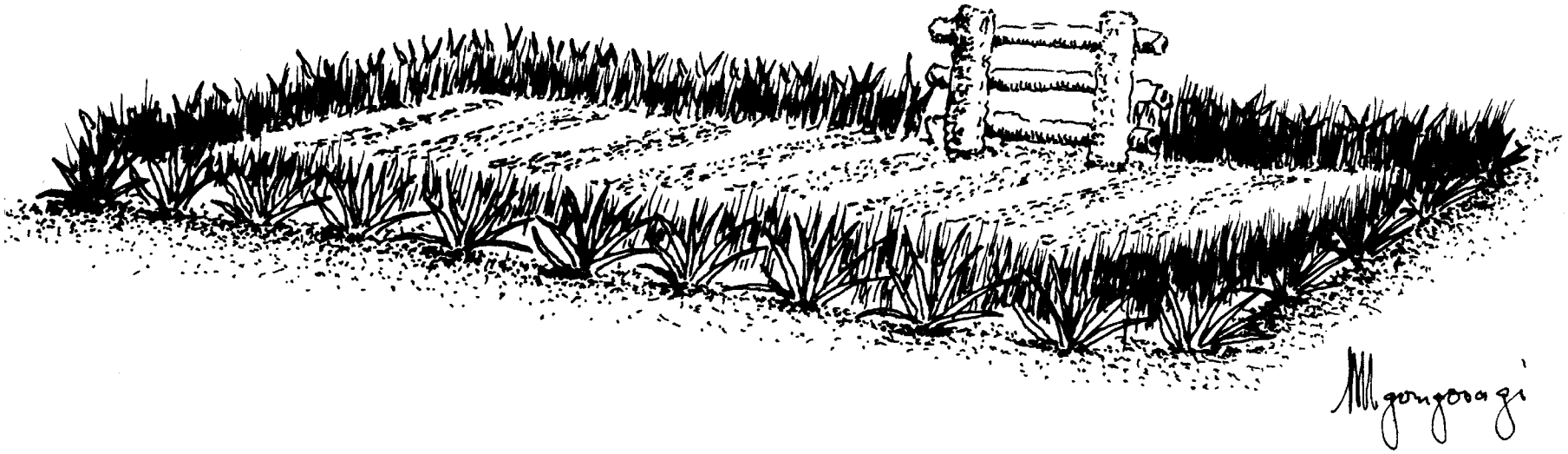
1. Living and non-living fences

Living fence of pineapple

The pineapple plants are placed close together so that their leaves touch when they have grown and they form a barrier.

Inside you plant vetiver grass close together to keep chickens from flying over the pineapples.

A gate has been built to provide easy access for people.

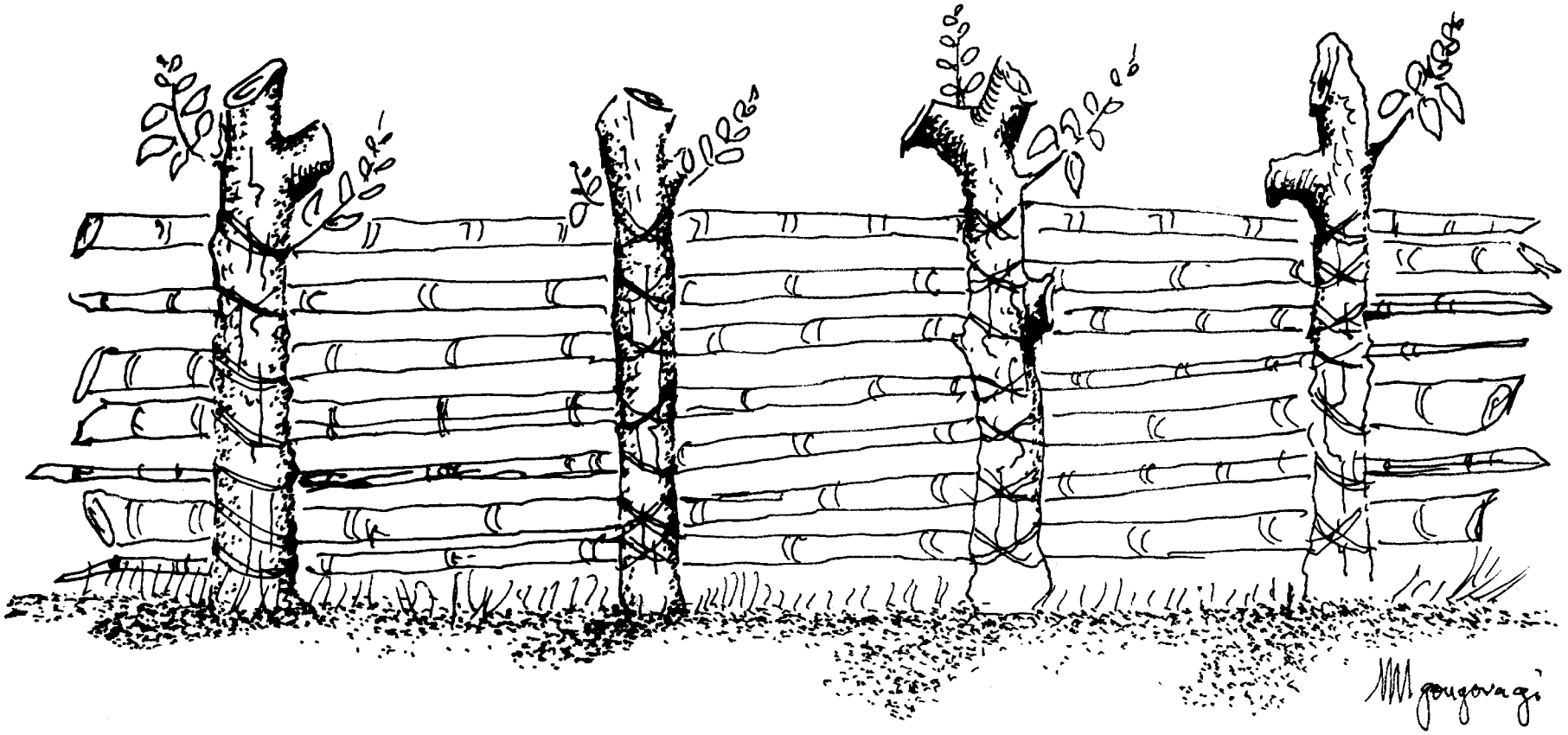


Living fence of Gliricidia trees and bamboo

Cuttings of Gliricidia trees planted as posts.

Bamboo poles have been cut and tied to the Gliricidia posts.

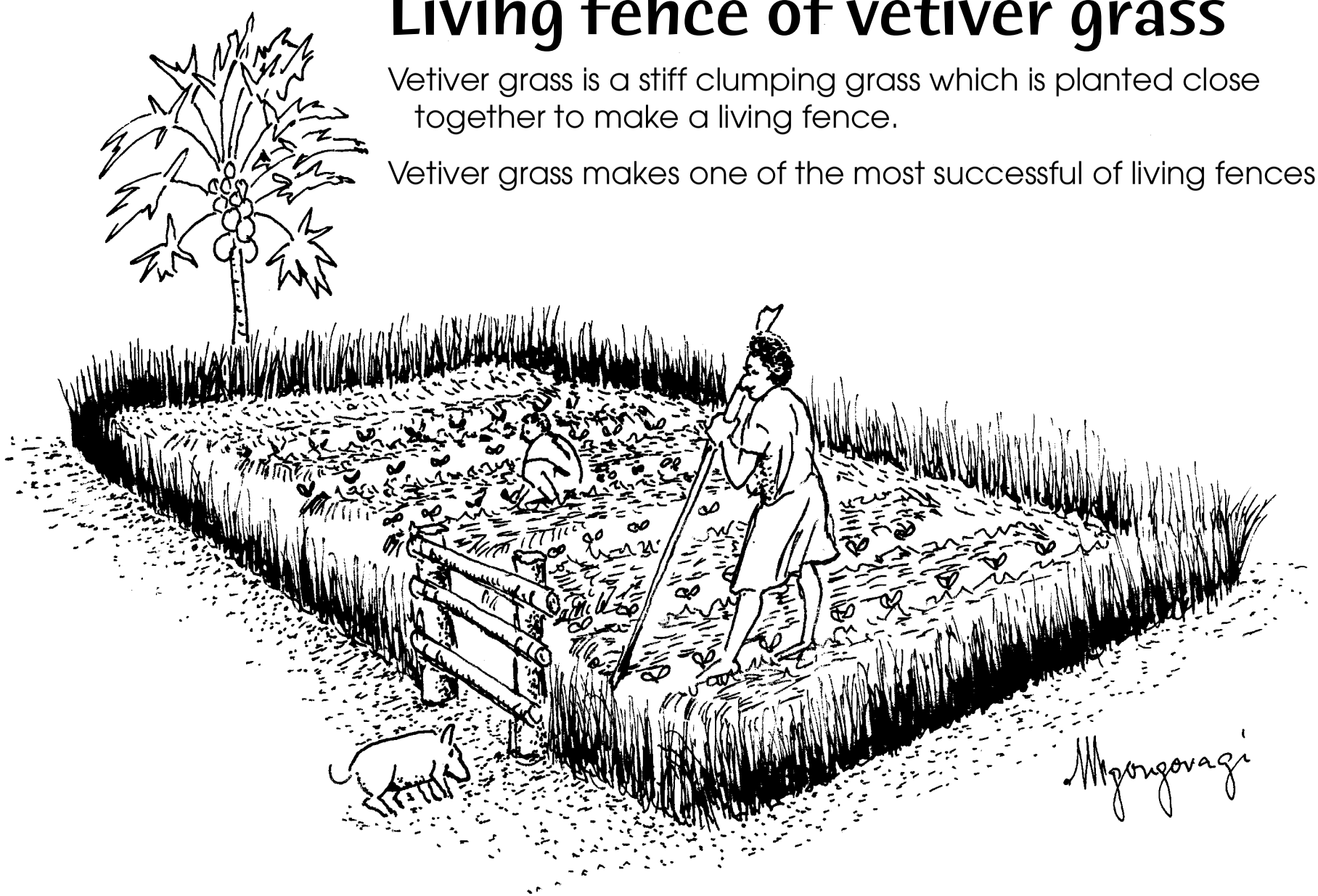
The bamboo poles are tied close together to stop chickens or dogs climbing between them and getting into the garden.



Living fence of vetiver grass

Vetiver grass is a stiff clumping grass which is planted close together to make a living fence.

Vetiver grass makes one of the most successful of living fences.

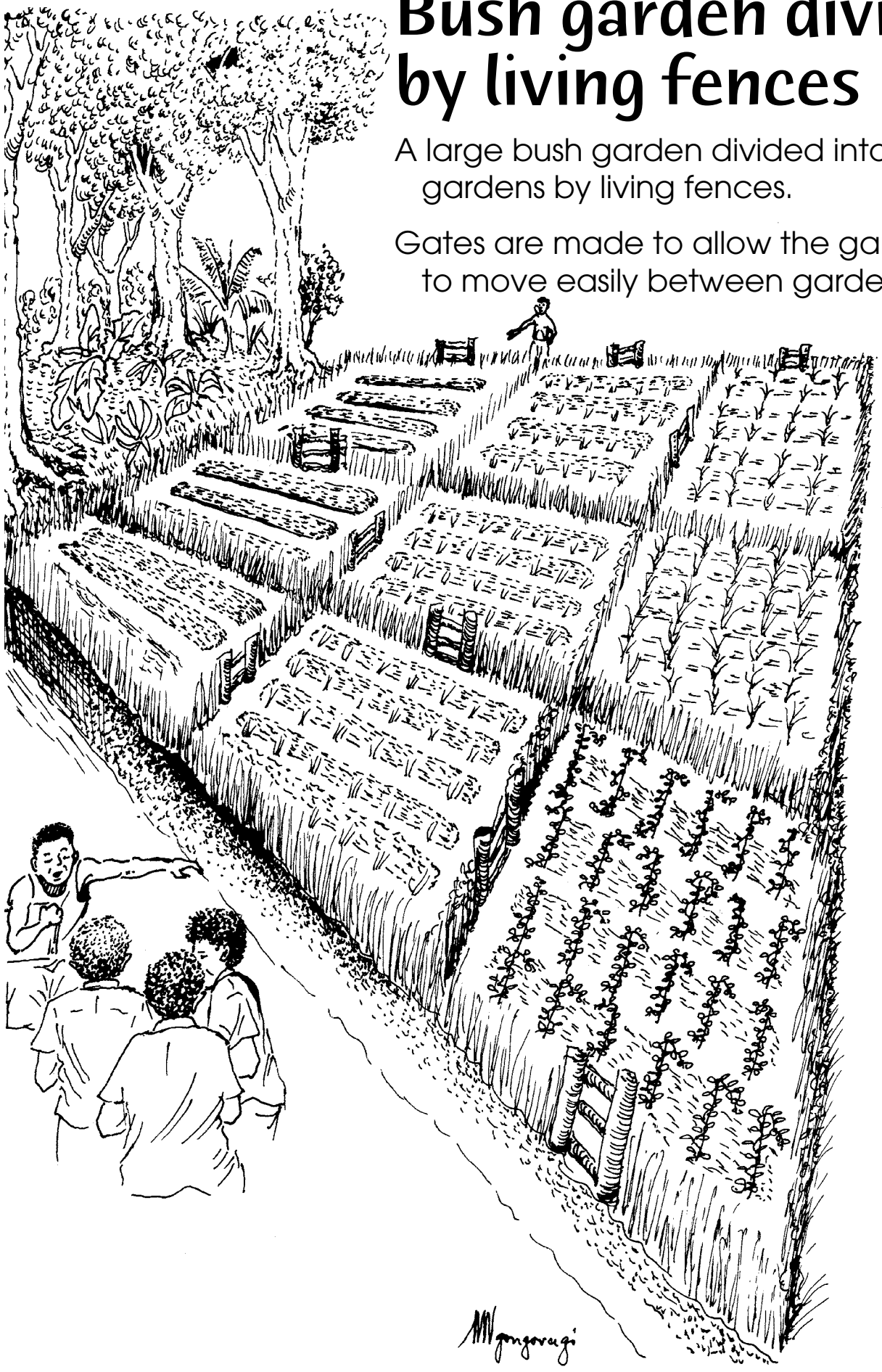


1d)

Bush garden divided by living fences

A large bush garden divided into smaller gardens by living fences.

