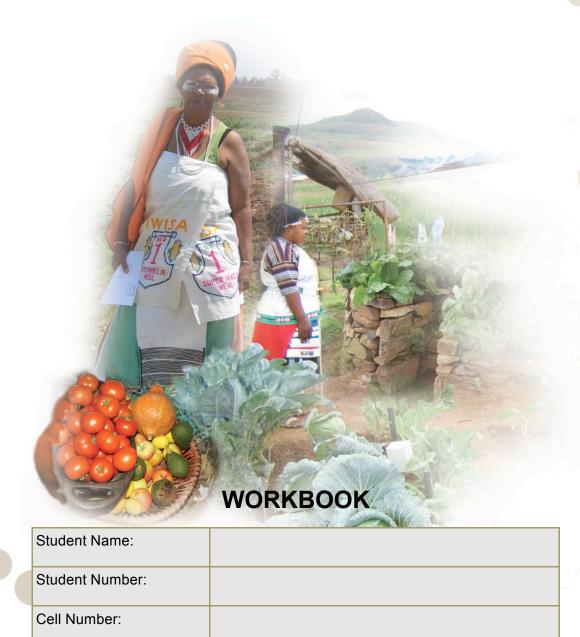
# Module 5 Optimising household food production

Module code: PHFS05P



University of South Africa 2010

Name of Promoter:

HFS Site / Centre:

# Introduction



Although you have been given some back ground on the workbook in the assessment section of TUT301, we would like to repeat that information here to avoid any misunderstanding. In this Module you will be doing practical action activities with the households in making a garden. Therefore the workbook prepares you to engage in the portfolio activities for work in the community.

By now you will be aware that your study guide contains a variety of learning activities. Some of these activities have been selected to deepen your understanding of the main topics dealt with in the module and are called *workbook activities*. How will you know which activities are workbook activities? We use a specific icon in your study guide, which clearly shows which activities need to be done in the workbook. You can see an example of the icons we use in this programme in the introduction to Module 1. The same numbers have been used for the activities in the study guide.

Please read the study guide first, do the in text activities and then do the workbook activities in the workbook provided **for this modules**. You will either do these activities by yourself or in a group with other students in your area. Although most of you will discuss the activities in your group, the idea is not to copy the answers provided by others, but rather to compile your own answers after discussion with your fellow students. If you do not have a group to work with, this is not a major issue. However, please do not ignore the activities which indicate that they are group activities. They are so designed so that you can do any of the group activities on your own. We only suggest that you work in groups if possible, since group-work often leads to meaningful discussion and critical thinking.

Take your workbook, with its completed activities, to the promoter-facilitated sessions where you will be given an opportunity to reflect on some of them with your promoter.





