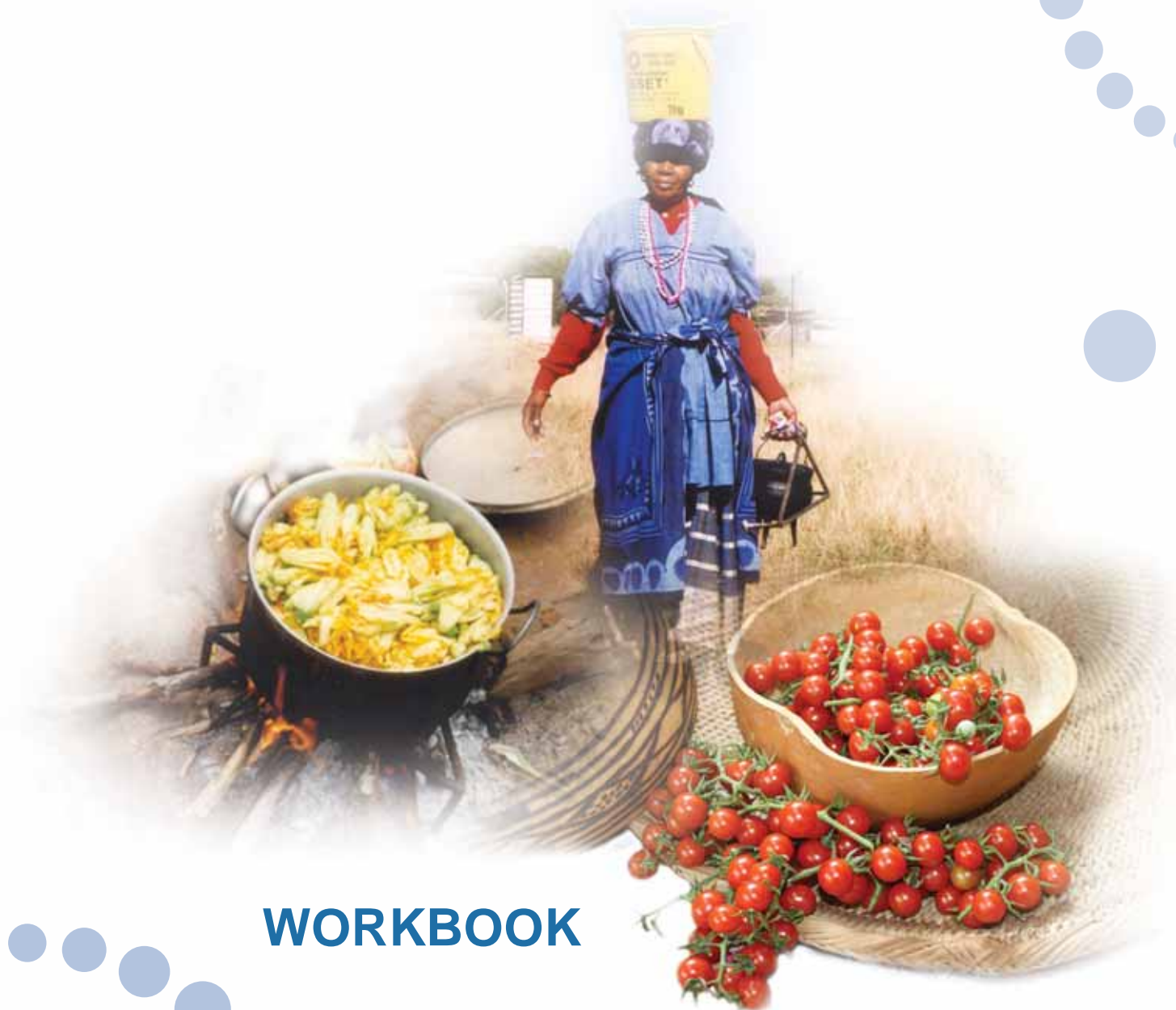


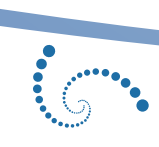
Module 3 Sustainable Natural Resources Use

■ Module code: PHFS03M



WORKBOOK

Student Name:	
Student Number:	
Cell Number:	
Name of Facilitator:	
HFS Centre:	





Although 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.

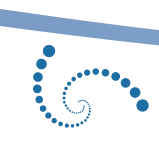
By now you will be aware that your study guide contains a variety of learning activities. Some of these activities have been selected to deepen your understanding of the main topics dealt with in the module and are called *workbook activities*. How will you know which activities are workbook activities? 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 3. The same numbers have been used for the activities in the study guide.

You will need to complete the workbook activities in the workbook provided **for each of the six modules** that make up this programme. 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 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 tutorial-facilitated sessions, where you will be given an opportunity to reflect on some of them with your tutor.



Note: Your tutor will award a mark on completion of the workbook, which makes up 10% of your final overall assessment mark.



Workbook activities for Unit 1: Natural resources and their importance



The first workbook activity for Module 3, Unit 1 is Activity 1.3 in the study guide.



Activity 1.3 A simple model of the water cycle

Complete this activity in groups or on your own.

Aim: Build a simple model of the water cycle to gain an understanding of the interlinked processes that take place.

Time: 1 hour

What you will need

Transparent (see through) container, cup, plate, dirty water, plastic cling film, small stone.

What you must do

1. Build your model of the water cycle as shown in any one of the figures below. Make sure that the cling film seals tightly along the edge of the container.

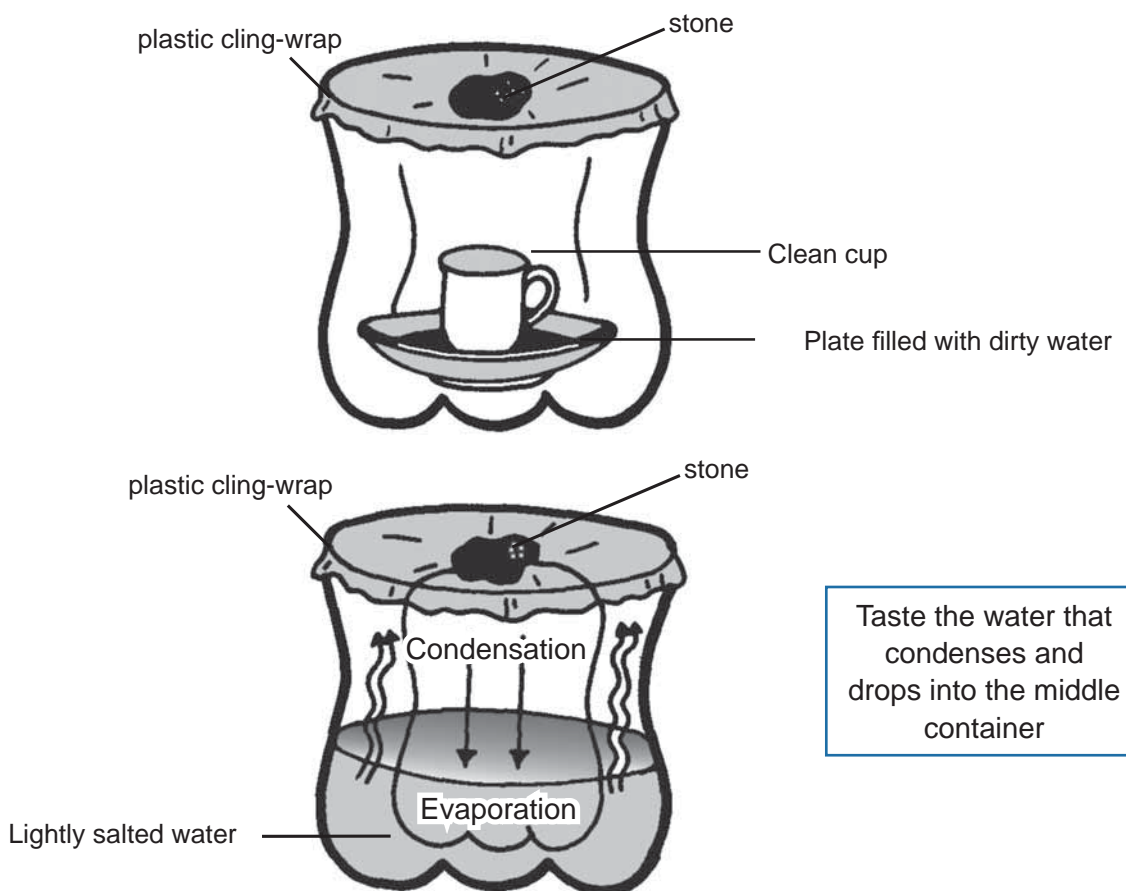


Figure 1.8 Models of the water cycle

2. Once your model is set up, place it outside in the sun and observe it over a period of a few days.
3. Answers the questions below in your workbook in the spaces provided.

Questions

1. Describe your observations. (What did you see?)

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2. How does your model represent the water cycle? Make a drawing of your model with arrows connecting the different processes that form part of the water cycle.