Gates are made to allow the gardeners to move easily between gardens.

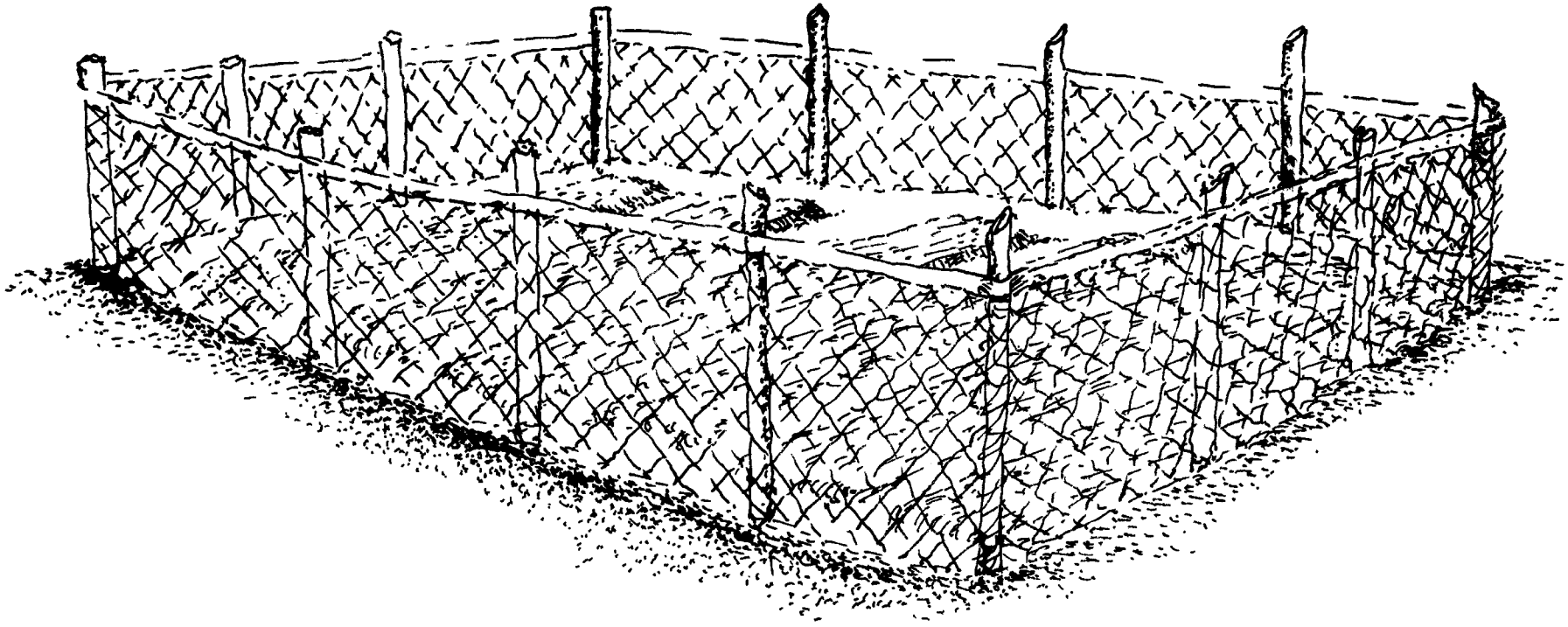


Non-living fence of old fishing net and posts

A non-living fence made of old fishing net stretched between posts.

The net is pulled tight and tied to the posts with rope.

Any holes in the net must be sewn closed to stop animals getting into the garden.

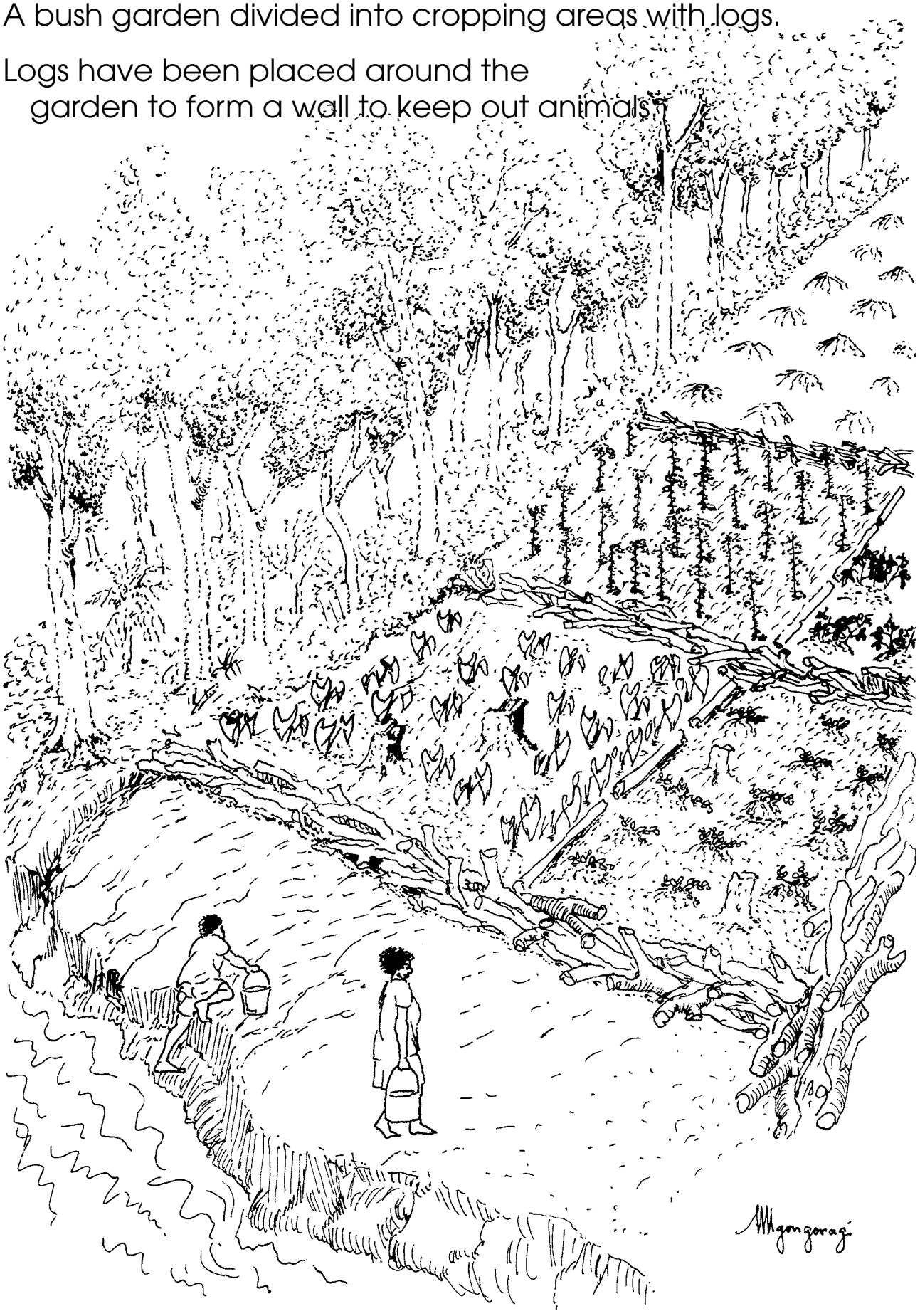


1f)

Non-living fence of logs

A bush garden divided into cropping areas with logs.

Logs have been placed around the garden to form a wall to keep out animals.



2. Basket gardens

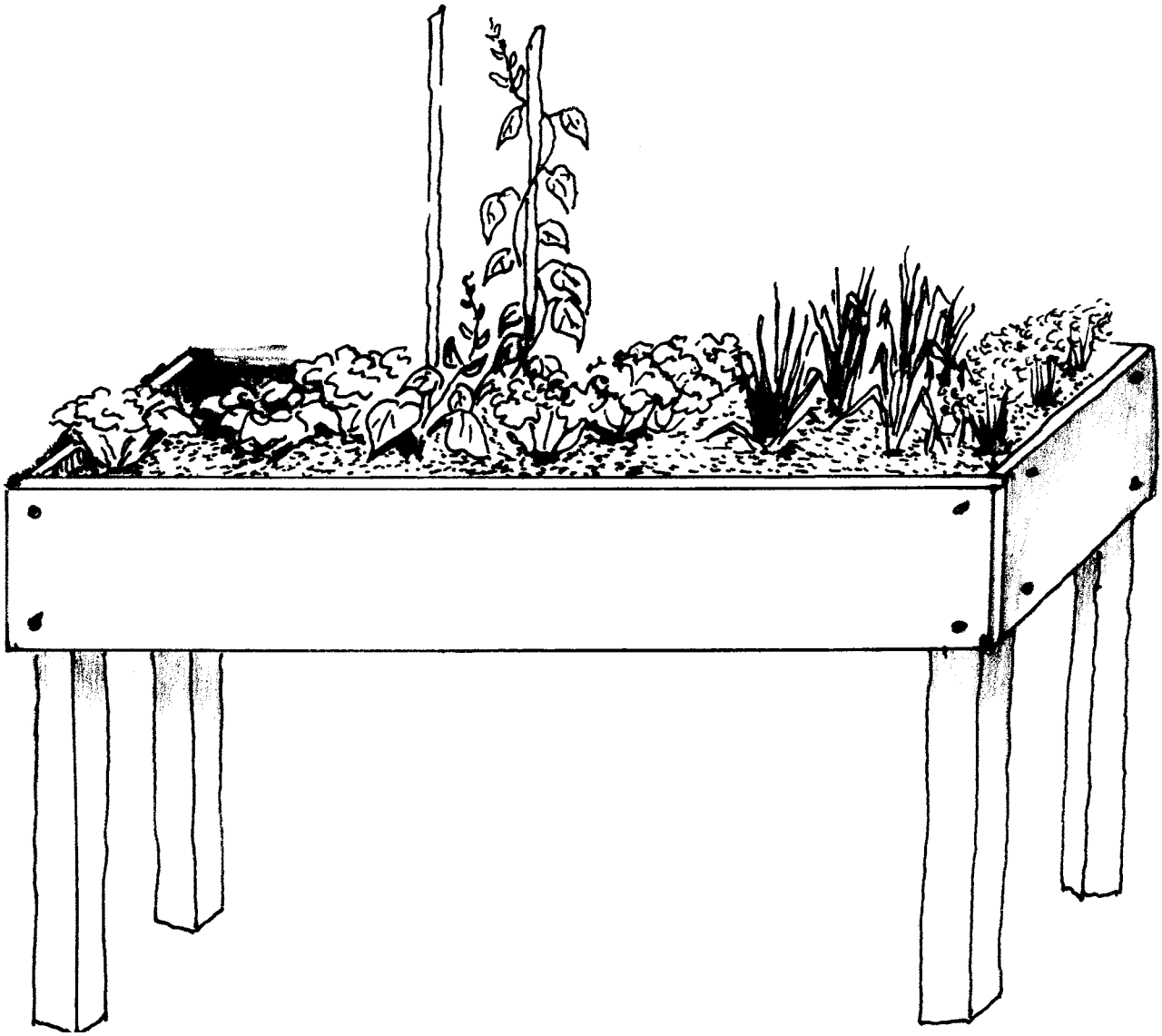
Basket gardens are made from dry banana leaf woven between bamboo sticks placed in the ground. They are then filled with organic matter.

The plant or seed is placed into the organic matter.

3. Table garden

The table garden lifts vegetables above the reach of chickens, dogs and pigs.