# Workbook activities for Unit 1: Sustainability of a farming system

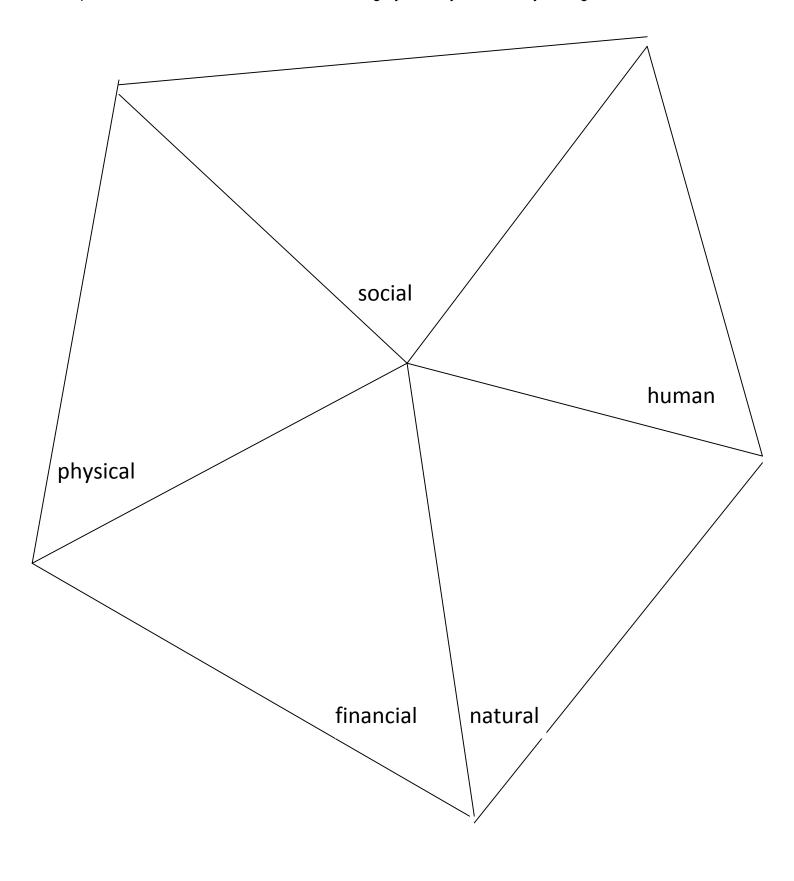


# Activity 1.2 The five categories of assets and the elements of sustainability

Aim: Assess livelihood assets in terms of their sustainability. Time: 2 hours What you must do Read through the descriptions in your study guide (Section 1.1.3) on the elements of sustainability. 1. Write down one example of a sustainable activity for each element. Ecologically sound: Economically viable: Adaptable: Socially just: Humane:



2. Look at the figure for the five categories of livelihood assets below. Take your 5 examples from question 1 and fit them into the livelihood category where you think they belong.



# Activity 1.3 Flow diagrams of different farming systems

Aim: Draw flow diagrams of different farming systems
Time: 1 hour
What you must do:
Read the descriptions of HEIF, LEIF and TF in section1.2 of your study guide.
1. Choose a specific farming activity such as growing maize, vegetable production, livestock production etc. Discuss how this will happen in practice for each of the three different farming systems. Think how this farming activity will differ when using the HEIF system as compared to the LEIF and the TF systems. Make notes of your discussion or thoughts.
2. Familiarize yourselves with what a flow diagram is by looking at the examples given in the study guide and then take your notes and turn them into flow diagrams that represent the different farming approaches you discussed. You will thus draw three flow diagrams; one for HEIF, one for LEIF and one for TF.



Flow Diagram 1: HEIF
Flow Diagram 2: LEIF
Flow Diagram 3: TF

# Activity 1.4 Comparing farming systems

**Aim:** Analyse a known farming system in terms of the three approaches to farming discussed in this unit.

Time: 3 hrs

# What you must do

1. Write down one example from your own experience of each farming system. (e.g. one example of TF, one example of LEIF). One example must be from your area.



2. Use these examples to complete the table below. Clearly indicate which example represents the system used in your home environment. Your home environment may contain elements of more than one system.

**Table: Three farming systems** 

Note: A variable is a factor that can change, e.g. water availability.

Variables	Traditional	HEIF	LEIF
Use of locally available inputs (e.g. manure, compost, seeds, oxen)			
Variety/specialization (types of seed, e.g. hybrids, kept from last year)			
Use of external inputs (e.g. seeds, fertilizer, pesticide)			
Use of local knowledge (e.g. ways to plant, knowledge of seasons, rainfall, wind)			
Use of extension services (for males /women, yes / no)			
Main production objectives (harvest is sold/feeds family/feeds livestock?)			
Cash income (yes/no/sometimes?)			
Labour requirements (how much labour? Family, male, female or hired?)			
Level of production (e.g. yield is high/low/vulnerable to risk?)			
Degree of recycling (are resources re-used? (e.g. cow manure used as fertilizer)			
Water use (how much? How often?)			
Sources of water (e.g. Rain Water Harvesting (RWH), rain, irrigation, hand- watering)			



# Activity 1.6 Assessing a homestead farming system

**Aim:** Analyse a homestead as a farming system in terms of strengths, weaknesses, opportunities and threats.

Time: 4 hrs

### What you must do

This activity consists of two parts and you must do both of them.

### Part A

Work with a gardener or farmer that you know in your area (or your own homestead) and draw a farming system flow diagram of his/her farming system. Make sure you clearly indicate the boundaries of your system, inputs, outputs and links between subsystems.

1. Make a comment about the present farming system. Can you identify any principles of LEIF applied here? If yes, what are they? How do they relate to each other? How do they increase the success of this farming system?

Flow Diagram: Farmers farming s <b>yste</b> m



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# Part B

1. Complete the table below, describing the strengths, weaknesses, opportunities and threats for this farming system.

Strengths	Weaknesses	Opportunities	Threats	
_				

your table)	).			



# Activity 1.7 Case study of a homestead farming system

**Aim:** Analyse the case study given in terms of the farming system used (TF, HEIF, LEIF) and in terms of the elements of sustainability.