3. We have seen that most water is stored in the oceans. This water is saline (salty). Is rainwater saline or fresh? Justify your answer.

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4. Which human activities have a negative impact on the water cycle?

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5. Reflect on how we can lessen our negative impact on the water cycle.

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Activity 1.5 Finding out about rainfall in your area

Complete this activity in groups

Aim: Get rainfall data in specific areas using local sources.

Time: 2 hours

What you must do

- Find out from knowledgeable people in your area:
 - what the average rainfall for the area is.
 - what the seasonality of the rainfall is (which months of the year have rain and which month has the most rain).
 - the average minimum and maximum temperatures for your area.
(You need to know whether there is frost, or you have very high temperatures and how long these conditions last)

Temperature is measured in degrees centigrade (also known as Celsius). We use the symbol ° for degrees. We use the symbol C for centigrade or Celsius.

*0°C is freezing point
20°C is mild
35°C is very warm*

Who are knowledgeable people whom you can consult about rainfall?

You can speak to older farmers who have been living in the area for a long time.

You can speak to the local agricultural extension officer in your area.

You can consult books or the Internet (Here you may need help from your tutor).

- Once you have spoken to people and looked at other sources, you need to write a short report, which includes the following information:
 - Whom you spoke to.
 - What each person said about average and seasonal rainfall and minimum and maximum temperatures. Present this information in a small table).
 - Compare this information with the general rainfall data you worked out in Activity 1.4 in the study guide.
 - Comment on similarities and differences.
 - Specify why it is important for an HFS facilitator to be aware of average rainfall and seasonality of rainfall.

Report on rainfall in your area

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Activity 1.6 Make your own terrarium

Complete this activity in groups or on your own

Aim: Build a terrarium to gain an understanding of evapotranspiration

What you will need:

A large glass or clear plastic container (eg: 2 litre coke bottle) with a lid, soil, sand, pebbles, compost. Seeds. Small plants. A small dish or cup.

Time: 1 hour

What you must do

1. Build the terrarium (small world) as follows:

- Place the sand and pebbles at the bottom of the container which has been tipped on its side
- Place about 3 to 4 cm of soil and compost on top of the sand and pebbles.
- Plant the small dish firmly in the ground and fill it with water.
- Create a small landscape by building small hills and valleys.
- Plant the seeds and the small plants in the soil.
- Moisten the soil and plants, using a spray bottle.
- Seal tightly and place the terrarium in indirect sunlight, for example on the veranda (stoep) away from the sun.

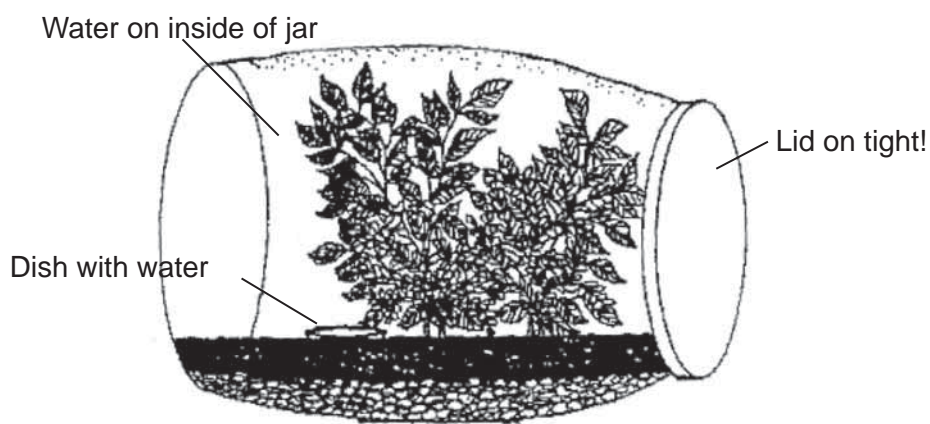


Figure 1.13 A terrarium to demonstrate evapotranspiration

2. Look at your terrarium (small world) every day for one to two weeks and write your observations in your workbook. What is happening inside the terrarium?

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What has changed over time? (Give the date and the event)

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Why do you think the changes have happened? (Give the reason for the changes)

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Try some of the following experiments and write down your observations:

- Add other life forms, for example, insects.
- Plant some more seeds or small plants of your choice.

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3. In what way does this model represent the water cycle? Make a drawing with arrows connecting the different elements of your terrarium in the space provided in your workbook.

4. Explain why is it important to know about evapotranspiration.

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Activity 1.8 Water use in your management area

Complete this activity in groups or on your own

Aim: Interpret information on water management in your area.

Time: 1.5 hours

What you must do

1. Look at the map in Figure 1.18 below.

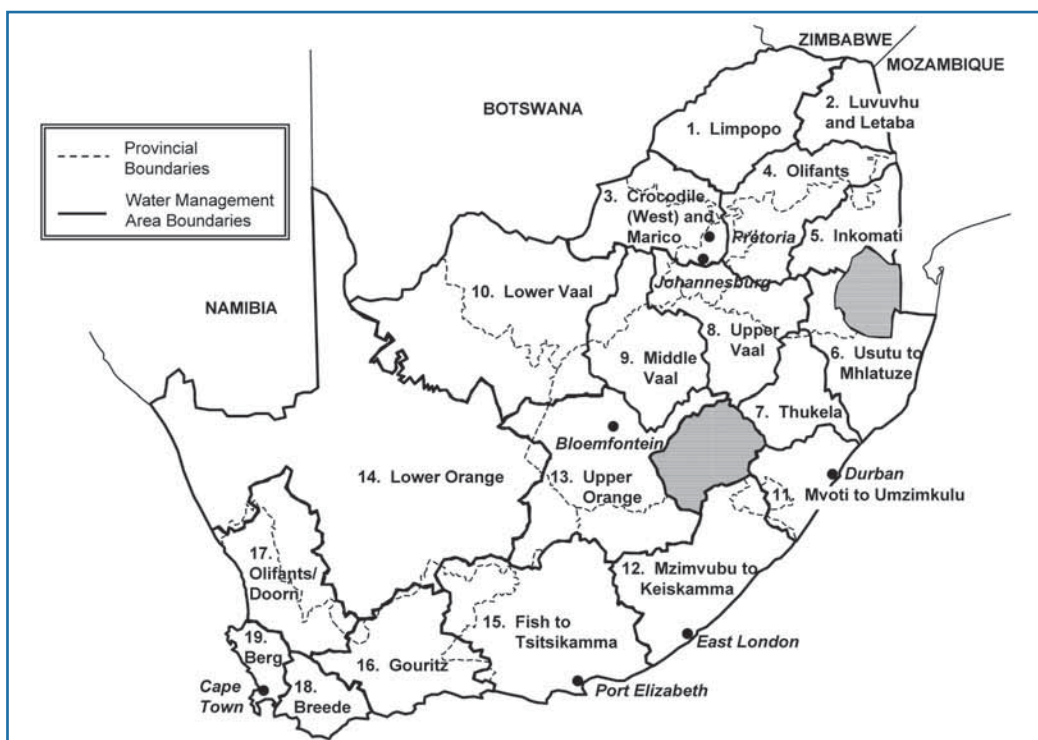


Figure 1.18 The 19 water management areas in South Africa

(Adapted from Oosthuizen, 2004.)

2. Identify on the map where you live. You may want to look at another more general map of South Africa to help you situate where you are and what the names of the major rivers are that are close to you. Find out the name of the water management area where you are and list the names of the major rivers.

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3. Now look at Table 1.3. Look under your water management area and summarise the water requirements information by answering the questions that follow:

Water Management Area	Irrigation	Urban	Rural	Mining and Bulk Industrial	Power generation	Aforrest-ation	Available balance in 2000	Potential water require-ments in 2025	Total local requirements
Limpopo	238	37	28	14	7	1	(24)	8	325
Luvuvhu/Letaba	248	11	31	1	0	43	(37)	102	334
Crocodile west and Marico	445	691	38	127	27	0	11	0	1 328
Olifants	557	92	44	94	181	3	(196)	239	971
Inkomati	737	65	24	24	0	198	(253)	114	1 048
Usutu to Mhlathuze	404	54	40	91	0	104	235	110	693
Thukela	204	56	31	46	1	0	(97)	598	338
Upper Vaal	114	795	42	173	80	0	481	50	1 204
Middle Vaal	159	112	32	86	0	0	(2)	0	389
Lower Vaal	525	78	44	6	0	0	48	0	653
Mvoti to Umzimkulu	207	438	44	74	0	65	(267)	1 018	828
Mzimvubu to Keiskamma	190	100	39	0	0	46	480	1 500	375
Upper Orange	777	129	60	2	0	0	486	900	968
Lower Orange	780	28	17	9	0	0	(9)	150	834
Fish to Tsitsikamma	763	116	16	0	0	7	106	85	902
Gouritz	254	57	11	6	0	14	(66)	110	342
Olifants/Doring	356	7	6	3	0	1	(35)	185	373
Breede	577	43	11	0	0	6	29	197	637
Berg	301	423	14	0	0	0	(34)	210	738
Total for Country	7 836	3 332	572	756	296	488	504	5 576	13 280

Table 1.3: Water requirements for the 19 water management areas based on statistics for the year 2000 (million m³/ year)

Questions

1. What does million m³/ year mean?

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2. Which water user, uses the most water in your water management area? Look at the headings across the top of the table to help you find this information.