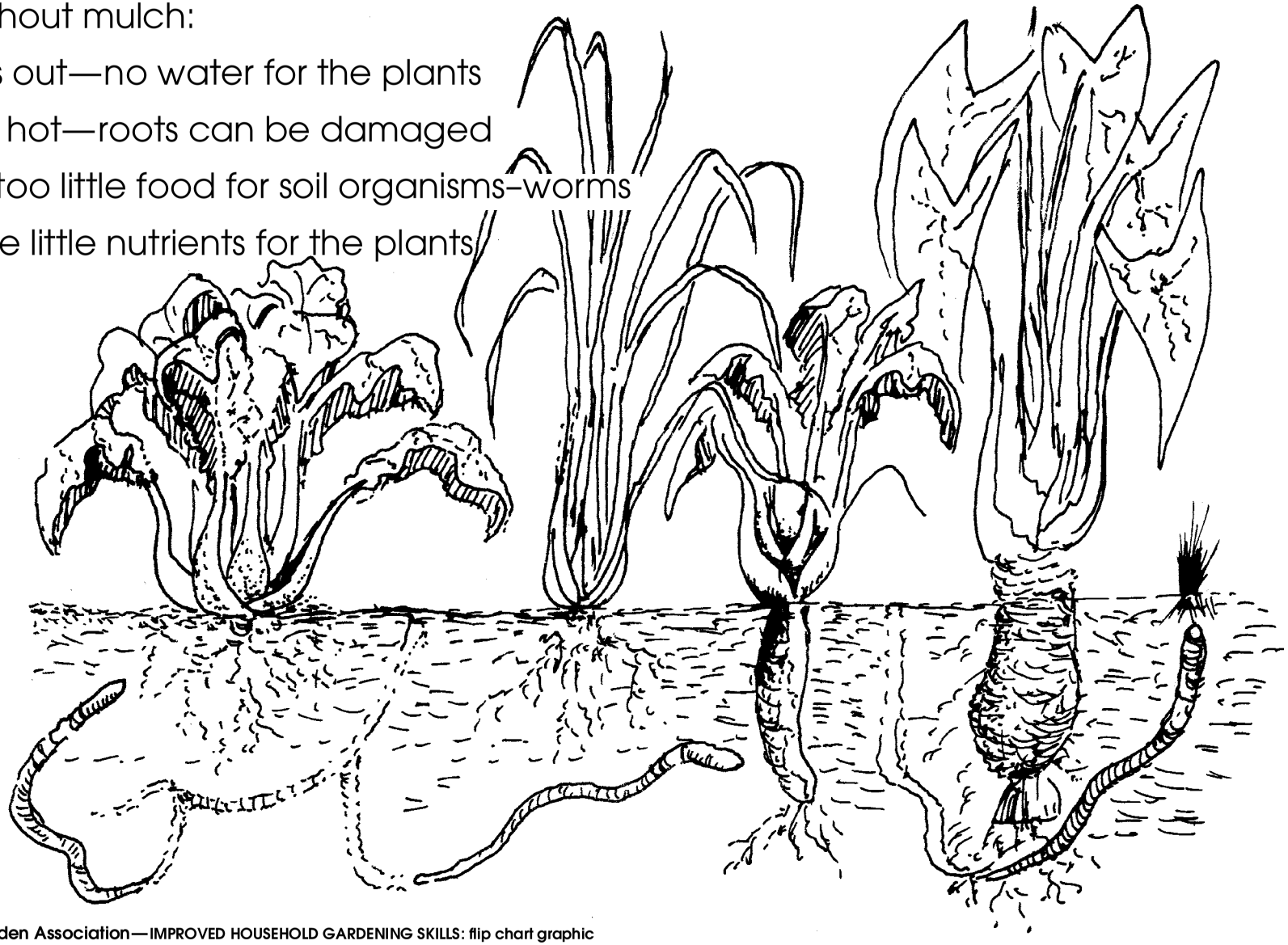
Table gardens are used to grow shallow-rooted vegetables such as Chinese cabbage, tomatoes, pepper and shallots.



4. Using mulch
Soil problems: no mulch

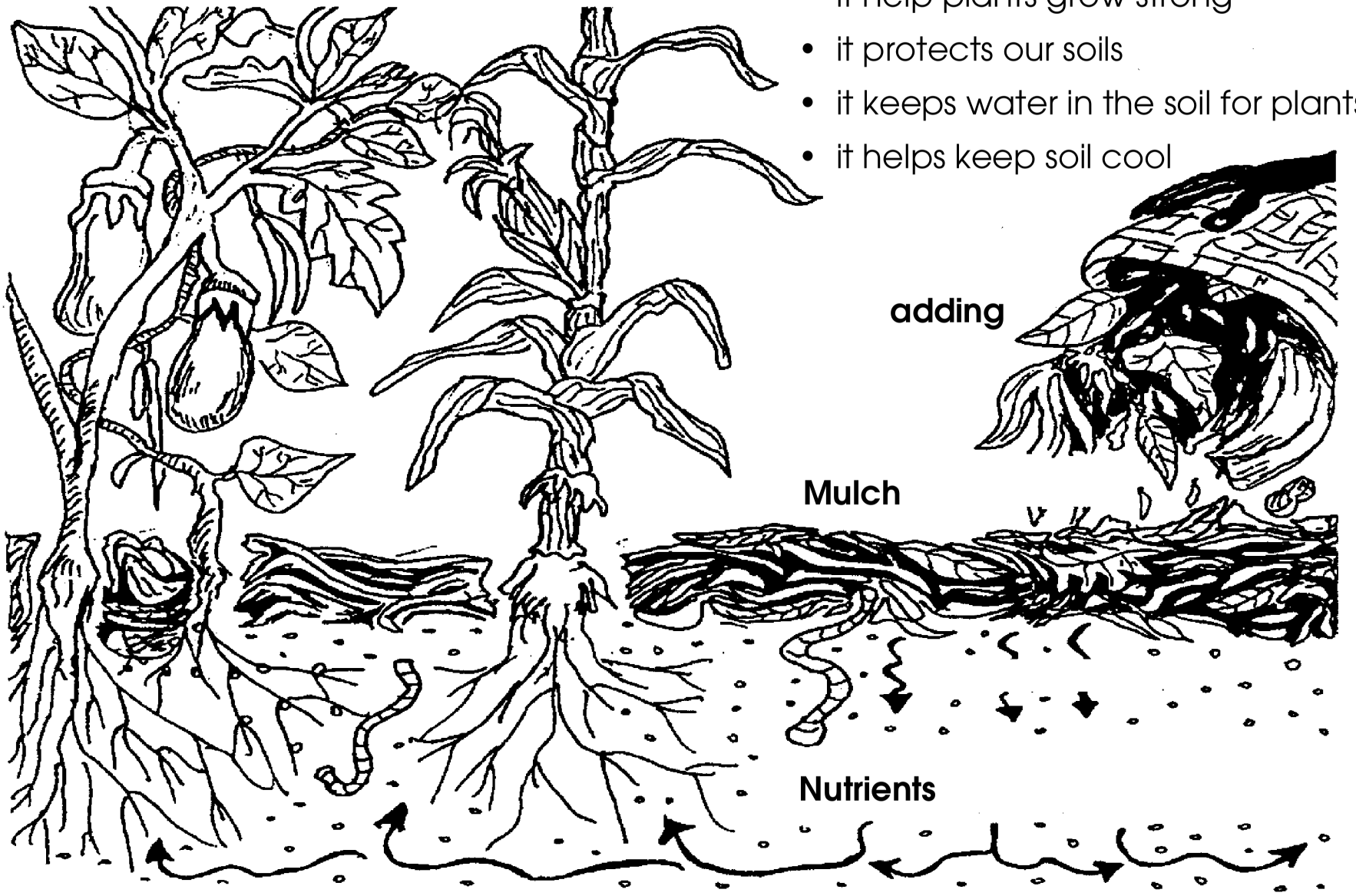
Soil without mulch:

- dries out—no water for the plants
- gets hot—roots can be damaged
- has too little food for soil organisms–worms
- leave little nutrients for the plants



Why use mulch?

- it help plants grow strong
- it protects our soils
- it keeps water in the soil for plants
- it helps keep soil cool

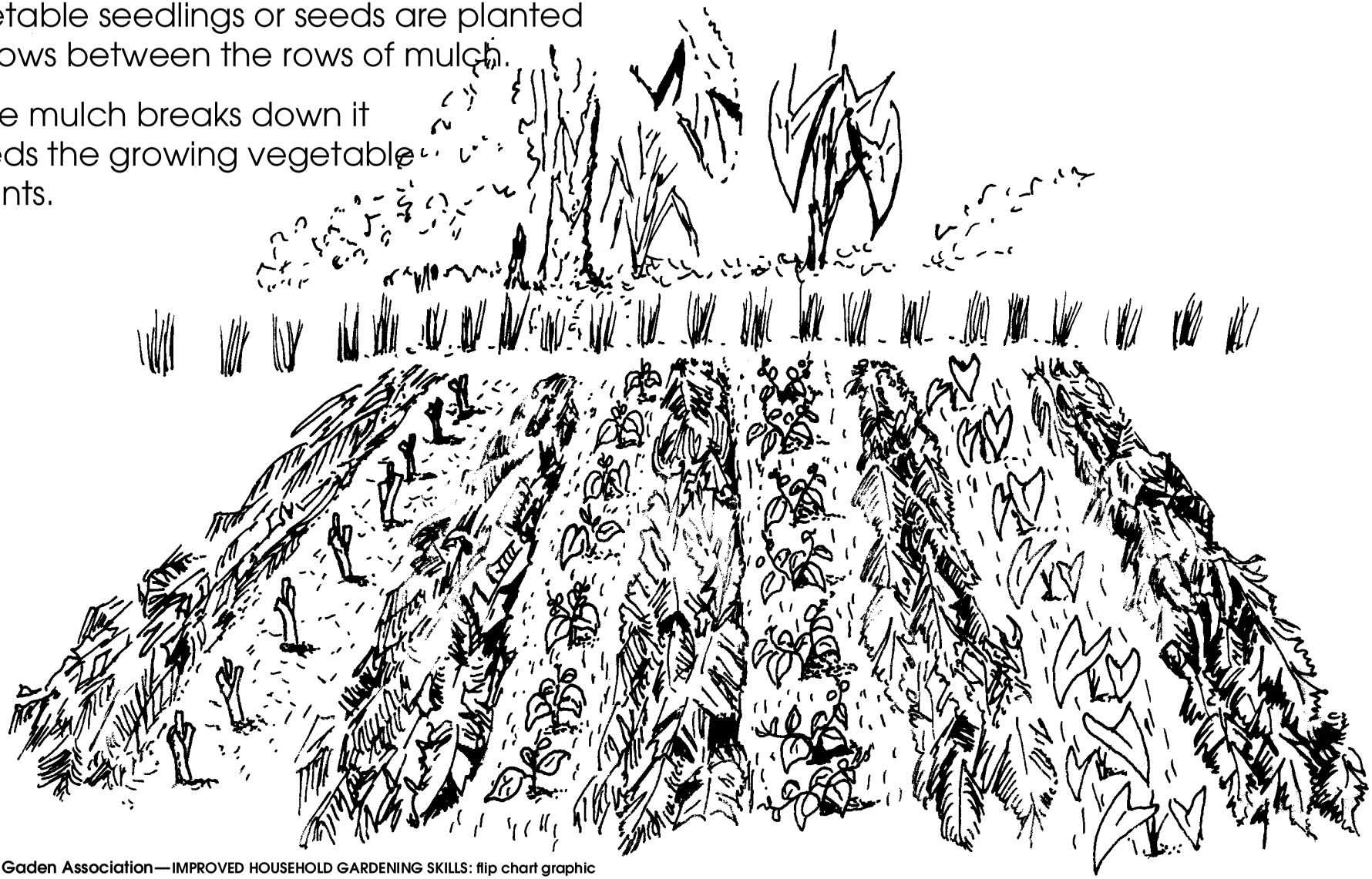


Making a mulched garden

Mulch is laid out in rows.

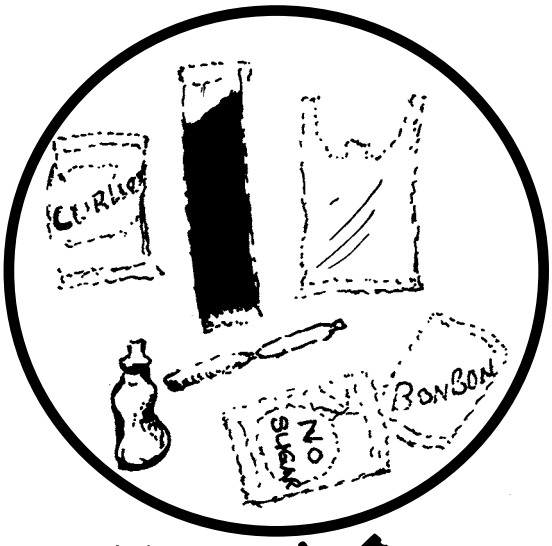
Vegetable seedlings or seeds are planted in rows between the rows of mulch.

As the mulch breaks down it feeds the growing vegetable plants.