Time: 3 hrs

### What you must do

Discuss and summarise the case study of a farming system that you have been given; using some of the processes and concepts discussed in this section (sustainability, 3 farming approaches, SWOT, and flow diagrams).

You will need to decide once you have read the case study which method you will use to present your summary. Use only ONE of the following methods:

- Elements of sustainability OR
- 3 Farming approaches OR
- System flow diagram OR
- SWOT analysis

Write a one-page summary of the case study and make your diagram using one of the above methods.



Diagram of Mr Matlere's farming s <b>yste</b> m
Diagram of Mr Matlere's farming s <b>yste</b> m
Diagram of Mr Matlere's farming s <b>yste</b> m
Diagram of Mr Matlere's farming s <b>yste</b> m
Diagram of Mr Matlere's farming s <b>yste</b> m
Diagram of Mr Matlere's farming system



# Workbook activities for Unit 2:



# Planning your food garden for maximum benefit

# Activity 2.1 Factors which influence the growth of a plant

### Aims:

- Identify factors which influence the growth of the plant
- Reflect on how the survival needs of plants are similar to those of humans.

Time: 30 minutes

### What you must do:

- 1. Think about any plant in its environment. The plant can be a crop plant on a farm, a vegetable plant in a food garden or a plant in nature.
- 2. Write down a list of everything in the environment that influences the plant. Write a separate list of living factors (things) and non-living factors that influences the plant.

Living factors	Non-living factors

<ol> <li>Which of the non-living factors that you named is necessary for the survival of the plant'</li> </ol>	?



4. How does the survival needs of a plant compare to the needs of a human?

Indicate your answers in the table below

Survival needs of humans

5. Write a paragraph to say how the needs of plants and humans are similar and how they are different.



# Activity 2.3 Identify different types of seed

For this activity you need to go to a shop that sells seed and if possible speak to gardeners and farmers in your area who keep their own seed

Make a list of at least 10 different types of crops/ vegetables that can be grown from seed. Write down the name of the crop (e.g. tomato) and the name of the variety (e.g. Floradade).

- 1. Decide whether your crop self-pollinates or cross- pollinates. Or ask the farmer you are interviewing.
- 2. Now make a few comments about what this means in terms of sowing seed of that specific variety.

Name of crop and name of variety	Self pollinating or cross pollinating?	Comments



# Activity 2.6 Addition of phosphorous or lime to the soil

Aim: Assist a farmer to experiment with the effect of phosphorus or lime on plant growth.

Time: 4 hours

### You will need

- small quantities of lime and super phosphate
- sticks/ stakes to mark our your plots.

### What you must do:

### 1. Planning

- 1. Discuss the issue of acidic soil with your household farmer or farmers. In this case you can also use a garden of one of your learning group team. Make sure that all gardening activities happen in at least one garden
- 2. Fill in the Small Scale Experiment Plan below (as we discussed in unit 1) with the farmer. You will go through the questions, work out the solutions (in this case addition of phosphorus and lime) and how you will observe and monitor the experiment.



SMALL SCALE EXPERIMENTAL PLAN
What is the problem?
What is a possible solution?
Why will this solution solve the problem?
How will I test this solution step by step?
What will I look for and what will I measure?
How will I measure the results or outcomes?
How will I compare my experiment to my usual way of farming?

# 2. Layout and implementation

- 1. Measure out 4 plots of the same size. Make the plots about 1 metre long and 1 metre wide.
- 2. Be sure to mark out your plots with sticks/stakes, so that you will know throughout the season where your plots are.
  - **PLOT 1:** This is your control plot. Prepare and plant this plot in your normal way.



- **PLOT 2:** Prepare the plot in your normal way and then add 2 big spoons full (20 grams) of super phosphate. This is spread evenly over your soil and is then dug into the soil. Then plant in your normal way.
- **PLOT 3:** Prepare the plot in your normal way and then add one big tin (jam tin 400 grams) of lime. This is spread evenly over your soil and is then dug into the soil. Then plant in your normal way.
- **PLOT 4:** Prepare the plot in your normal way and then add 2 big spoons full (20 grams) of super phosphate **and** one big tin (jam tin 400 grams) of lime. This is spread evenly over your soil and is then dug into the soil. Then plant in your normal way.

Below is an example of what your experiment might look like.