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3. Which water user uses the least water in your water management area?

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4. What do you think is meant by the heading *Rural*? Why are the water requirements (read allocations) for rural much lower than for the *Urban* heading? Think of at least three possible reasons.

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5. Is the “Available balance in 2000” for your water management area in brackets? What do you think this means?

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6. Compare the “Available balance” in your water management area with the “Potential water requirements in 2025”. What do these figures mean to you?

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7. Suggest at least three potential options of how to solve the problem of too little water.

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Activity 1.10 Considering aspects, ridges and valleys

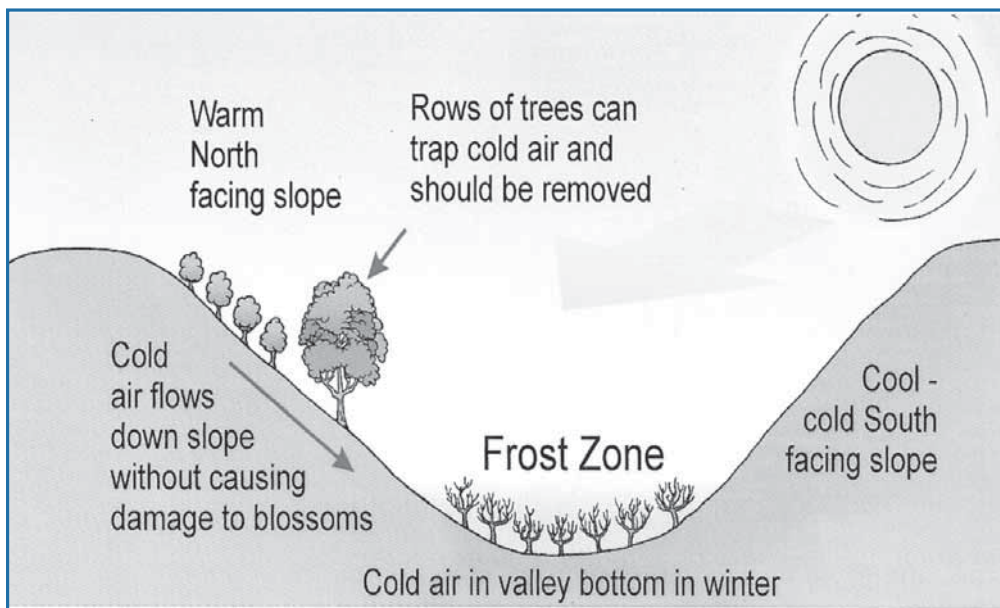
Complete this activity in groups

Aim: Analyse a figure on aspect, ridges and valleys for land use options.

Time: 1 hour

What you must do

1. Look at the figure below. It gives an indication of where to plant fruit trees taking the aspect, ridges and valleys into consideration.



Note the aspect and the movement of air as shown in the drawing. Then answer the following questions.

Questions

1. Where is the best place to plant trees and crops? Give two reasons for your answer.

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2. Why have no fruit trees or other trees been planted on the cool, cold south-facing slope?

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3. What is the difference between the fruit trees planted on the north-facing slope and the fruit trees planted in the valley bottom?

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4. A comment on the drawing states: *Rows of trees can trap cold air and should be removed.* Discuss what this statement means.

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5. Where is the cold air coming from and where is it going?

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6. Where will the cold air be trapped?

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7. If you would want to plant rows of trees to protect your fruit trees from cold air where would you plant them?

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Activity 1.11 Identifying soil types

Complete this activity in groups or on your own

Aim: Identifying different soil types by touch and observation

Time: 2 hours

What you need

For the sausage test: At least three types of soil (about a handful of each) and some water. These can be collected from the river (sand), low lying wet areas (clay) and good cropping fields (silt). Look for soils that have a different colour and texture so that you can compare them.

For the bottle test: Three clear plastic or glass bottles (for each small group), such as 1-litre coke bottles, with caps. Handfuls of three different types of soil from the area or of the three main soil types there are.

What you must do

Tell by touch: You can tell how much sand, silt or clay is in your soil by how it feels.







1. Wet some soil and roll it into a ball between your hands.
2. Now roll this ball into a sausage.
3. Use the table below to identify your soil type.

My soil type is:

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Table 1.5 Identify soil type by touch

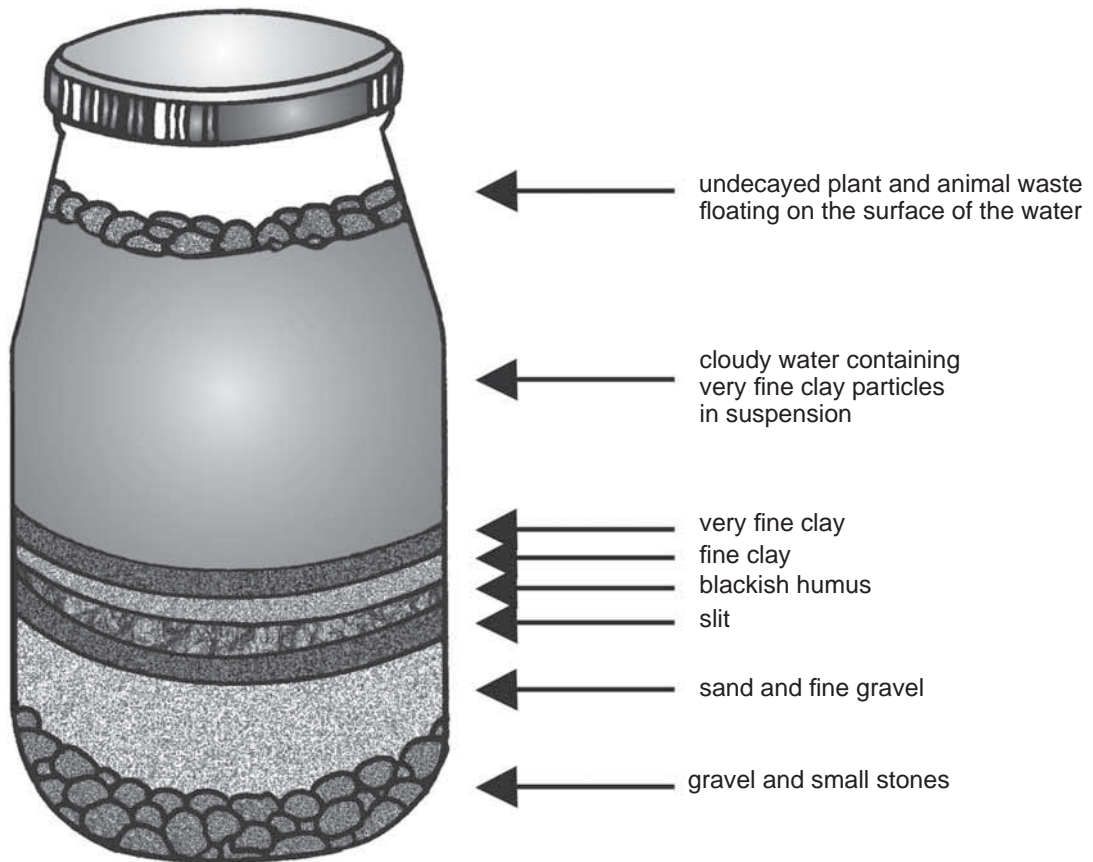
What soil looks like	What soil feels like	When rolled into a sausage		The soil is
Very Sandy	Very rough	Cannot be rolled into a sausage		Very Sandy 0-5% clay
Quite Sandy	Rough	Can be rolled into a sausage but it cannot bend		Sandy 5 - 10% clay
Half Sandy & half smooth	Rough	Sausage can bend a little		Sandy Loam 10 - 15% clay
Mostly smooth	A little sandy, quite smooth but not sticky	Sausage can bend about half way around		Loam or Silt Loam 15 - 35% clay
Mostly smooth	A little sandy, quite smooth and sticky	Sausage can be bent more than half way round		Clay Loam or Sandy Clay 35 - 55% clay
Smooth	Smooth and sticky	Sausage can bend into a ring		Clay More than 55%

Tell by observation.

1. Fill a bottle one third full of soil.
2. Almost fill the bottle with water and shake vigorously for several minutes to separate the soil grains.
3. Leave the bottle with its contents to settle and observe what takes place.
4. Make a **labelled** drawing and write a description/comments next to it in the space provided in your workbooks.