4d)

Materials for mulching



USE:

plants, leaves, grass, food scraps

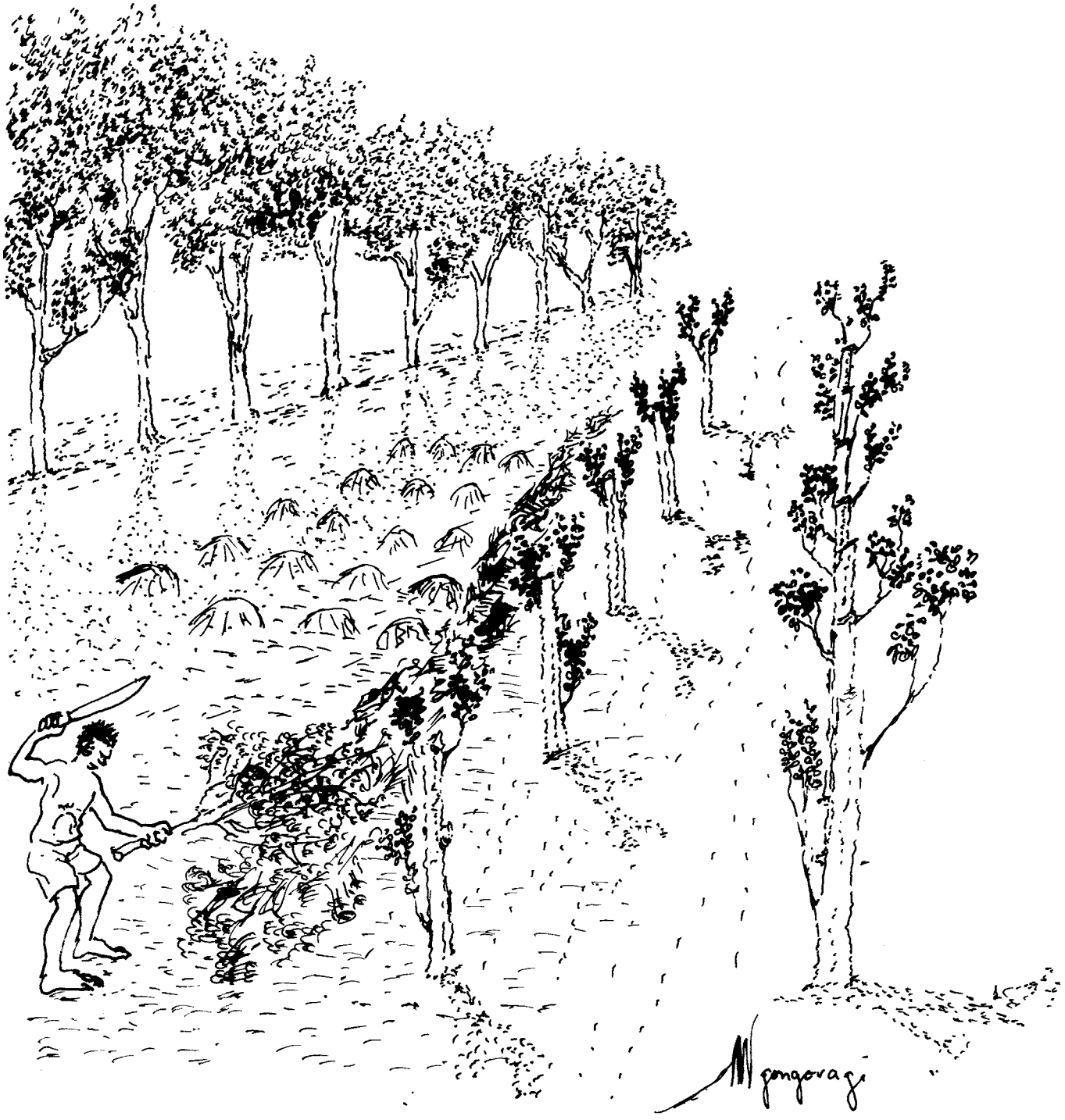
DON'T USE:

tins, bottles, plastic

Mulching with Gliricidia

Gliricidia trees can be slashed and the leaves used on the garden as mulch. The trees will grow again.

Gliricidia can be grown in rows with crops planted between the rows.

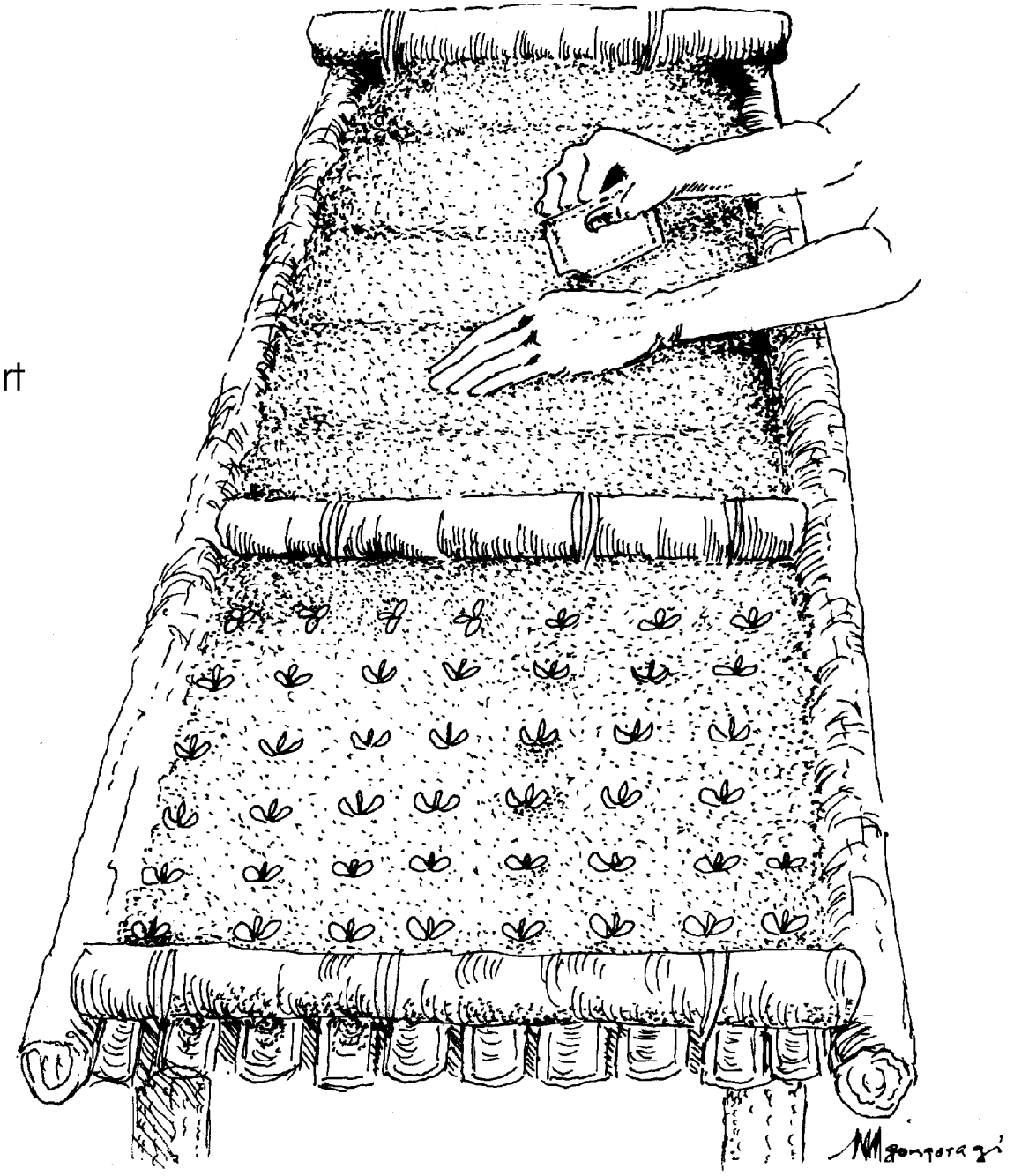


5. Making a nursery Planting mix

Scraping coconut husks into boxes ready to mix with soil

Making a nursery: planting seeds into seed box

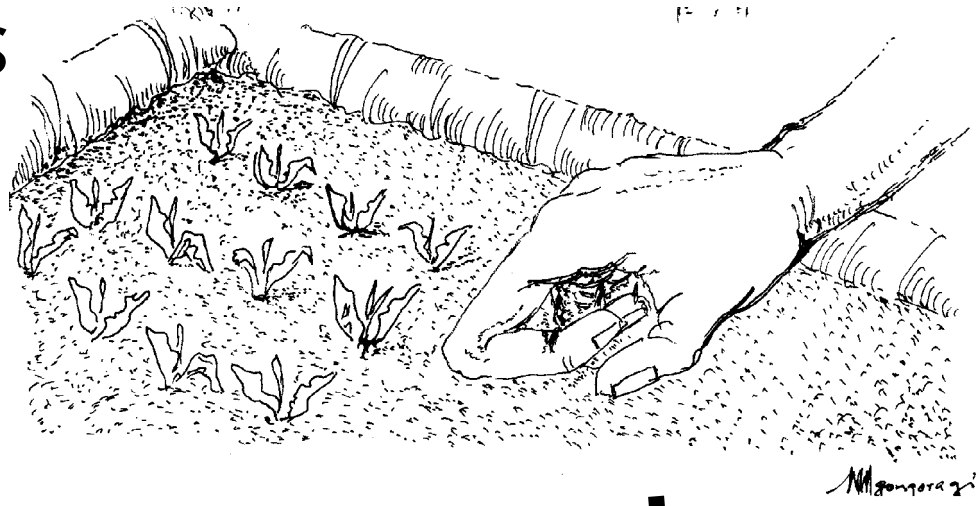
Plant seeds into seed box filled with three parts coconut husk to one part soil.

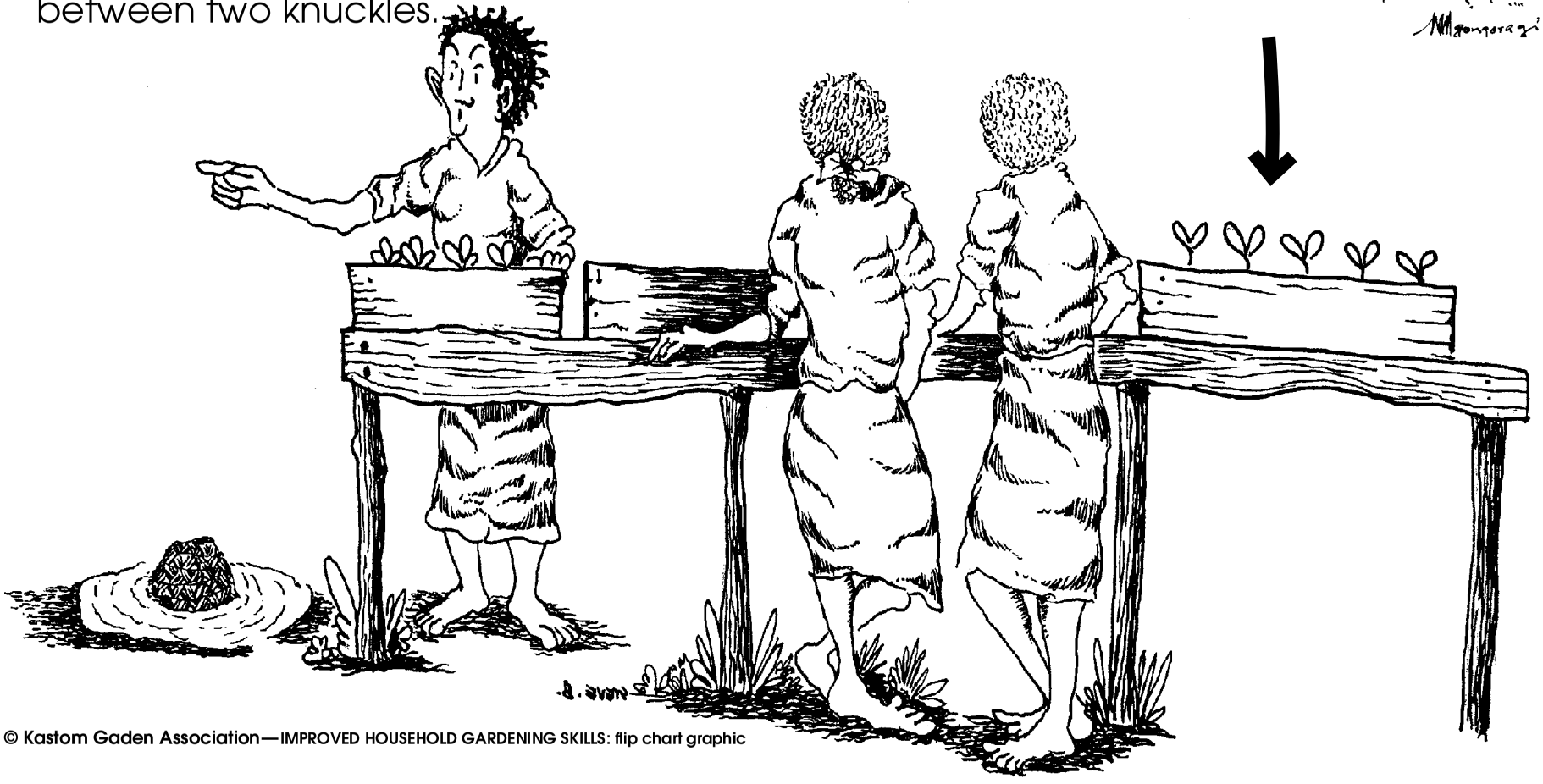


Transplant seedlings into seedling box

Transplant germinated seed into the seedling box.

The right distance apart to plant our seedlings is as wide as the distance between two knuckles.