Plots:	Control	Phos	Lime	Phos+lime
	1	2	3	4
Garden				

### 3. Monitoring

- 1. Every week the farmer will need to monitor (check) and see in which plots the plants grow better, and give you feedback.
- 2. So you will need to follow-up with them how the monitoring is going and ensure that they are filling in the form correctly. Try to fill in this form for at least 3 weeks
- 3. Look at the plants' growth (size), their colour (bright green or yellowish) and their health (are there signs of diseases, spots or discoloration).



A monitoring form is provided below:

Exp plot►	1	2	3	4
Date of monitoring ▼	Control	Phosphate	Lime	Phosphate + Lime
Week 1				
Week 2				
Week 3				
Week 4				
Week 5				
Week 6				
HARVEST (WEEK 12)				
(31221112)				

4. Reflection
Reflect on this activity and write answers to the following questions:
What worked well?



What did you find most difficult?				
What changes would you make to the experiment in the future?				
What have you learned from your experiment?				
Activity 2.9 Companion planting				
Aim Practice choosing companion planting combinations  Time 1.5 hrs  What you must do  1. Work in groups of 3-5 2. Make a large drawing of a garden with a number of different beds (See the page below for instructions and for space to do the drawing)				
3. Make a list of all the crops you would like to plant. Include in this list new crops you may want to experiment with (including medicinal species and herbs). Look at the Vegetable planting guide and nutrient fixing plants in your resource pack for this module to be sure you are planting crops suitable to the season and area you live in.				



	examples given in Module 5, Unit 2 and the table on companion planting.  How does each of these combinations support each other? Is it through nutrient consumption, insect repellent properties, rooting depth, timing, shade tolerance or something else?
Г	
	Drawing of garden with beds, with companions
ı	



# **Activity 2.10 Crop rotation plans**

Aim: Practice developing crop rotation plans

Time: 1.5 hrs What you must do 1. Work in groups of 3-5. 2. Make a list of all the crops you would like to plant. Include in this list new crops you may want to experiment with (including medicinal species and herbs). 3. Now decide which of the two crop rotation systems presented above you would like to use. 4. Design a crop rotation system, using your list of plants and taking into account the different seasons when crops are planted Diagram of a crop rotation system



## Activity 2.11: Finalising your design plan for action

### Aim:

Linking all aspects of garden design, in order to put your plan into action

Time: 3 hours

### What you must do

- 1. We have now examined everything that is needed in order to start a successful food garden.
- 2. Table 2.10 (Module 5, Unit 2 above) gives you detailed information on the steps you need to follow to start your food garden.
- 3. Use the information in your previous modules, as well as table 2.9, to complete the table below. You need to indicate how YOU would go about planning your garden, following all the steps. (Use extra sheets of paper if required. Your garden drawing should come on a separate sheet.)

# Step 1: Ensure that appropriate inputs and equipment are available Supply the information for your situation. Step 2: Determine the size of the garden Supply the information for your situation.



Step 3: Decide on the location of the garden
Supply the information for your situation.
Step 4: Find information on the climate of your area
Supply the information for your situation.
Step 5: Plan the layout of the garden
Supply the information for your situation.



Step 6: Fence the garden
Supply the information for your situation.
Step 7: Prepare the soil
Supply the information for your situation.
Stor 0. Dignt the group
Step 8: Plant the crops
Supply the information for your situation.



Step 9: Apply mulch
Supply the information for your situation.
Step 10: Weed your garden
Supply the information for your situation.
Step 11: Irrigation
Supply the information for your situation.



Step 12: Control pests
Supply the information for your situation.



# Workbook activities for Unit 3: Making and maintaining your food garden



### Activity 3.1 Experiment to test different bed designs

Aim: Assist a household in experimenting with different designs of garden beds.

Time: 3 hours

### What you must do

#### The Plan

Discuss garden bed design and different ways to construct the beds with your household farmers. You can use the information provided above. Choose one of the different types of bed design described and implement this with the farmer

Fill in the Small Scale Experimental Plan (as we discussed in Unit 1 of Module 5) with the farmer, and observe and monitor the experiment. (There is an outline of a plan in on the next page.)

### **Monitoring**

The farmer will need to monitor the experiment. Every week they will need to check the following:

- Are the plants in the new bed growing better than those planted in other ways (the way the farmer normally plants)? The usual way is the farmer's control.
- Is there a difference between the amount of water that needs to be given to the usual and the new bed designs? (How will the farmer observe or measure this?)
- Does watering need to happen more often for the usual or the new bed? (How will the farmer measure and record this?)