Soil sample mixed with water to show layers

bottle in which a soil sample mixed with a large quantity of water is thoroughly shaken



5. Use the examples below to guide your comments.

Examples

- The substances settle in layers, the heaviest at the bottom and the lightest at the top. Some particles float on the surface. Others remain suspended (float) in the water. Some substances are lighter than water and float on its surface. These are pieces of organic matter such as leaves, seeds, fruit or insect litter and fungus spores. Other heavy substances such as gravel, pebbles and sand quickly fall to the bottom.
- The finer substances then accumulate (stick together); first the silt, followed by the fine and very fine clay. These layers vary in consistency and colour. The layer of water above the settled material remains cloudy for a long time. It contains clay particles so fine that they stay suspended in the water.
- If some salt crystals were added to the soil before the bottle was shaken, we notice that they have now disappeared. They have dissolved in the water and can no longer be seen. Some soil components are visible and others are invisible.

6. Once you have decided on your soil types, use the table below to give an indication of good soil management practices for each of your soil types.

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Activity 1.12 Identifying soil texture, structure and depth

Complete this activity in groups or on your own

Aim: Digging a soil pit to tell different soil textures, structures and depth.

Time: Five hours

What you will need:

Tools to dig a hole, a tape measure or ruler to measure depth and paper to record your results on.

What you must do

Complete this exercise in your home or in the garden of a member of the community. Make drawings and, if at all possible, take a few photographs.

Note: Digging a soil pit is quite hard work. You may want to dig this pit in a spot in a garden where other activities will take place later. For example this pit can form the beginnings of a trench bed which you will use in Module 5, or it can become the planting hole for a fruit tree.

1. First look at the general environment. Are the plants growing there doing well? Are all the plants of the same kind, growing the same? If not, describe the differences.

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2. What does the soil look like? Is it cloddy, sandy or granular? What colour is it? Can you see any organic matter or humus in or on the soil?

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3. What life forms can you find that are working the soil? Describe them and give an idea of what you think they are doing in the soil in terms of moving material, decomposition and production. Make drawings of your life forms (or take some pictures, if possible).

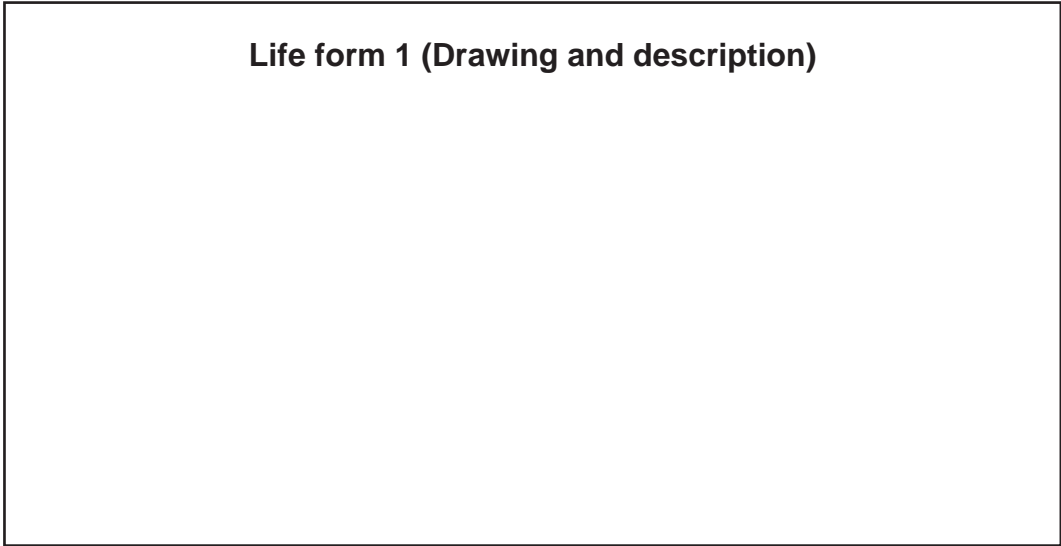
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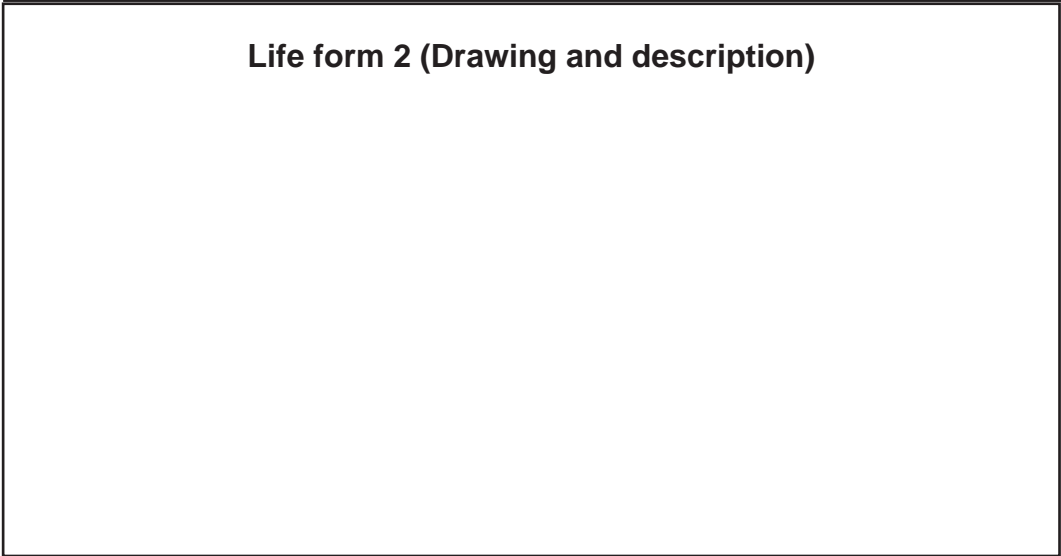
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Life form 1 (Drawing and description)



Life form 2 (Drawing and description)



- 4. Dig a pit about 40 to 50 cm wide and 40 to 50 cm deep. Keep on digging until there is a change in soil colour and consistency (that is, when you move from the top-soil into the sub-soil).

Now carry out the following activities:

Check and record how deep the topsoil is.

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Check for root growth and comment on the kinds of root you find and how they are growing.

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Are there any impermeable layers (layers that cannot be dug through) in between the topsoil and subsoil? Describe what they look and feel like.

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5. Make a drawing of the soil profile, or take a photograph.

6. Use the *Telling by Touch Table* (see Activity 1.11 above) to assess the texture of your topsoil and subsoil. Record the percentage of clay in each.

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7. Describe the structure of your top- and subsoil. Does your soil come out in clods or is it crumbly?

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8. Will the topsoil support plant growth? What effect will the subsoil have on plant growth? Give reasons for your answers. What could be done to overcome some of the restrictions?

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 **Activity 1.13 Using biodiversity as a resource**

Complete this activity in groups or on your own

Aim: Interpret information in a case study on the use of biodiversity as a resource.

Time: 2 hours

Do you remember Lesedi, the son of the local business man, whom you met in Module 1? Lesedi's uncle, Jan Baadjies, lives in Calvinia in the Northern Cape, where he practises as a traditional healer. During the last school holidays, Lesedi went to visit his uncle, and was surprised by how different this community is compared to the one that he comes from.

What you must do




- 1 Read the following case study of the Hantam community in the Northern Cape, and follow the instructions.






Lesedi is walking in the foothills of the Hantam mountains with his uncle, Jan. He is very interested in the plants that are adapted to the very dry and quite harsh conditions of the Northern Cape. He is also very impressed with his uncle's knowledge of the plants, and how they are used. His uncle encourages him to collect small samples of the plants, and Lesedi makes thorough notes on all the different plants his uncle tells him about. He also takes photos with a new camera that his mother brought him from money she got by selling produce from her homestead garden. Jan explains to Lesedi that, as a traditional healer, he needs to harvest the plants very carefully and not to take too many at once. The veld offers a treasure chest of foods and medicines, but we should use these resources responsibly, Jan tells his nephew. That evening, Lesedi records all the plants he collected that day in a table like the one below:

Table 1.7 Indigenous plants used by the Hantam community

Key: S=Scientific name; E=English; A=Afrikaans; Z=Zulu; X=Xhosa; So=Sotho

Name of plant	What it looks like	What it is used for
<i>Rhus lancea</i> (S) Karee (A)		Fruit is eaten by people in Calvinia
<i>Hydnora africana</i> (S) Jakkalskos (A)		Edible fungus
<i>Sutherlandia frutescens</i> (S) Cancer bush (E) Kankerbossie (A)		Medicinal uses- boosts the immune system, used to build an immune system amongst people suffering from cancer and HIV/AIDS



<p><i>Hyobanche sp</i> (S) Soetprop (A)</p>		<p>Plant's nectar (syrup) is drunk by people</p>
<p><i>Galenia africana</i> Geelbos (A)</p>		<p>Used for leaching; can be used in a food-warmer or food-cooler</p>
<p><i>Aloe spp</i> (S)</p>		<p>Put in drinking water of chickens, to ensure their good health; placed on human wounds</p>

Questions

1. Which plants that Lesedi recorded are used as food?

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2. Which plants that he recorded are used for medicine and other purposes?