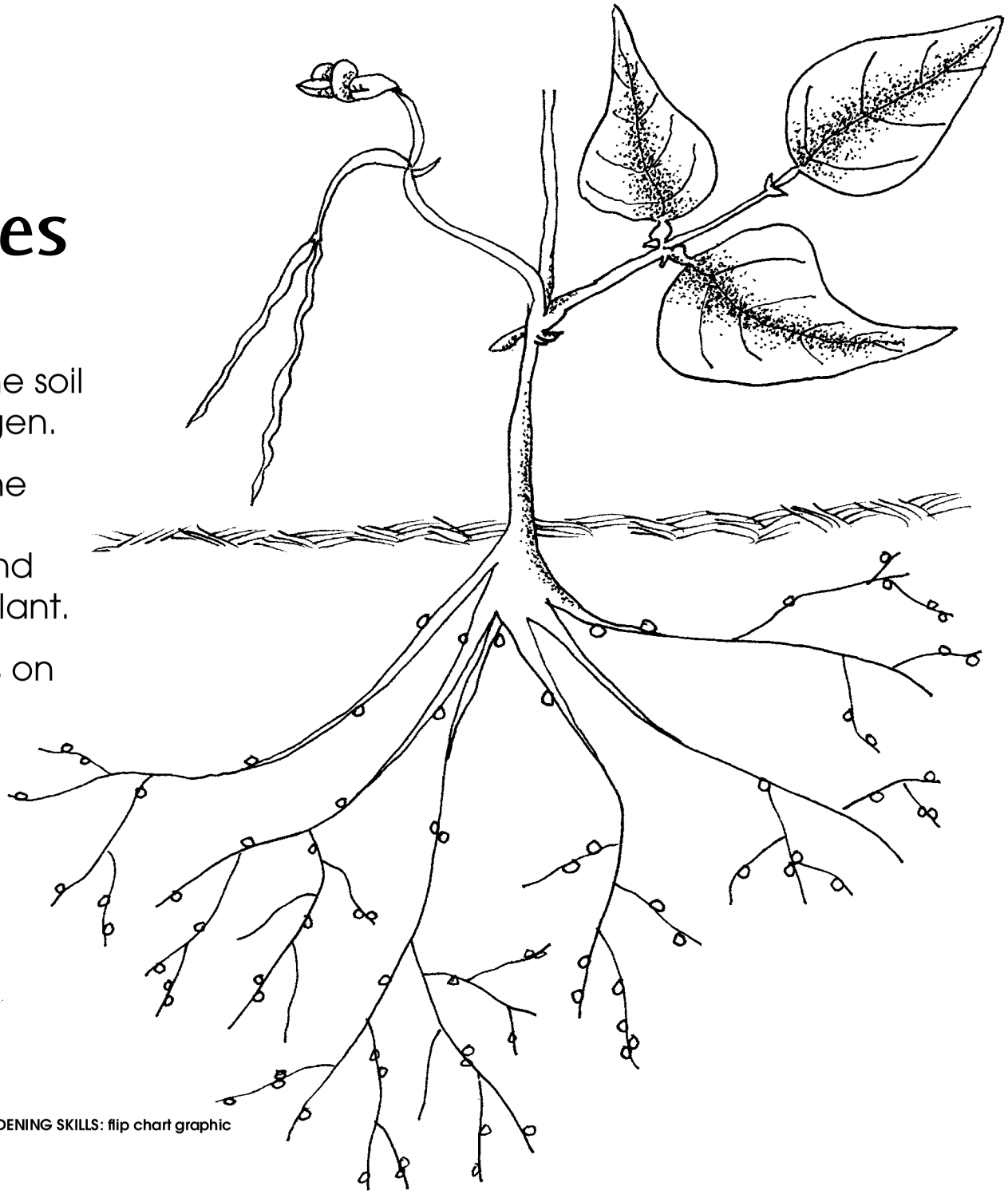
6. Legumes

How do legumes fix nitrogen?

In the air spaces between the soil particles you will find nitrogen.

Small bacteria that live on the roots of legumes take the nitrogen from the soil air and turn it into proteins in the plant.

These bacteria form nodules on the roots.



Identifying legumes

Legumes can have their leaves in groups of three, such as beans.

Gliricidia has a different type of leaf pattern.

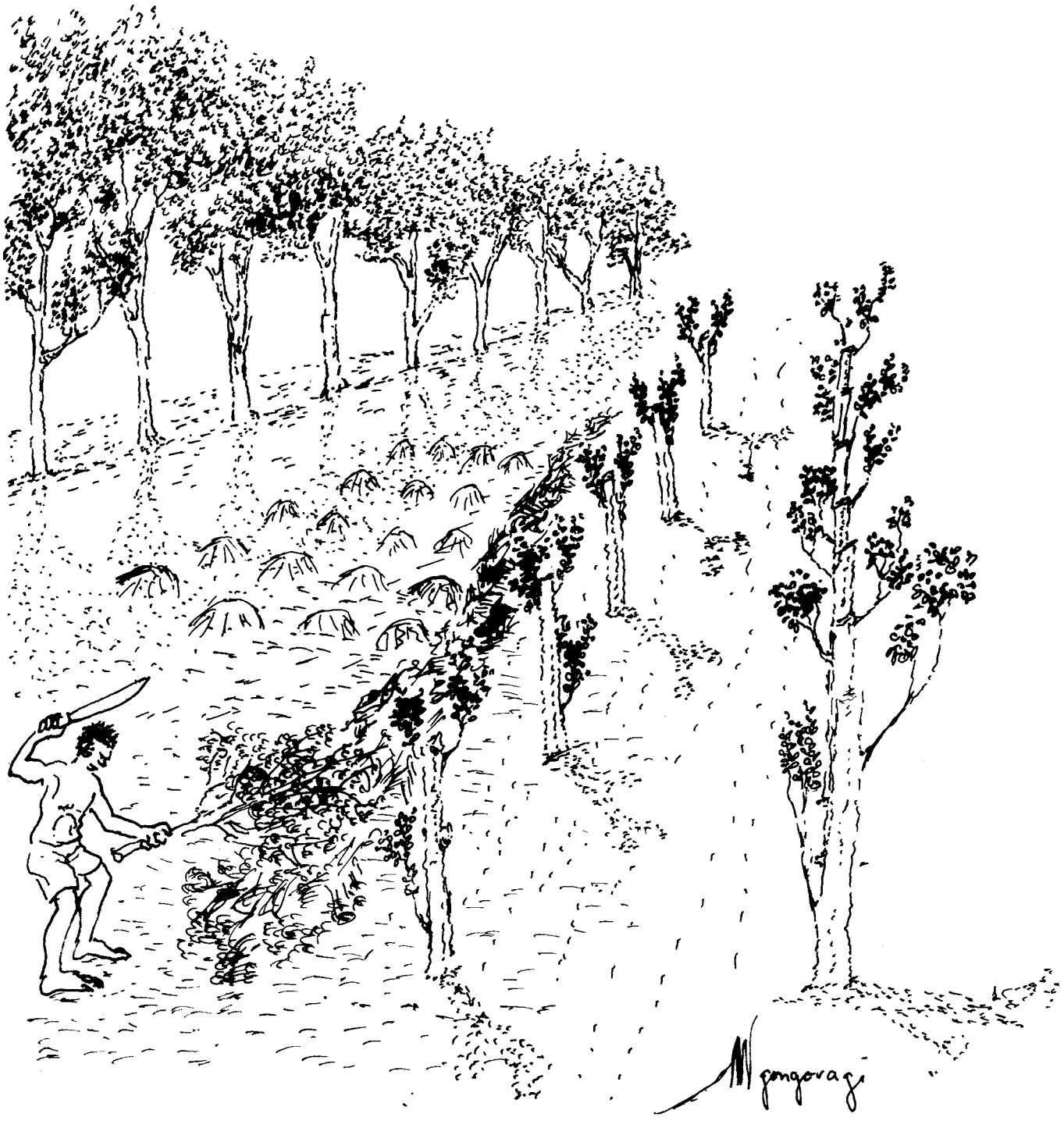
All legumes have a fruit which is called a pod.

Legumes also have white, pink or brown nodules on their roots. In these root nodules nitrogen is taken in by the bacteria and turned into plant protein.

Alley cropping with Gliricidia

Gliricidia can be grown in rows with crops planted in alleys between the rows.

Gliricidia trees can then be slashed and the leaves used on the garden as mulch. The trees will grow again.



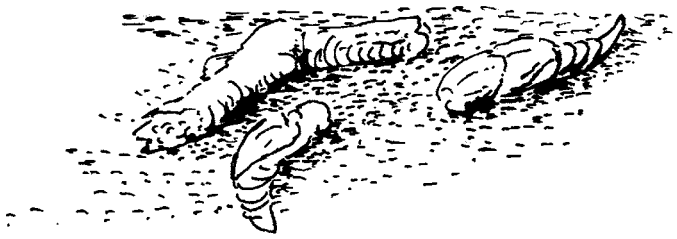
7. Safe Pest Management

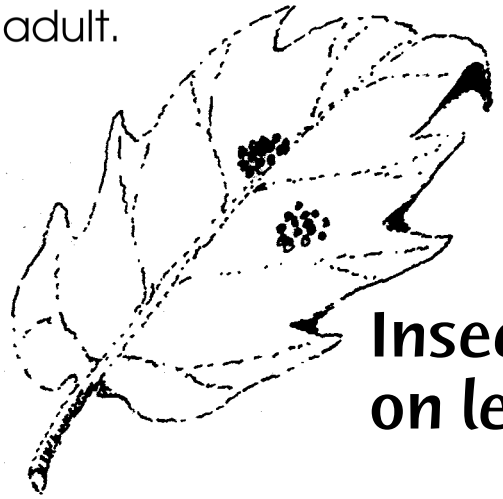
Insect life cycle

Insects take a variety of forms from egg to adult.

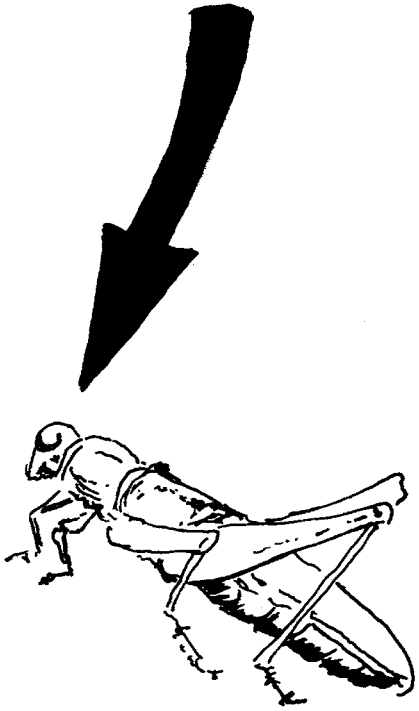
Larvae

Larvae pupates





Insect eggs on leaf



Adult

Adult lays eggs

Identifying insects in the garden

Walk a transect through the garden to collect and identify insects

Plants used to make botanical sprays for pest management

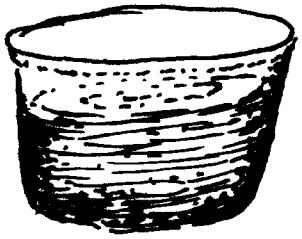
Tobacco Ginger Chilli Marigold

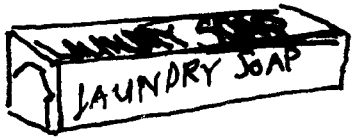
Making botanical sprays

1 .....

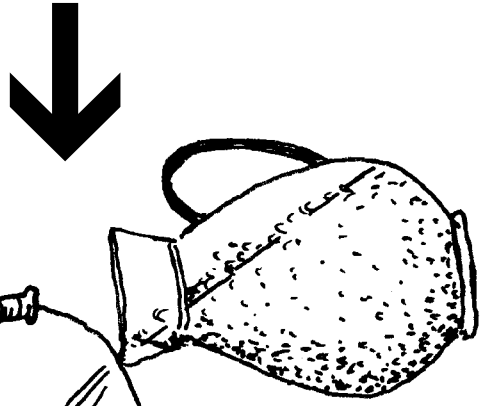
Chilli

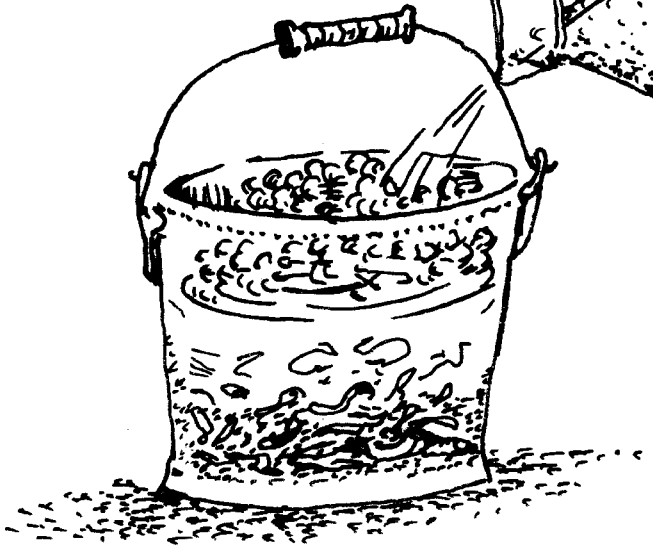
2 .....





Soap and water

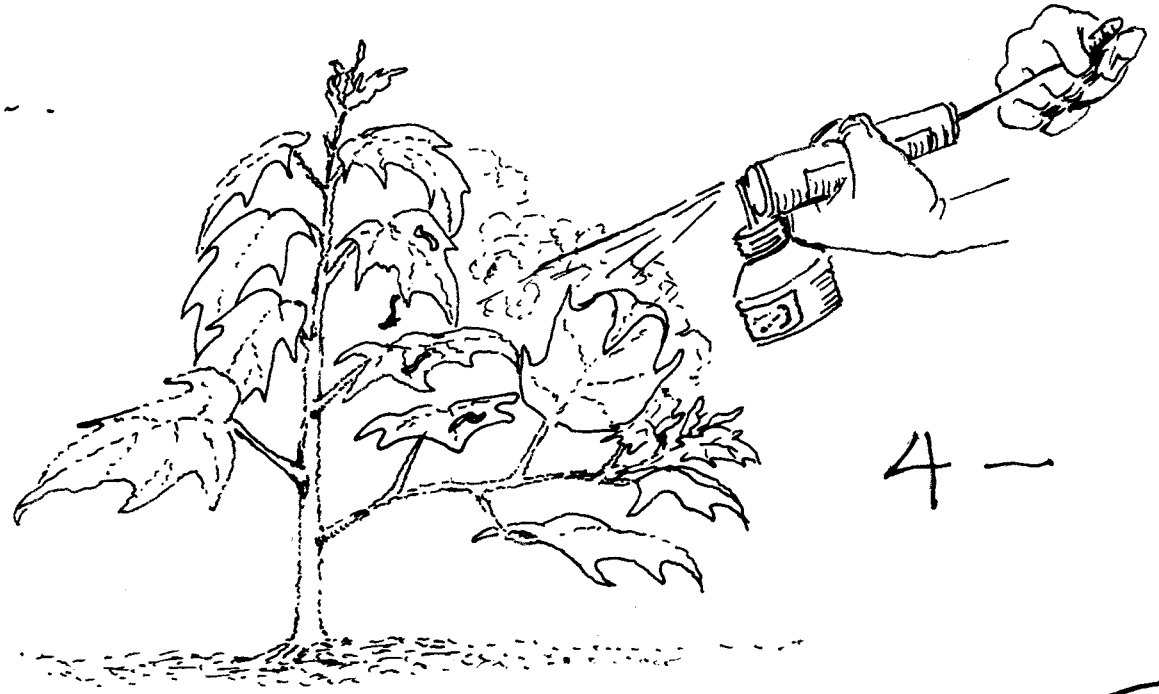




Using botanic sprays

Take care when using botanical sprays. Do not breath the spray if possible and do not spray it on yourself. Wash your hands when you have finished spraying.