A monitoring sheet is also provided below to assist this process



SMALL SCALE EXPERIMENTAL PLAN
What is the problem?
What is a possible solution?
wriat is a possible solution:
Why will this solution solve the problem?
How will I test this solution step by step?
What will I look for and what will I measure?
How will I measure the results or outcomes?
How will I compare my experiment to my usual way of farming?



Exp plot▶	Control	New bed design
Date of monitoring ▼	Plant growth: Amount of water for irrigation: Watering more or less often:	Plant growth: Amount of water for irrigation: Watering more or less often
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
HARVEST (WEEK 12)		

# Activity 3.2 Experiment to test mulching

### Aim:

Assist a farmer with an experiment to test the effects of mulching on their soil, water and plant growth.



Time: 3 hours

### What you must do

### The Plan:

Discuss mulching with your household farmers. You can use the information provided above.

Choose an area to conduct a mulching experiment

Fill in the Small Scale Experimental Plan (as we discussed in Unit 1 of Module 5) with the farmer, and observe and monitor the experiment.

SMALL SCALE EXPERIMENTAL PLAN
What is the problem?
What is a possible solution?
Why will this solution solve the problem?
How will I test this solution step by step?
What will I look for and what will I measure?
what will riook for and what will rineasure:
How will I measure the results or outcomes?
How will I compare my experiment to my usual way of farming?



# Monitoring

The	farmer will	I need to	o monitor th	e experiment	. Everv	week they	/ will need	to check	the fo	ollowina:

•	Did they use less water on the mulched plants, than on the plants that were not
	mulched? (How will they test this?)

• Were the plants that were mulched bigger and better than the ones that were not mulched? (What will they observe and or measure here?)

Exp plot►	Control	Mulching
Date of monitoring ▼	Plant growth: Amount of water used:	Plant growth: Amount of water used:
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
HARVEST (WEEK 12)		



# Activity 3.3 Experiment to test liquid manures/ teas

**Note:** Do this activity when your seedlings have been transplanted into your vegetable beds.

Aim:

Assist a farmer with an experiment to test the effects of liquid manures/ teas

Time: 2 hours

### What you must do

### The Plan

Discuss the use of liquid manures with your household farmers. You can use the information provided in your manual. Choose a liquid manure brew to make up and implement this with the farmer as an experiment

Fill in the Small Scale Experimental Plan (as we discussed in Unit 1 of Module 5) with the farmer, and observe and monitor the experiment.

SMALL SCALE EXPERIMENTAL PLAN	
What is the problem?	
What is a possible solution?	
.Why will this solution solve the problem?	
	· •
How will I test this solution step by step?	
What will I look for and what will I measure?	•
How will I measure the results or outcomes?	· •
Tiow will i modeling the recente of outcomes.	
How will I compare my experiment to my usual way of farming?	
	. •



## Monitoring

The farmer will need to monitor the experiment. Every week they will need to check the following:

Were the plants that were treated with liquid manure bigger and better than the ones that weren't? (What will they observe or measure here?)

Exp plot►	Control	Liquid manure
Date of monitoring ▼	Plant growth:	Plant growth:  Amount of water for irrigation:  Watering more or less often
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
HARVEST (WEEK 12)		



# Activity 3.4 A Farmer experiment for planting a range of crops

**Aim:** Assist a farmer in doing an experiment to test the effects of companion planting, crop rotation and or succession planting.

Time: 4 hours

### What you must do

### The plan:

Start by discussing the issues of planting a range of crops with your household farmer or farmers. You can use the information provided in your manual to discuss what different types of crops might be included according to the food preferences of the family. Then discuss the addition of more types of plants by including companion planting and crop rotation. Discuss the advantages and disadvantages of doing this.

Then discuss carrying out a small experiment involving the planting of a range of crops. You may end up doing more than one experiment. One may be to mix cropping of a bed, one may be introducing the planting of herbs in the garden, one may be a crop rotation plan. Fill in the Small Scale Experiment Plan (as we discussed in Unit 1 of this module ) with the farmer. You will need to fill in one of these forms for each experiment that is done. You will go through the questions, work out the solutions and how you will observe and monitor the experiment.