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3. Do any of the plants Lesedi collected grow in your area? What does this tell you about the climate (temperature and rainfall) in your area? Refer to the rainfall maps in Figure 1.9 (Annexure A)

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4. If you do recognise the plants that Lesedi collected, what are they used for, or what other plants that you know are used for similar purposes?

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5. Why did Lesedi's uncle tell him to harvest the plants carefully and not to take too many?

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5. In these modern times, why should we consider using plants from the wild to plant in homestead gardens?

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Activity 1.16 Your place in the cycle of nature



Complete this activity on your own in your workbook

Aim: Understanding the place of humans in the cycle of nature.

Time: 30 minutes

What you must do

1. Draw yourself in the centre of the page. Draw or write on the paper:
 - all the different foods you eat.
 - where your food comes from.

2. How do these things (that have become your food) get their own food? Use arrows to show the links between the different elements.

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3. What will happen if one of these links is broken or damaged?

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Workbook activities for Unit 2: Natural resources and food security



The first workbook activity for Module 3, Unit 2 is Activity 2.2 in the study guide.



Activity 2.2 Finding out about resources of two villages

Complete this activity on your own or in groups

Aim: Assess and analyse the availability, access and utilisation of the natural and other resources of the two households in the different villages.

Time: Two hours

What you must do

1. Read the case studies below of Village A and Village B.



Village A

Overview

There is no headman or chief ruling the people, but the nearby municipality is responsible for the village in terms of issues such as land allocation for residential, business and project purposes. The village is partly peri-urban in the sense that a small number of households have homestead gardens in their yards.

Natural environment

The climate of the area is warm in summer and cold in winter. There is a good infrastructure and access to basic resources such as electricity and safe water, which is free. Most of the projects running in the village are funded and are successful. Some households have homestead gardens, which form part of a project. This is a way of producing food and the vegetables are sold to other people in the village. Households who participate in the homestead garden project are food-secure because they produce and sell the food and other products and get money to buy other necessities for the household.

Household activities

The household activities are the activities, which household members perform on a daily basis from the time they wake up until they go to bed in the evening. Most villagers are involved in project work during the day, from Monday to Friday. There are nine projects, which consist of the bakery, carpentry, dairy, sewing, poultry, egg and vegetable, brick-making, glass fitting and pillow making projects. In the evenings the women do the household chores, watch TV and socialise with their families.

Household food supply/acquisition

Most households buy their food from the local shops. Only a few households produce their vegetables in the yard. The food mostly purchased is maize meal, rice, flour, sugar, tea, meat (chicken) eggs, milk, vegetables (potatoes, cabbage, onions, tomatoes), tinned foods (fish, baked beans and spices). No indigenous wild fruit, vegetables or indigenous animals are used as a source of food.

Nutritional and indigenous knowledge (IK)

The primary caregivers (women), have little or no nutritional knowledge, and, in addition, have little indigenous knowledge about edible and non-edible plants in the environment. They prefer store-bought foods and do not consult with the older people who still have knowledge of indigenous foods.



Village B

Overview

One chief governs this rural village. External environmental factors play a very important role in the availability, production and distribution of food at the household level. Lack of access to the most important resources such as fuel (firewood) and water is a problem, which affects their food habits negatively. Without access to water, food production remains impossible. Many people are unemployed and depend on other household members to provide money to buy food. Lack of funds (sponsorship) prevents the development of gardening projects, which, in turn, delays development in the village.



The natural environment

The climate of the area is very warm and dry in summer and cold in winter. The villagers can only depend on rain, which has been scarce in the previous year. The people therefore use water from the wells, but they are exposed to infection, because the well water is contaminated.

There is limited electricity in the village and firewood is still used as the main source of energy for preparing food. The women collect firewood in the bush (two hours there and back), but, since dry wood is scarce, they are using live branches from the trees or sometimes even cutting down the trees themselves. This is illegal and if the local authority catches them, they are fined.

Communal land around the village is used as grazing land for the animals. Only the households that have formed part of the village for a long time own a piece of land. The chief allocates land, but for newcomers there is no more land.

Household activities

The women face a number of specific constraints that prevent them from increasing their income. In order to prepare food they have to buy paraffin, gas or electricity or they have to steal wood. With the high unemployment rate their only hope for survival is the local forest, which is becoming more and more depleted. Apart from collecting water and firewood, the women are engaged in farming activities (seasonal) such as planting, harvesting and processing. The harvested crops are owned and controlled by their husbands.

Household food supply/acquisition

Basic food such as maize meal, sugar, tea, flour, potatoes and cabbage, is bought from the local shops and the nearest town. The women depend on money from their husbands and their mothers-in-law who are pensioners. Crops such as maize, sweet reed, cowpeas, njugo beans and pumpkin are planted. The food source is supplemented by indigenous foods, some of which are shown in Table 2.1 below.

Nutritional and indigenous knowledge (IK)

Although the women do not have nutritional knowledge, they have IK about edible wild foods. This IK was learned through socialising rather than from formal education. They depend heavily on wild foods, as resources are scarce. Foods prepared such as 'tshima' (sorghum), cow pea and njugo, which is a bean dish, are typical examples of foods, which form part of a balanced diet.

Table 2.1 Indigenous foods eaten by members of Village B

Foods	Sotho/Pedi name	Xhosa/Zulu name	English name
Vegetables	Lerotho Mokolonyane		African cabbage Black jack
Fruit	Mahlatswa Marula		Wild plums Marula
Wild animals	Mmutla Pela		Hare Rock dassie
Birds	Kgaka Mokowe		Guinea fowl Grey lourie

(Case studies adapted from a report compiled by Mrs M. Masekoameng and Miss Molotja on Food habits of the Pedi, 2003)

- Complete the table below to compare the availability of, access to and utilisation of resources by the households of the two villages under discussion.

Resources	Village A	Village B
Availability of		



Access to		
Utilisation of		

3. In your groups, discuss your findings and then individually write a summary of your findings.

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Questions

1. Which village can be regarded as the most food-secure? Justify your answer.

.....

2. What benefits are there in collecting indigenous foods from the natural environment?

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3. What negative impact can the collection of firewood and indigenous foods have on the natural environment?

.....
.....

4. How can the negative impacts that you gave in Question 3 be reduced?

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.....

4. Assume that a major economic disaster strikes, that all the shops close down, and the transport is discontinued. Which of the two villages will be the most food-secure? Justify your answer.

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5. Suggest long-term strategies to address the challenges faced by Village B.

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Reflect

6. Reflect on your assessment and analysis of resources in the above activity and write down your answers to the following questions:

- What worked well?
- What did you find the most difficult?
- What changes would you make to this activity in the future?
- What have you learned from your experience?

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Activity 2.4 Draw a resource map of your area

Do this activity in groups or on your own

Aim:

Practising in a group of three to five people how to make a resources map that focuses on specific features and issues.

Time: 2.5 hours

What you must do

Here are suggestions to guide you.

A. Plan

1. Decide on a suitable place where you can make your resources map. It can be one of the group member's home villages or an area that all the group members know.
2. Discuss in your group why you want to draw this map. What is its purpose? Choose two or three features and issues that you will show on your resources map. If you try showing too many features and issues, it will become confusing. Look at this list for ideas:
 - Physical features: hills, valleys, large rocks, erosion
 - Types of natural vegetation such as grassland, bushes, trees
 - Cultivated areas and agricultural lands showing cropping and crop types
 - Land-use such as gardens, fields, grazing areas, forests
 - Rivers and water points
 - You can also include the village infrastructure such as the boundary, roads, houses, schools, markets, clinics, churches, special places such as sacred sites.
3. Draw up a list of questions to which you want to find answers. Here is a list to give you an idea:

Questions

1. What resources are plentiful?

.....

2. What resources are scarce?

.....

3. Where do people go to collect water and who collects it?

.....

4. Where do people go to collect firewood and who collects it?

.....

.....

5. Do people have vegetable gardens and who looks after their gardens?

.....

6. Do people have livestock and who looks after them?

.....

7. What kind of livestock is there?

.....

8. Where do the livestock go to graze?

.....

9. Which resource do people have most problems with?

.....

10. What are these problems?

.....

11. What is the community doing to solve these problems?

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B. Do

1. Take a walk through the area and make notes of the features and resource issues that you want to investigate.

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2. As a group, you can make a drawing of the map on the ground first. Mapping on the ground has a number of benefits:

- It is easily visible to the group.
- It encourages a lot of discussion.
- It allows for a lot of detail.
- It can be changed or corrected easily.
- You can add to it as the space on the ground is not limited.

Of course the big disadvantage is that you cannot take your map away. If you want to keep a copy you have to copy it onto paper. If you have access to a camera, you can of course take a photograph



of the map on the ground. The diagram below shows a group creating a resources map on the ground and it gives an idea of what it looks like on paper.