3 - - -



Spraying pest

4 —

Wash your hands when you are finished spraying

Benefits of botanic sprays

Use botanic sprays carefully and only when insect pests are in large numbers.

The careful use of botanic sprays reduces insect pest damage and leaves more food plants for you.

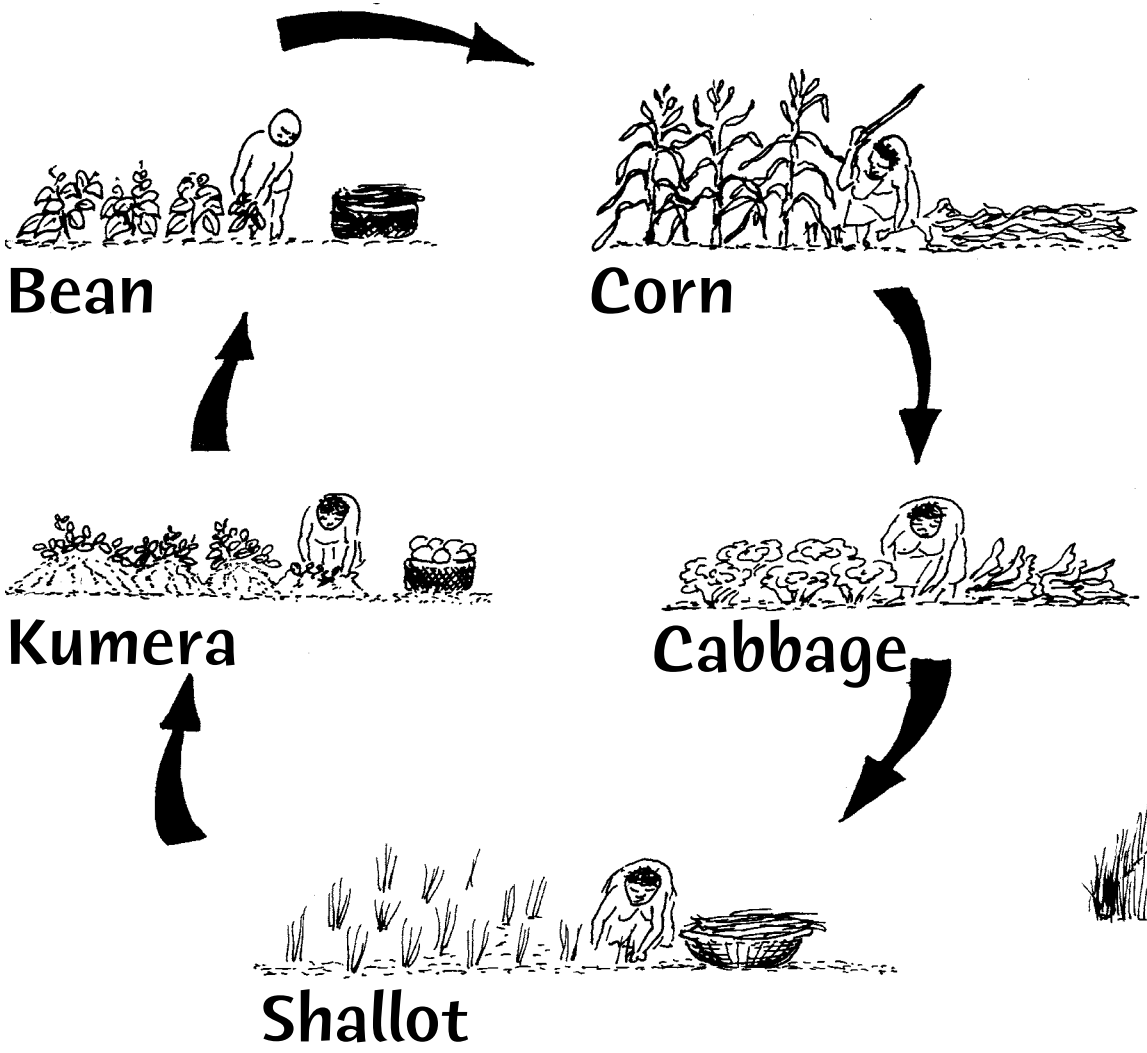
5 —

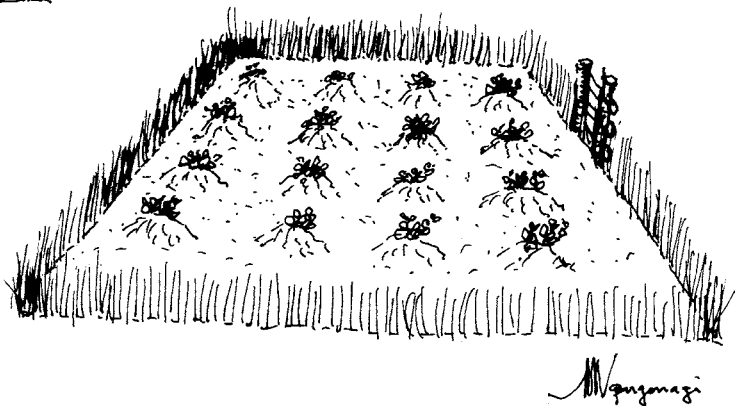
Botanical spray used **No botanical spray used**

Crop rotation

Following a crop in the garden with a different crop breaks the life cycle of insect pests that might live in the soil.

Crop rotation avoids depleting the soil of nutrients.





8. Keeping of chickens

Needs and functions of chickens

Chickens need:

food

shelter

water

protection from predators

health care

place to lay eggs

Chicken functions:

clean up gardens

fertilise gardens

eat insect pests

Chickens provide:

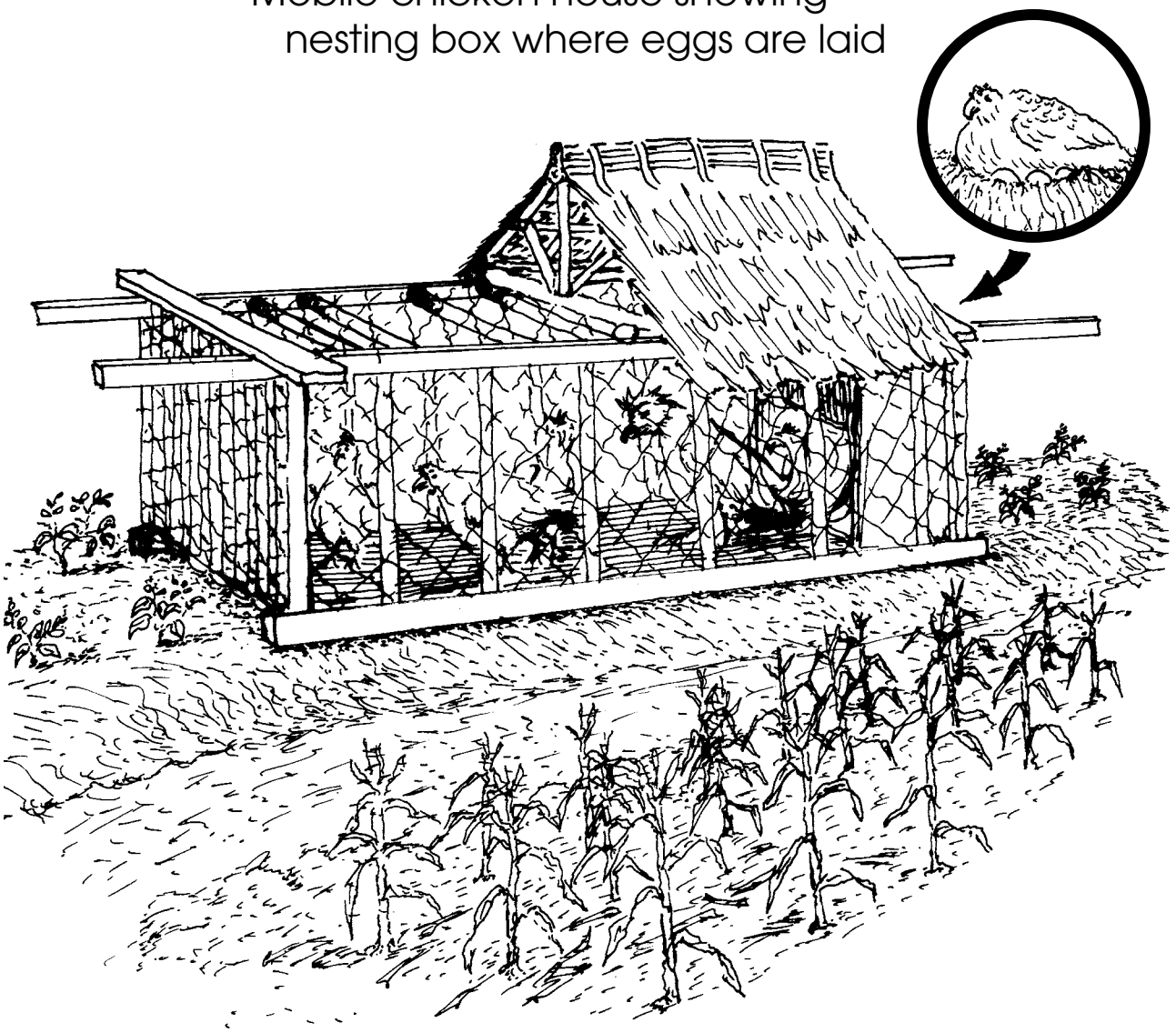
eggs

meat

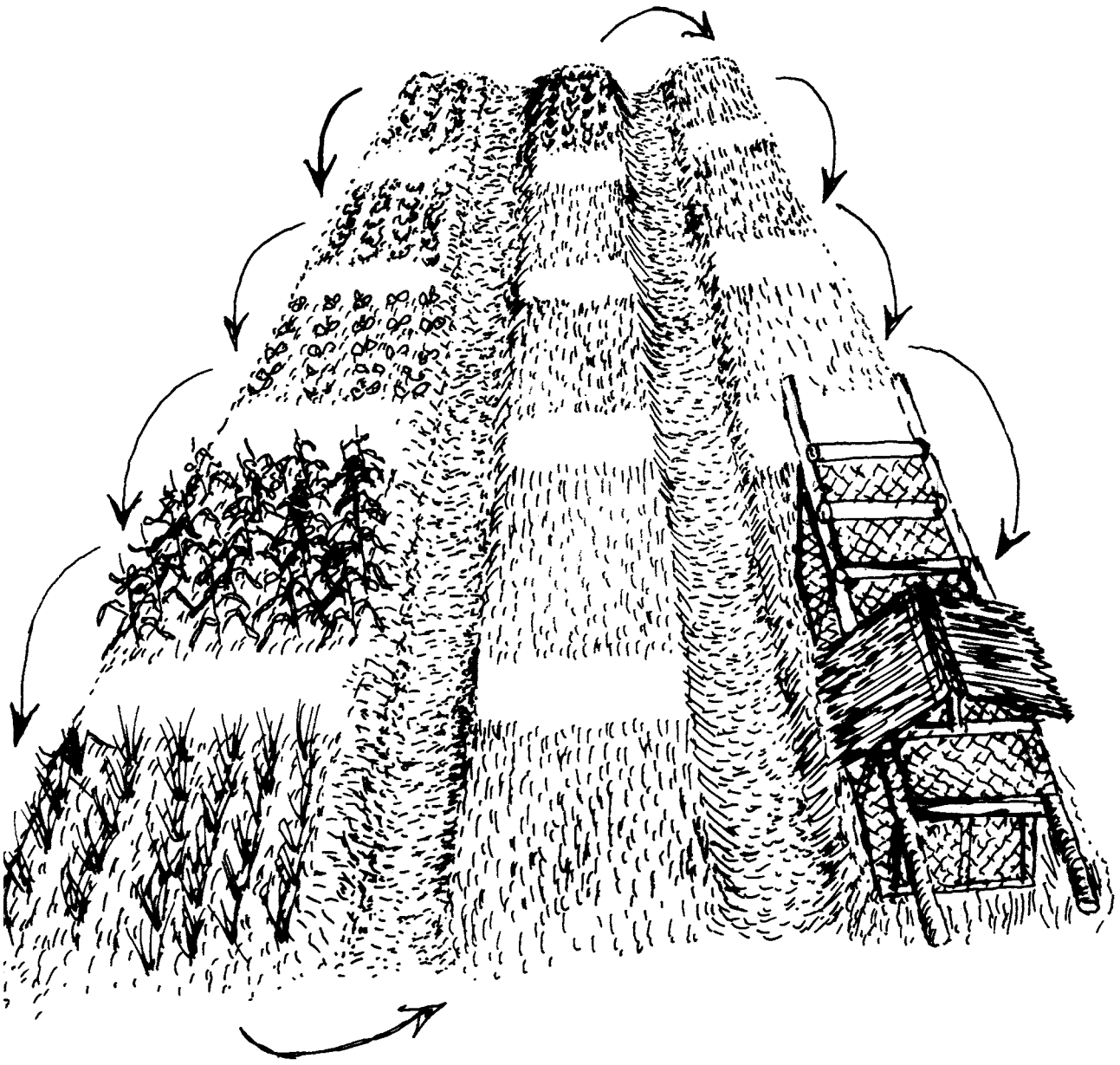
8b)