### Monitoring

Now the farmer will need to monitor their experiment. Every week they will need to check specific things such as:

- How are the new crops growing, compared to the normal or usual crops planted?
- Do the crops grown together as companions grow better than the crops planted separately? Are there fewer or different kinds of pests and diseases? Is there a difference in the amount of watering that is required?
- A crop rotation experiment will take a few years to show a difference. It is difficult thus to do a
  small scale experiment as the one shown here. It is possible for you/or the farmer to set aside
  a piece of the garden and start to practise rotation there (3-4 beds depending on the system
  you choose). Then it will be possible to compare the growth of crops in the rotated beds with
  those in normal beds. You will need to plant the same crops at the same time for this to work.

Exp plot▶	Control	Planting a range of crops
Date of monitoring	Plant growth: Effect of planting different	Plant growth: Effect of planting different crops
▼	crops together on plant growth:	together on plant growth
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
HARVEST (WEEK 12)		





# Activity 3.5 Assess and analyze best practises for pest and disease control (Portfolio Activity 4.2)

Aim: Assist a farmer in doing an experiment to test the effects of companion planting, crop rotation

Note: This activity consists of Part A and Part B.

### Aim:

- Solve a problem in a food garden using a pest control brew.
- Assess and analyse pests and disease problems in the community during a workshop.

Time: 4 hours

### What you must do

### Part A

- 1. Read the pest and disease control brews explained above.
- 2. Choose one of the brews that you think will solve a particular problem you have in your garden. Do a small-scale experiment using your brew of choice.
- 3. Record your experiment (using the plan and monitoring sheet provided below). Here you will need to choose your own criteria for observation and measurement that will be recorded on the monitoring sheet.
- 4. Take photographs if possible, (of yourself making the brew, applying the brew and monitoring your experiment in your garden).



SMALL SCALE EXPERIMENTAL PLAN What is the problem?	
What is a possible solution?	
Why will this solution solve the problem?	
How will I test this solution step by step?	
What will I look for and what will I measure?	
How will I measure the results or outcomes?	
How will I compare my experiment to my usual way of farming?	



Exp plot▶	Control	Pest and disease control measure
Date of monitoring ▼		
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
HARVEST (WEEK 12)		



### Part B

- 1. The community now get together for a workshop to discuss the common pest and disease problems that they experience. (Your group of households (5-10))
- 2. Community members suggest remedies they have tried, and which work well.
- 3. Below is an example of how you can record the discussions during the workshop. Note that the last column is for suggestions/new ideas and interventions you will offer during your workshop.

Table 3.5 Pests and disease problems, solutions and new ideas as analysed by a learning group participants in Potshini (2006).

PROBLEM	SOLUTIONS TRIED AND THEIR USEFULNESS	OTHER SUGGESTIONS/ NEW IDEAS
Rats eating vegetables	Rattex and traps.	Rattex is extremely poisonous and should be avoided. Rather get a cat to catch the rats.
Birds eating seedlings	<ul> <li>Use scarecrows which are huge human figures made from straw and dressed with clothes.</li> <li>Be in the garden from dawn to 8 am to chase birds away.</li> <li>Plant during early winter so crops are stronger when birds come in July-August.</li> </ul>	<ul> <li>Use old cassette tapes to make a barrier over the plants to keep birds out.</li> <li>Use netting over the garden to keep birds out.</li> </ul>
Mealy bug in fruit trees	- Nothing	<ul><li>Planting with compost to restore balance in the soil.</li><li>Pruning parts of the plant attacked by mealie bug</li></ul>
Moles	Amadumbe (taro) chase them	
Fruit fly sting on tomatoes	- Nothing	Fruit fly traps (demonstration in workshop).
Aphids and worms	Chilli and soap spray	Chilli, garlic and soap (demonstration in workshop).
Cutworms	- Eggshells around the plants - Work warm manure into the beds	- Cutworm <b>collars</b> (demonstration in workshop) - Light traps for moths.
Stalkborer	- Granules (bought from a shop)	- Napier fodder as a <b>trap crop</b> (demonstration in workshop).



Tutors will demonstrate some methods that work well during the workshop.

- 4. Compile a table similar to the one in the example. Record the problems and solutions tried, and suggestions/ new ideas to overcome the problem(s) in your table.
- 5. After analysing the present situation regarding pests and diseases with your group, you can give a talk on natural pest and disease control. We suggest that you focus on three topics (a) Using your garden friends (predators); (b) Using safe chemical sprays, and (c) Mechanical control measures. Use the information provided in your resource pack as a guide.

PROBLEM	SOLUTIONS TRIED AND THEIR USEFULNESS	OTHER SUGGESTIONS/ NEW IDEAS