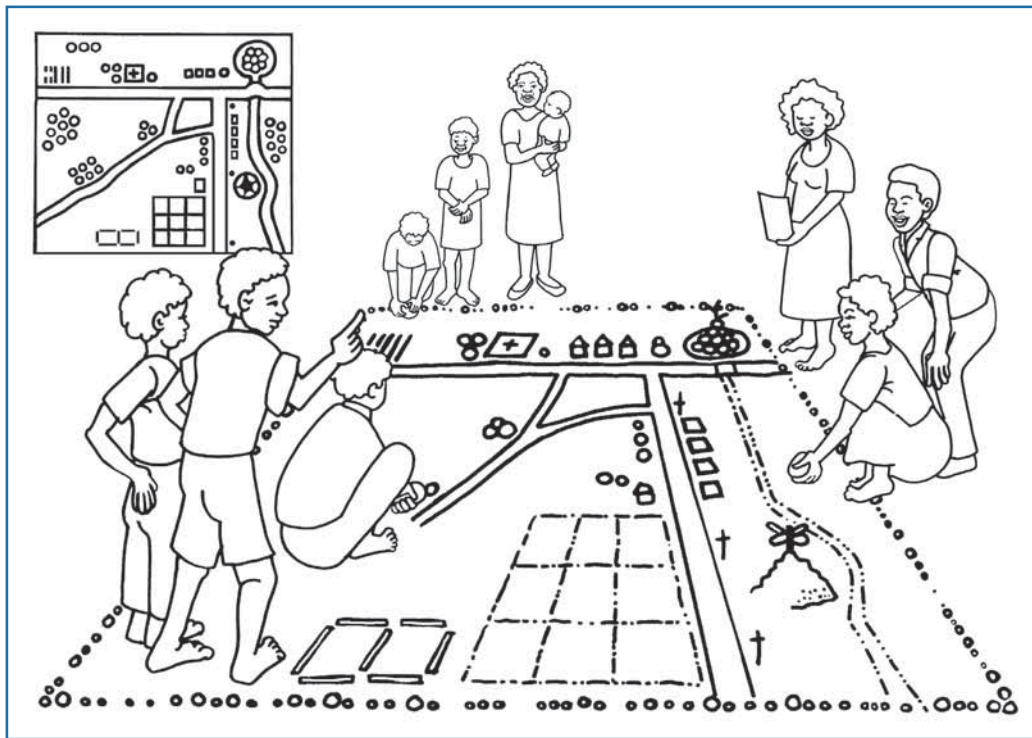


Figure 2.5 A group creating a resource map on the ground

3. Draw your map on paper. You can use colours to show different features.

Your resource map



Activity 2.6 Draw a transect walk diagram

Complete this activity on your own or in groups.

Aim: Practise in a group of three to five people how to do a transect walk and finalise a transect diagram that focuses on specific features and issues.

Time: 2.5 hours

What you must do

Here are suggestions to guide you.

A. Plan

1. Decide on a suitable place where you can do your transect walk. It can be one of the group member's home villages or an area that all the group members know.
2. Discuss the purpose is of the transect walk in your group and decided upon what information you want to gather. Choose two or three features and issues that you want to explore. Look at this list given below for ideas:
 - Land use: crops cultivated, local cultivation patterns, local technology used for irrigation, water/plant/soil conservation, erosion, soil types, local vegetation, use of wild plants, resources in disrepair such as dip tanks.
 - Resources or facilities: state of roads, problems and opportunities with water points or plotting a gravity water system.
 - Village or homestead areas: drainage and sanitation use of back yard space, location of taps, household chores, state of dwellings and interactions between different groupings.
3. Write a list of questions to which you want to find answers.

Your questions

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B. Do

4. Take a walk across the area in a straight line and make notes on relevant features that you observe. The idea is to stop at regular intervals, say every 500 meters, or every 10 minutes, or whenever a particularly interesting feature is observed. Use the opportunity to get clarity about the issues and discuss the problems and opportunities.
5. After the walk, share the notes you have made with the rest of the group and refine your ideas.
6. Involve everyone in the group to help make a transect walk diagram. During this time you will continue to discuss the issues and sharpen your ideas. Check the final diagram. Does it reflect adequately what you have observed?

Your transect walk diagram

C. Reflect

7. Reflect on the transect walk and the making of the diagram.
 - What worked well?
 - What did you find the most difficult?
 - What changes would you make to a transect walk activity in future?
 - What have you learned from your experience?

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Activity 2.8 The rapid transmission (spread) of HIV/AIDS

Complete this activity in groups or on your own.

Aim: Gain an understanding of the rapid transmission of HIV by doing an experiment

Time: 1 hour

What you need

A base solution such as NaOH, Ca(OH)₂ or KOH; phenolphthalein; test tubes or small glass bottles, water and a little milk; materials to make a poster. (See Annexure B)

What you must do

Part A

Read the following information and answer the questions that follow.

The AIDS crisis in Africa

It is estimated that 84% of the world's deaths from HIV/AIDS have been in Africa. Some 90% of HIV-positive babies born are born in Africa. In 1999, the number of new cases of HIV infection in Africa was 300% higher than in the next worst area (Southeast Asia). More than 14 million Africans have already died of HIV/AIDS.

An ever-growing number of children are becoming AIDS orphans. These are children whose parents have died of HIV/AIDS and who have no one to care for them. One of their more serious problems therefore, is food insecurity. According to a former UN Secretary-General, Kofi Annan: 'By overwhelming the continent's health and social services, and by creating millions of orphans, AIDS is causing social and economic crises which, in turn, threaten political stability.'

Questions

1. In groups discuss what can be done to reduce the spread of HIV/AIDS in South Africa.

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2. What can be done to help AIDS orphans?

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3. Why do we talk of AIDS orphans and not of HIV orphans?

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Part B

During the contact session you will be given a small bottle or test tube filled with a solution. As you know, HIV is transmitted through the exchange of body fluids. The liquid in the test tubes or glass bottles **represents** body fluid.

1. Choose four people in your class with whom you are going to share your 'body fluid'. Go to the first person and pour your liquid into his or her test tube or bottle.
2. Shake this liquid in the test tube or bottle of the other person (to mix it), and pour half of it back into your test tube or bottle.
3. Do another three such 'exchanges'.
4. Your tutor will now put a few drops of phenolphthalein in your test tube or beaker. Phenolphthalein is an indicator that colours a base solution pink. All people with pink test tubes or bottles will be considered 'HIV-positive'.

AIDS = *Aquired Immune Deficiency Syndrome, caused by the Human Immunodeficiency virus (HIV), which attacks the immune system. People die of AIDS and therefore we refer to their offspring as AIDS orphans.*

Questions

1. How many learners were 'HIV positive' at the start of this activity?

.....

2. How many learners were 'HIV positive' after exchanging 'body fluids'?

.....

3. Write the increase in the number of people 'infected' with HIV as a percentage.

.....

4. What did you learn from this activity?

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Activity 2.10 The inheritance rights of women

Complete this activity on your own.

Aim: Identify constraints to and opportunities for better management of household resources.

Time: 1 hour

What you must do

1. Divide into small groups of three to four people.
2. Read the case study below and discuss the questions that follow in your group.
3. Each person then answers the questions in the workbook.



The Kantono case study

Kantono was a prosperous farmer in Naboa village, Pallisa, Uganda. He owned large tracts of land on which he grew a variety of crops and kept hundreds of cattle, sheep and goats. He had a large family to support, most of whom were relatives that could not maintain themselves. The family however, provided the labour that his farm required.

In 1998, Kantono's health started deteriorating seriously. He was sickly, very weak and could no longer supervise work on his farm. His relatives blamed it all on his wife Balike, whom they accused of bewitching him to steal their clan's wealth. Despite all the pressure imposed on her by her husband's relatives, Balike remained committed to her 30-year old marriage, which had yielded thirteen children and seven grandchildren.

After some persuasion, Kantono agreed to visit Pallisa Hospital where he was diagnosed with HIV, the virus that causes AIDS, locally known as O'silimu. He calmly accepted his fate but his relatives still blamed Balike for being a Malaya (prostitute) who had brought the disease into the home. Kantono's health worsened and everything in the once well-to-do home, fell to ruin. The crop harvest declined and disaster loomed around the home.

Kantono died at the beginning of 2000 and no sooner had his body been lowered into the ground than his relatives, who had come from various parts of Pallisa, started wrangling over the property he had left behind. Balinke watched the scenes as they unfolded until after Kantono had been buried.

The Kantono case study, including questions for discussion, is reproduced with the permission of Household Agriculture Support Programme (HASP), Uganda (HASP, 2002).

Questions

1. What is the Kantono case study all about?

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2. What factors may explain the decline in farm productivity in this case-study?

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3. Why do you think Balike was treated in this manner by Kantono's relatives?

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4. What can be predicted for the future of the following people and property after Kantono's death:
a) Balike?