The mobile chicken house

Mobile chicken house showing
nesting box where eggs are laid



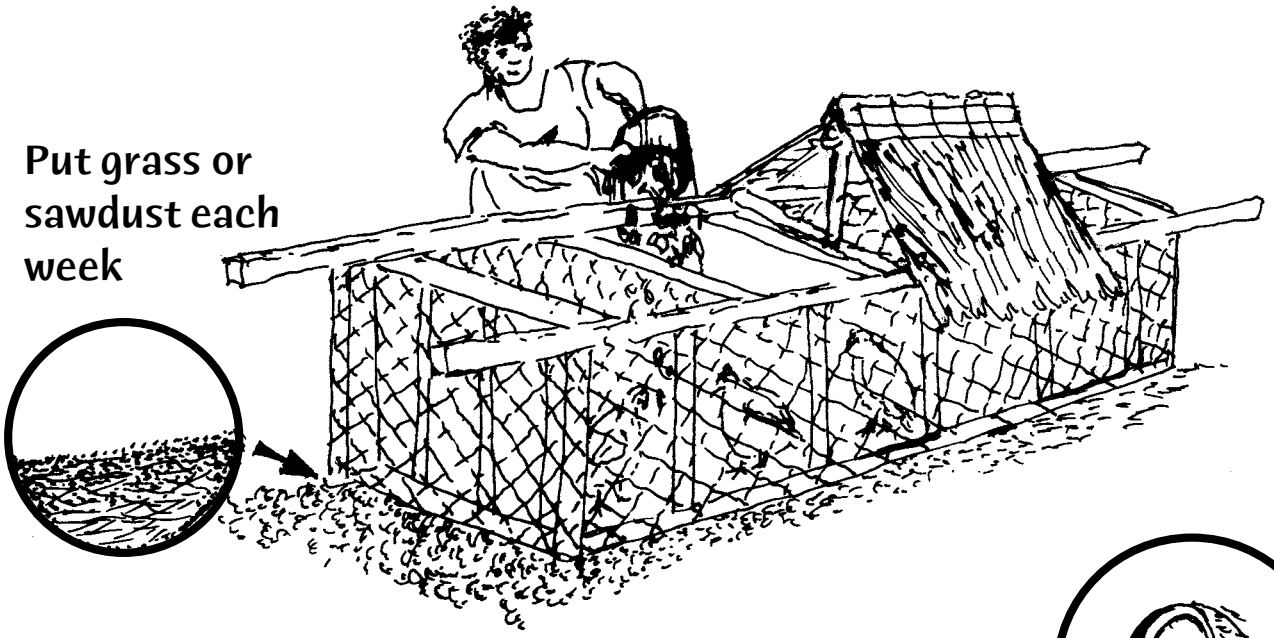
Moving the mobile chicken house



Move mobile chicken house around the garden

8d)

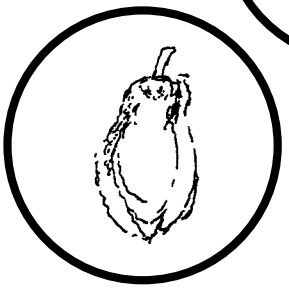
Feeding and caring for chickens



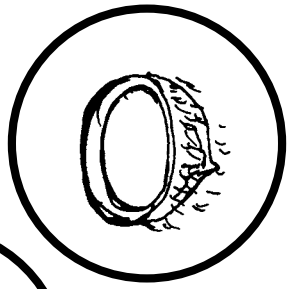
Put grass or sawdust each week

Fill water each day

Give leaves each day



Give pawpaw and kitchen scraps



Give coconut

9. Nutrition and local food

1. How to feed children: 0–4 months

- breast feed only

2. How to feed children: 4–6 months

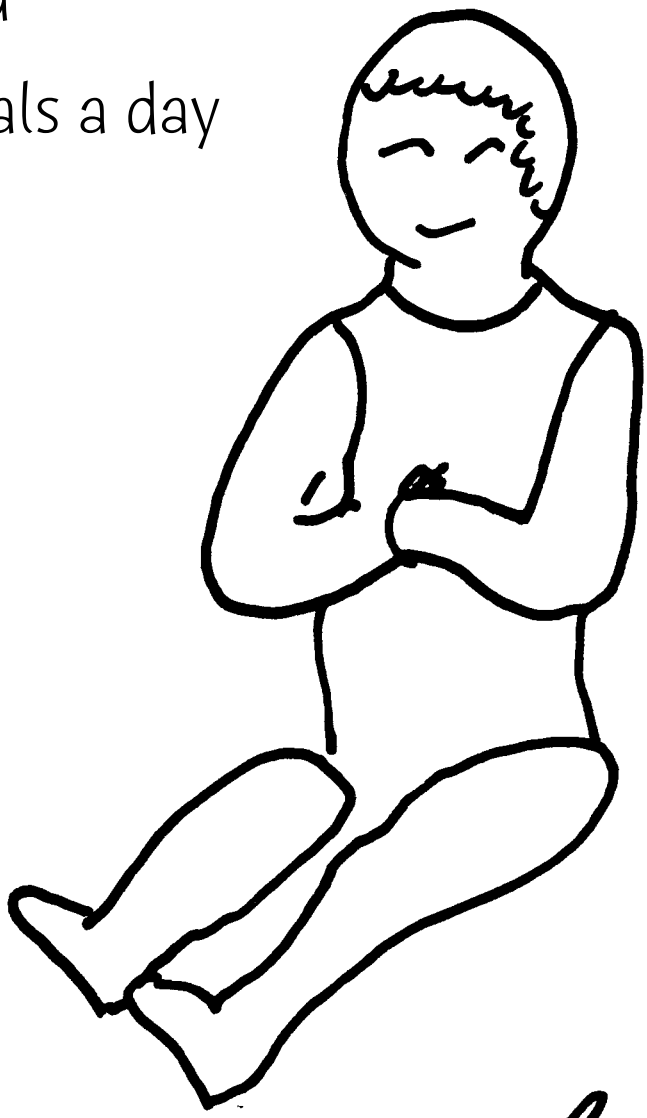
- breast feed
- start soft foods

Soft foods:

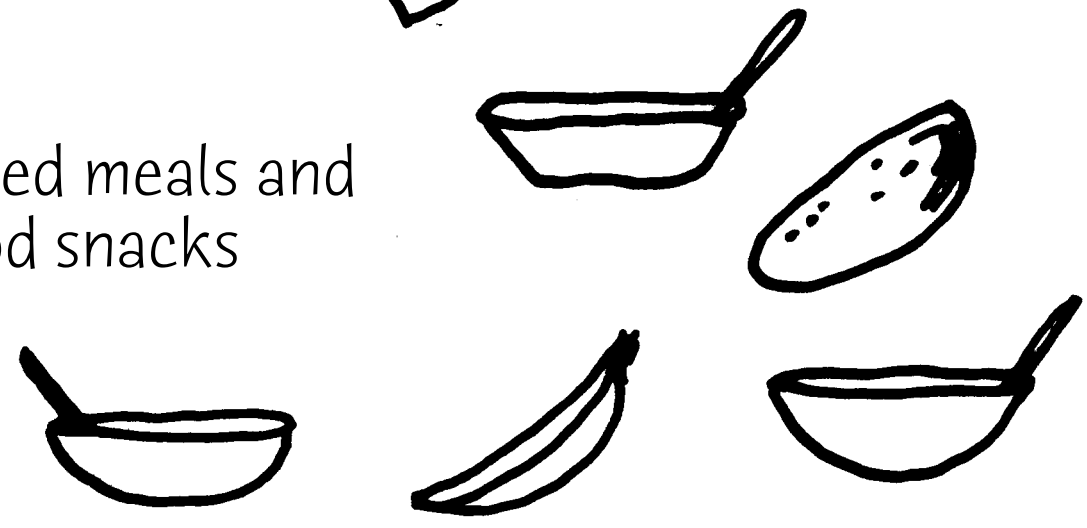
- potato
- pumpkin
- coconut
- cabbage
- banana
- pawpaw