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b) Kantono's thirteen children?

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c) Kantono's farm?

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5. What lessons can we learn from this case-study?

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Activity 2.11 Gender-related use and control of resources in an area

Complete this activity in groups or on your own.

Aim: Conducting a gender-related exercise to establish the use and control of resources in your area

Time: One hour

What you must do

1. Brainstorm in your groups and compile a list of resources which you regard as important for your community.

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What is meant by control of resources?
Someone decides how the resource can be used and by whom. This does not necessarily imply ownership

What is ownership of resources?
A resource such as land can be owned by someone while another person uses it or decides about its use.

2. Form a female and a male group.

3. Each group must compile a table similar to Table 2.5 (Refer to your study guide) Add columns to your table for different age groups (young, adult, aged) and disadvantaged groups.

Constraints	Young	Adult	Aged	Disadvantaged
Economic				
Political				
Institutional				
Environmental				
Socio-cultural				
Demographic				



3. Assign ticks to each of the resources according to the level of access and control for.

Questions

1. Which resources do women and men (and the young and old) use? Are there differences in their use according to gender, age, social group? What access and control do disadvantaged people have?

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2. Who decides about the use of these resources?

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3. Who has ownership over the resources (the right to sell or give them away)?

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4. What are the main differences between women and men when it comes to the type of resources they use, control, or have ownership over?

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5. Among women and men of different socio-economic groups, who are the resource- rich? Who are the resource-poor?

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6. What is the relationship between women's labour and their use and control of resources? What are the links between men's labour and their use and control of resources? Give information on other relevant groups.

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7. How will the death of a male (or female) adult in the household change the access, control and ownership rights over resources, including land, of the surviving partner. What happens to the children in a household when both parents die?

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8. What services and structures in the community can support rural women and men in managing resources and improving their livelihoods? Give the same information for disadvantaged groups, different socio-economic groups, grandparent or child-headed households, as well as households taking care of sick relatives or orphans.

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9. Discuss your data in your male and female groups and each student should then write a conclusion.

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Reflect

Reflect on the gender-analysis activity and write answers to the following questions:

- What worked well?
- What did you find the most difficult?
- What changes would you make to the activity in the future?
- What have you learned from your experience?

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Workbook activities for Unit 3: Using natural resources wisely



The first workbook activity for Module 3, Unit 3 is the start-up activity in the study guide.



Start-up activity: Our fragile Earth

Complete this activity in groups or on your own.

Aim: Gain an understanding that the Earth is as fragile as an eggshell, when the resources it provides us with are not used sustainably.

Time: 30 minutes

What you will need

Two balloons, a streamer, three pieces of string, each 30 cm long, an A4 sheet of paper, a paper clip and an uncooked egg (a whole raw egg).

Fragile means it can break very easily, as the shell of an egg breaks when you do not work with it carefully

What you must do

1. Work in small groups, and use the materials provided to build a structure to protect the egg.
2. This structure should be strong enough, so that when the structure, with the egg in it, is dropped from a height of 2 meters by a member from another group, the egg should not break.
3. After you have done this activity, each person should answer the following questions.

Questions

1. Did your egg break, or was the structure effective in protecting the egg during the fall?

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2. An egg can easily break. Are there any lessons from this activity that we can learn regarding our Earth? What is the link between an egg that can easily break, and our Earth and its resources?

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3. Why is it important that we take good care of planet Earth and its resources? Reflect on this question.

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Activity 3.2: Audit of a catchment in your area

Complete this activity in groups or on your own.

Aim: Use a checklist to identify the human activities in a catchment in your area

Time: One hour

What you must do

Work in groups and use the checklist below to observe what happens in your catchment area.

Checklist

1. Describe the settlement pattern in the catchment (developed, developing or informal).

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2. List land activities in the catchment (what people do and how the land is used)

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3. Note the distance of human activities from the river banks.

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4. Note the condition of the riverbank vegetation. Observe any **alien plant** and erosion problems)

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What are alien plants?

Alien plants are also called *exotic plants*. Examples are pines, bluegums and blackwattle. They were brought into an area by people. They grow in our natural areas and use large amounts of water.

Indigenous plants grow naturally in an area.

5. How do people dispose of waste?
Are there landfills or rubbish dumps?

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6. Note any loss of indigenous vegetation (in other words, changes due to farms and plantations such as pines and bluegums).

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7. Note wetland and groundwater disturbance/contamination.

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8. Other observations.

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Questions

1. Has the catchment been changed and degraded over time? Speak to older community members to find the answer.

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2. Do the wetlands release clean water all year long?

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3. Explain how the **riverine vegetation** (plants along the river) provides flood protection.

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4. Is there pollution that might be prevent the river from meeting human needs and from supporting animal life?

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5. How do the people in the catchment dispose of waste?

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6. Rank the quality of your catchment according to the following score.

BAD	NOT SO GOOD	GOOD
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7. What influence can the quality of your catchment have on the quality of the lives of the people in your area?

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8. How can the quality of the catchment in especially rural areas influence food security?

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Reflect

Reflect on the above activity and respond to the following questions:

- What worked well?
- What did you find most difficult?
- What changes would you make to this activity in the future?
- What have you learned from your experience?

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Activity 3.3: Selecting water-wise plants and animals for your area

Complete this activity in groups or on your own.

Aim: To identify suitable, water-wise choices of plants and animals in an area

Time: 30 minute

What you must do

1. In groups discuss and make a list of examples of crop plants and farm animals that have high-, medium – and low water needs.

2. Which of the plants and animals that you listed would be suitable for your area?
Underline those on the table you have completed

Crops with high water needs (marshy areas such as wetlands)	Crops with medium water needs	Crops with low water needs

3. Do people in your area make water-wise choices in their selection of plants and animals? Justify your answer.

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Activity 3.5: Make a line level

Complete this activity on your own.

Aim: Make a line level to measure contours and slope

Time: 1 hour

What you will need

20m fish line; a line level; two lengths of wood about 2 metres long (marked at 30, 40 and 50 cm from one end; a measuring tape.

Note: A spirit or line level is a small plastic tube that you can buy from the hardware, and is often used by builders.



What you must do

1. Using a measuring tape and a pencil, mark each piece of wood (pole) carefully along its length in 10 cm marks. Number these marks from the bottom.
2. The two pieces of wood are then linked by exactly 10 meters of string (after you have tied the string to the poles), which should be tied to each pole so that it can be slid up and down the pole.
3. Hang the spirit or line level in the middle between the poles. When the string is horizontal, the spirit level is also horizontal or level and the air bubble will be in the middle of the transparent tube. When you have assembled your line level, it should look like the picture in Figure 3.5 below.

Note: To use the line level to mark contours the string is placed at the SAME HEIGHT (on the same mark) on both pieces of wood.

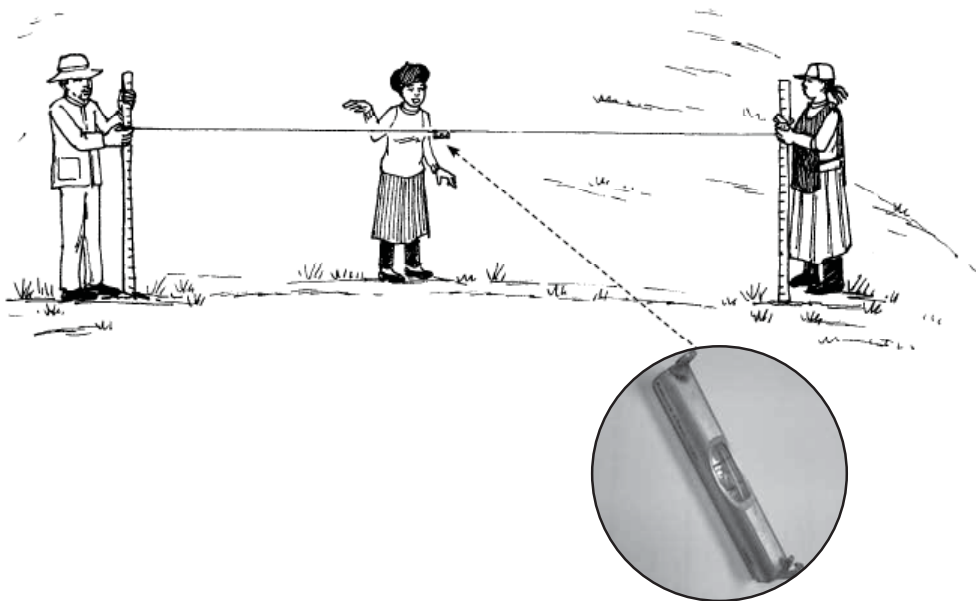


Figure 3.5 Using a line level to mark contours.

(Note that the string is tied at the same height on each pole. The bubble of coloured liquid in the line level is in the middle when the poles are at the same height.)

It is common to start marking contours at the top of the slope where you are working. You start by marking the first contour. Once you have done that, you need to move down to where you will make the second contour. How far apart the contours are depends on the steepness of the slope.