3. How to feed children: 6-12 months

- breast feed
- 5 small meals a day

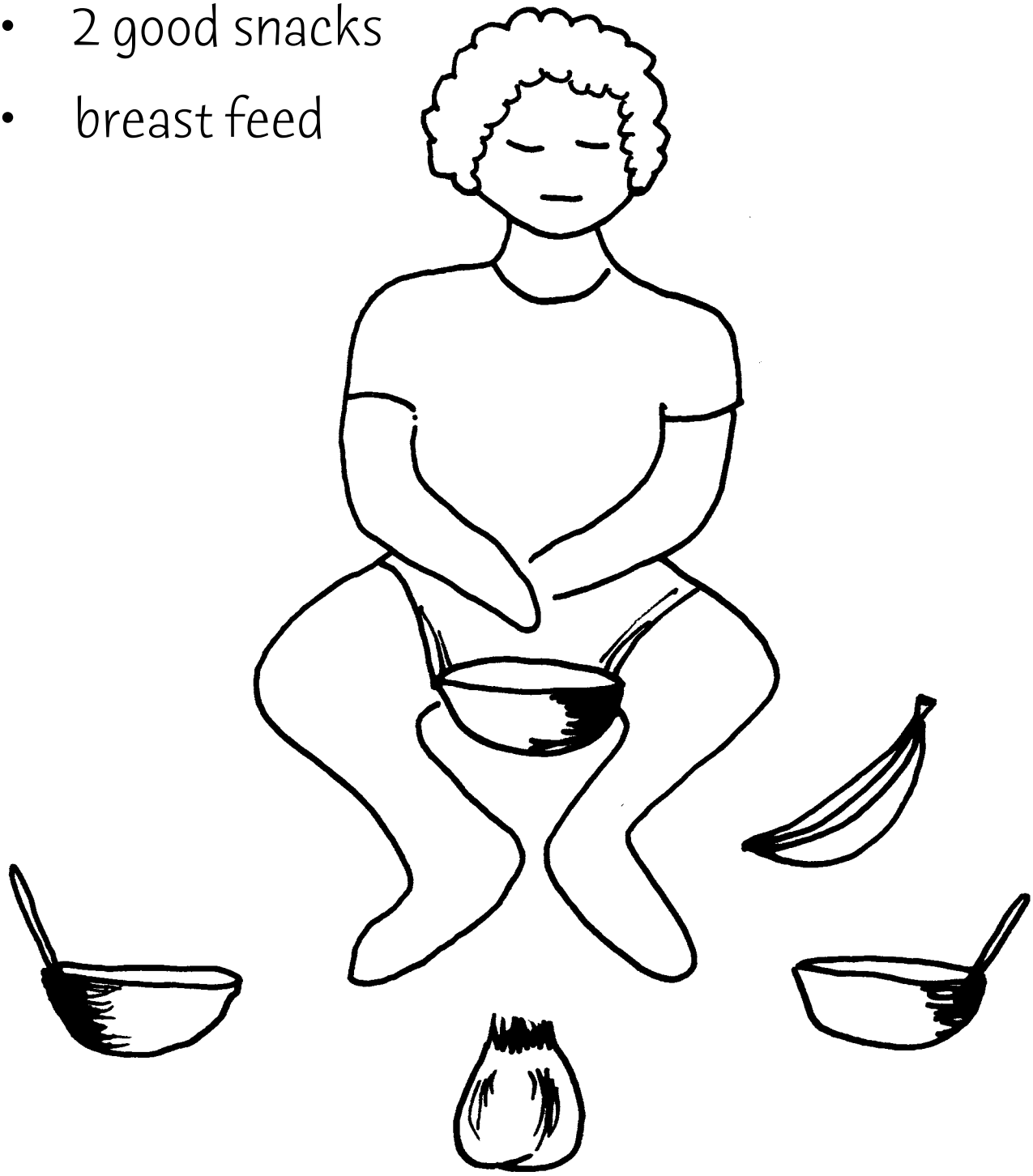


3 mixed meals and
2 good snacks



4. How to feed children: 1-2 years

- 3 mixed meals
- 2 good snacks
- breast feed



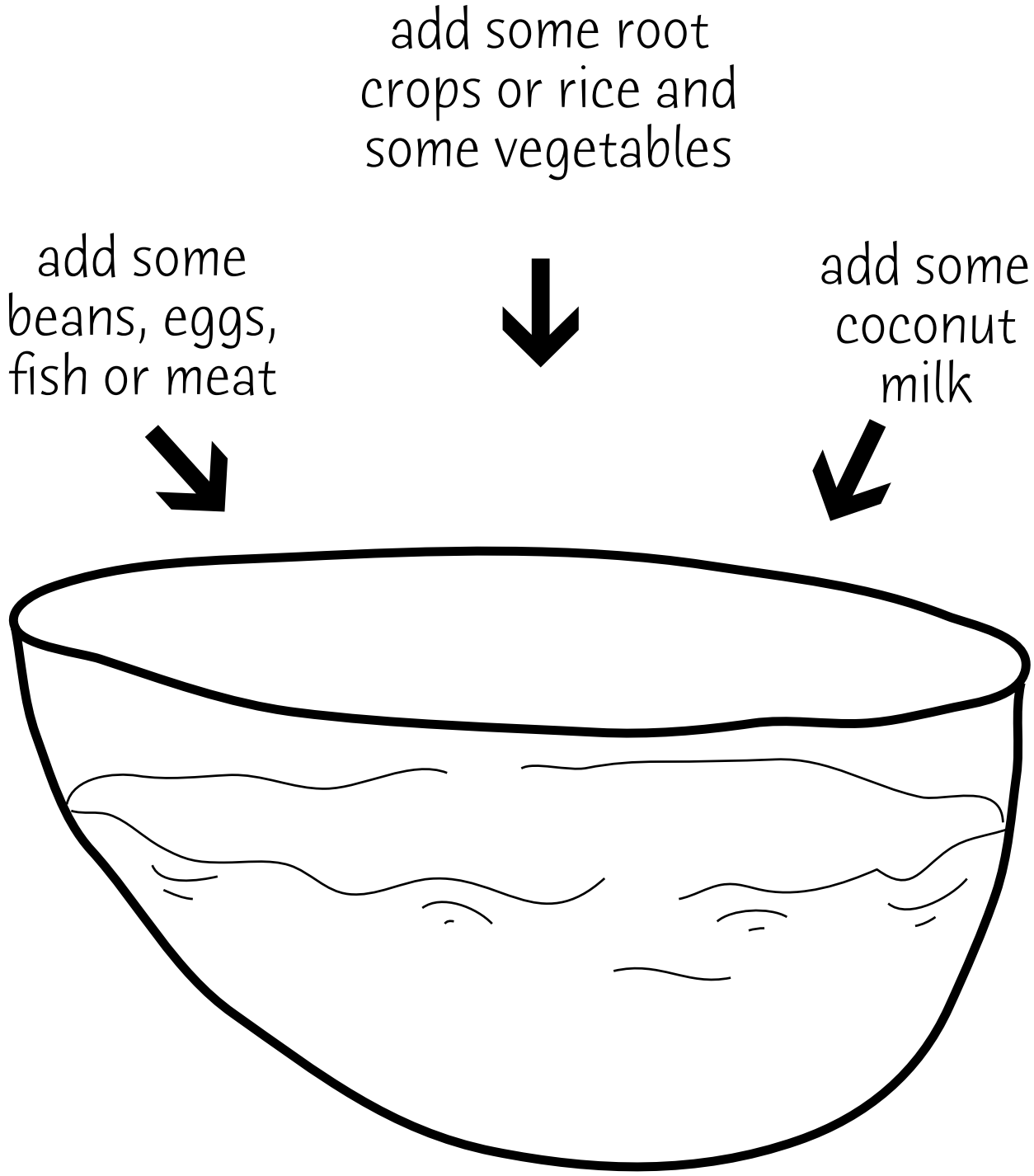
5. How to feed children: from 2 years up

- 2-3 mixed meals
- 2-3 good snacks

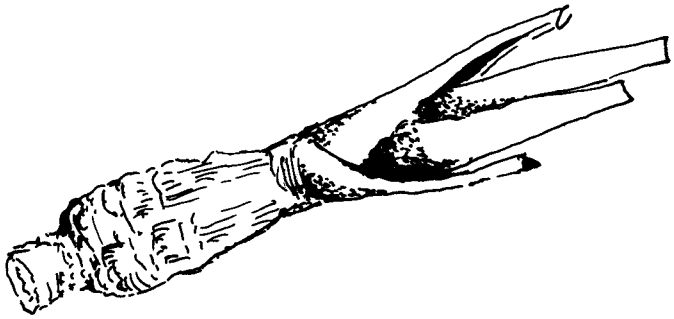
Mixed meal

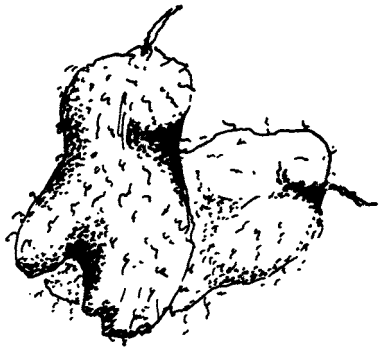
- mixed meals make healthy families
- vegetables for mixed meals can be grown in our sup sup garden

1. A mixed meal is a healthy meal



2. Start to make a mixed meal





Start with one of these:

- potato
- taro
- cassava
- yam
- banana
- corn
- rice
- (noodles or biscuits)

3. Add beans, peas or nuts

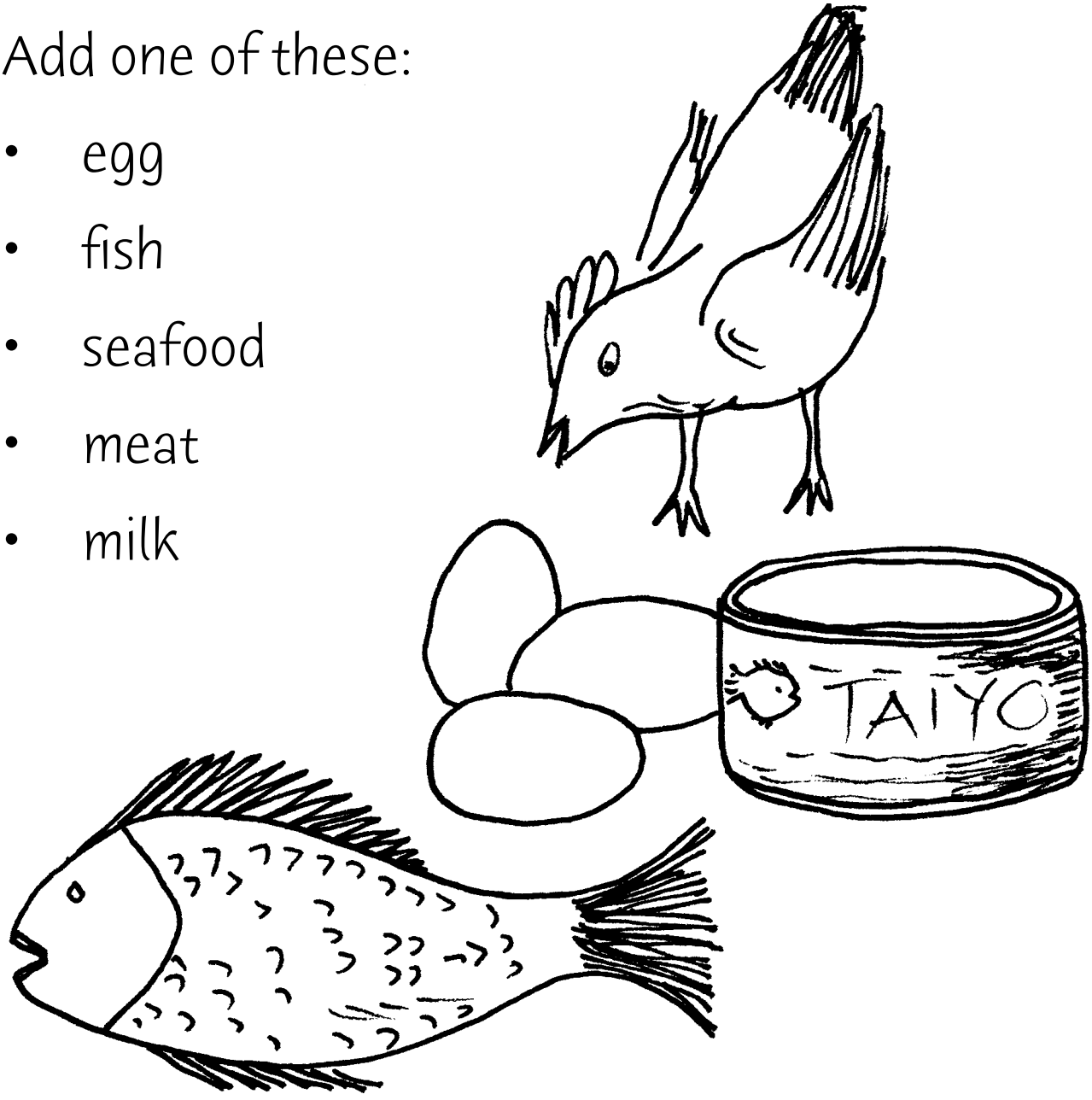
Then add one of these:

- beans
- peas
- nuts

4. Use an animal food instead

Add one of these:

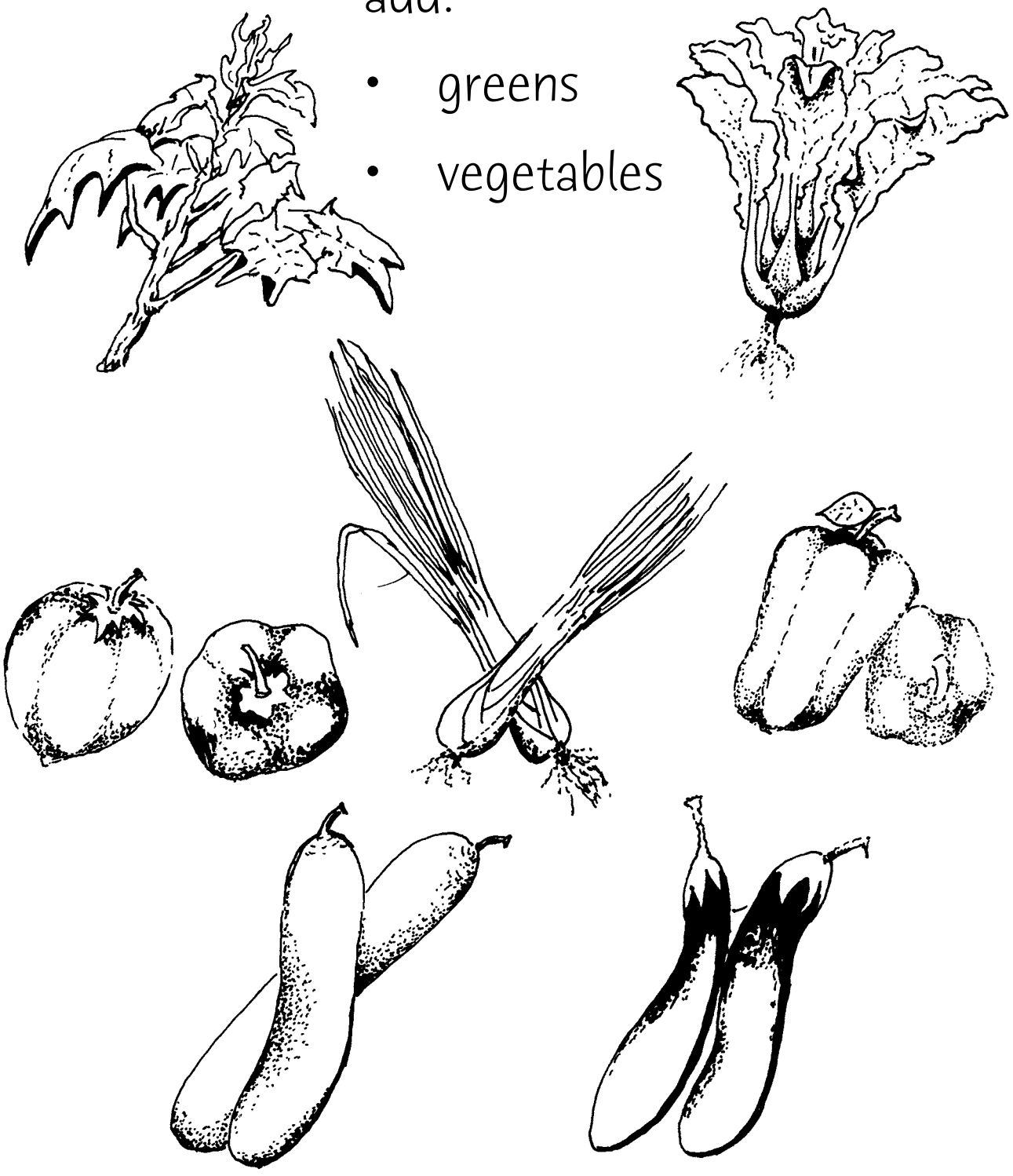
- egg
- fish
- seafood
- meat
- milk



5. Add vegetables to the mixed meal

add:

- greens
- vegetables



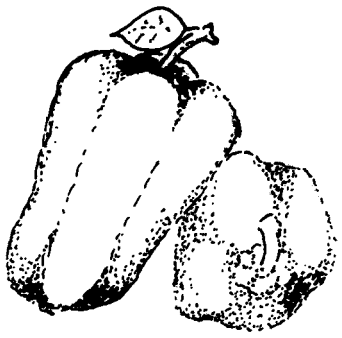
6. Use fruit instead of vegetables and greens

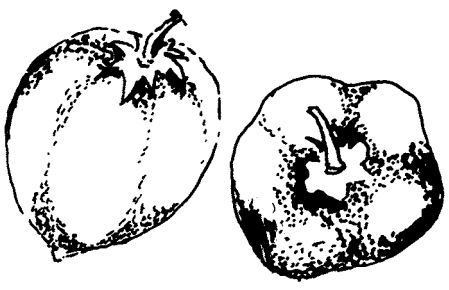
Add 1 or more fruit:

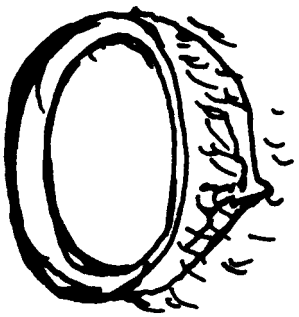
- pineapple
- paw paw
- banana
- apple
- banana
- star fruit

Grow fruit trees around your house

7. Healthy snacks







Have 2-3 snacks a day:

- coconut
- sugar cane
- banana
- paw paw
- pomelo
- nuts
- tomato
- pepper
- pineapple
- corn

Foods security, with shelter and health care, is the basic need for any community planning further development.

The Kastom Gaden Association and the Solomon Islands Planting Material Network are working with partner communities to establish a secure food future in the Solomon Islands.