Activity 3.6: Using a line level

Complete this activity in groups or on your own.

Aim: Use a line level to measure slope

Time: 30 minutes

What you must do

1. Two people should hold the poles you used in the previous activity.
2. Place the poles down the slope 20 metres apart. (See Figure 3.6 above) The string should be on the same mark from the bottom of the pole towards the top (on both poles), when you start. The people holding the poles must make sure that they keep the poles standing straight up (in other words, that they are upright).
3. One person now stands between the two poles in order to look at the spirit or line level.
4. The person on the higher ground moves the string down the pole until the line is level, that is, until the bubble is in the centre of the transparent tube of the spirit level.
5. When the line is level, count the number of marks you have moved the string down. Each mark shows a 1° slope. For example, if you have to move the string down five marks you have a 5% slope. Once you know the percentage you can go back and look at the table (See Annexure B - Conversion of angles to degrees of slope and distance between contours) to work out how far apart the contours need to be. For a 5° slope as in this example contours are about 19 meters apart.

The figure below gives you an indication of how to measure slope with a line level.



Figure 3.7 How to measure slope with a line level



Activity 3.9: Causes of soil erosion in your area and possible solutions

Complete this activity in groups or on your own.

Aim: Identify soil erosion in your area and suggest possible solutions

Time: 2 hours

What you will need

At least two people whom you can talk to and who will be prepared to walk around the areas with you and discuss causes of, and possible solutions to the problem of, soil erosion.



What you must do

1. Read through the notes on soil erosion and control measures above. Look for signs of soil erosion in your area. Look around the homesteads, croplands and grazing lands.
2. Using your notes, identify places where soil erosion happened. Make drawings and, if at all possible, to take a few photographs.

Place drawings or photographs of soil erosion in your area in the space below

2. Describe the type of soil erosion that you can see. Is it sheet, rill or gully erosion?

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3. What do you think are the causes of this erosion? Talk to people in your area about the erosion. Ask them for ideas about causes. Walk around the area and see if you can identify any causes.

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4. Also talk to people about what can be done to control erosion. Make a list of their suggestions.

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5. Write down some ideas of your own on how to control the erosion that you have seen. You will need to refer back to your notes as well.

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Reflect

Reflect on the assessment and analysis of resources activity and write answers to the following questions:

- What worked well?
- What did you find most difficult?
- What changes would you make to this activity in the future?
- What have you learned from your experience?

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Activity 3.10: The wise use of biodiversity in your area

Complete this activity in groups or on your own.

Aim: Identifying wild plants, seeds and animals in your area which can be used to enhance food security, either directly or indirectly.

Time: 1 hour

What you must do

1. What plants do you and your family or household use from the wild? Think about what you eat, what your animals eat, what you build with, what you use for craftwork, medicines, and traditional ceremonies.
2. If you do not use any plants from the wild, talk to an older person in your family or community and find out what kind of plants were used in the past and which of those are still available today.
3. Complete the table below to indicate the utilisation of plants from the wild by you, your family, household or other members of the community.



	Plants from the wild (English name)	Plants from the wild (traditional name)	How can the plant be harvested sustainably?	What are the plant's needs? How should I take care of it in my garden?
Food for humans				
Food for farm animals or pets				
Building material				
Craftwork				
Medicines				
Ceremonies				

Questions

1. Is there a difference in the way the plants are used at present and how they were used in the past? Why do you think this is so?

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2. Are the plants from the wild still as plentiful as they were in the past? Justify your answer.

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3. Why have most people stopped using wild plants?

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4. Reflect on how plants from the wild could be used to enhance food security.

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Reflect

Reflect on the assessment and analysis of resources activity and provide answers to the following questions:

- What worked well?
- What did you find most difficult?
- What changes would you make to this activity in the future?
- What have you learned from your experience?

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Activity 3.13: Making a solar cooker (Optional)

Complete this activity in groups or on your own.

Aim: Demonstrate how the sun can be used as an energy source to heat water

Time: 1 hour

What you will need

A cardboard box, aluminium foil (or silver paint), plastic (transparent) paper or clingwrap, a cold drink can that is painted black, water, scissors and glue.

What you must do

1. Decide upon a design for your solar cooker. Why would you like to use aluminium foil in the cooker? And clingwrap (or plastic sheet)?
2. Fill the black can with water at room temperature, and place it in the solar cooker.
3. Decide upon a suitable place to put the solar cooker, where it will receive sufficient sunlight.
4. Leave it in the sunlight for 2 hours. Then touch the can with your bare hands, and feel the temperature. (Be very careful not to burn yourself. Some solar cookers are very effective!)



Figure 3.22 Making a solar cooker

Questions

1. What is the function of the aluminium foil?

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2. What is the function of the clingwrap (or sheet of plastic)?

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3. Why should the can be painted black?

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4. Touch the can. What is your observation?

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5. Write a paragraph on the advantages of solar cookers.

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Reflect

Reflect on the activity and write answers to the following questions:

- What worked well?
- What did you find most difficult?
- What changes would you make to this activity in the future?
- What have you learned from your experience?

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Activity 3.14: Creating a design plan for your area

Complete this activity in groups or on your own.

Aim: Create a design plan of a food or any other garden for your area taking low input principles into consideration.



Time: 4 hours

What you do

Follow the steps explained below, and use any relevant information in this module to design a plan of action for your area, in order to enhance food security.

Step 1: Revisit your helicopter plan

In Unit 3 of Module 2 you had to draw a helicopter plan showing how you would like your area (yard) to look in five year's time. It is now time to revisit this helicopter plan to remind yourself of your expectations and to take them into consideration when you start your design plan.

Step 2: Revisit the map you compiled (Resources map and Transect walks)

In Unit 2 of this module, you have used various tools to map your area. You will recall that we looked at resources mapping and transect walks.

You now need to revisit this map to help you decide where you will make your garden.

Step 3: Decide where and how you will make your garden

Although you have a map of your community, and a list of your resources, you now need to decide on these important aspects:

1. Where you will make your garden?
2. How will they address their water needs?
3. How you will prepare your soil?
4. What plants you will plant?

Where will you make your garden?

Walk around your own area, preferably with other people in your own household, You will want to do this several times at different times of the day to really understand the area. After ten years we still take what we call 'garden walks' to see how the designs are doing and to discuss what changes and additions we want to make.

You need to look at the following factors:

- The current layout of trees, the places where you keep your animals, and the buildings in your own area
- The life styles of your own household members
- The slope, aspect and ridges in your own area including where North, South, East and West are
- The direction of the usual winds (which may change at different times of the year)

How will they address their water needs?

- Decide on how you will controll run-off
- How irrigation can be implemented in the most effective way

- How to address your water needs in the most sustainable way (capturing rainwater, dew and 'grey' water)

How will you prepare your soil?

- Establish the type of soil you have and how you can improve it (compostand/or manure)
- What will you use as mulch?
- What types of beds will you make; raised, sunken or level?
- How will you prevent soil erosion?

Which plants will you plant?

- Decide on the best plants and animals to use according to permaculture groups and to enhance food security directly or indirectly. For example, you will be directly enhancing food security by planting a variety of vegetables and fruits to eat. You will be indirectly enhancing food security by planting medicinal plants, food plants and flowers to sell.
- Consider using indigenous plants and seeds which you have harvested in a sustainable way from nature.

Step 4: Visualise or “draw” your plan:

There are several ways that you can visualize or “draw” your plan:

- in your head,
- on paper such as a notebook, flip chart, poster board, old cardboard or chalkboard,
- outside in the actual area with rocks, broken bricks, sticks, or other markings to help you see your ideas and make changes by moving them around as you think through your plan.
- by using all of these methods, which is the best way to do it.



A. The bare homestead plot





B. The garden design using bricks

Figure 3.29 An example of a design plan laid out with bricks

Step 5: Discuss your design plan with other people

You have worked hard and have designed a plan which you are very proud of. It is however very important to discuss your design plan with other people; not only with members of your group or household, but also with other knowledgeable people. There are numerous people with experience that will add value to your plan. After discussions, revisit your design and adapt it where necessary. Keep in mind that the success of your project depends on a good design which takes all low input principles into consideration.

Step 6: Action plan

After you have mapped your area and created your design plan, you have to write an action plan for your area. When you are working in a team or community situation, a written list helps to create clear communication. You can brainstorm all the activities that need to be done then put them in order into a plan. Remember, things may change when you get out there and start doing. This action plan will form the main topic of Module 5.

Your action plan

After having worked through the five steps above, you now need to write your action plan.

Answer the following questions as part of your action plan:

Questions

1. What were the major changes that you made to your original map for your area, after you had walked through the area a second time? What made you change your mind?

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2. Was there consensus in your group, regarding the priorities that need to be addressed in the area? Is it important that every member should have a voice? Justify your answer.

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3. What problems do you think you will encounter when you put your design into action? How can these be addressed?

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End of the workbook for Module 3

