4. PREVENTING DISEASE

Some people still blame witchcraft for bringing sickness and disease into their community. However, most people now accept that there may also be scientific causes of disease.

Exercise 18: What are the underlying causes of disease?

Ask participants to list what they consider to be the underlying causes of disease according to their tradition and culture. Write down each suggested cause on flip chart paper and discuss the implications of each in turn.

- Is witchcraft still being blamed for causing disease in your community?
- How can this fear be overcome?
- Why is there more sickness and premature death in Africa than there is in developed countries?
- What can the government do to reduce disease in your community?

4.1 The scientists' view of the underlying causes of disease

Scientists have discovered that there are three main types of human diseases, these are *deficiency* diseases, *physiological* diseases and *infectious* diseases.

4.1.1 Deficiency diseases

Deficiency diseases are caused through malnutrition. Examples of these are pellagra, anaemia, goitre and night blindness, etc. These diseases all have local names so you can insert these in Table 13. These diseases usually disappear once the missing vitamins or nutrients are put back into the diet, although there may be long-term damage to the immune system and other vital organs.

Table 13: Deficiency Diseases - Symptoms and Causes

Local name	Disease	Symptoms	Missing nutrient	Best Source
	Scurvy	Bleeding gums, delayed wound healing	Vitamin C	Guavas, baobab, West Indian cherry
	Xerophthalmia	Night blindness	Vitamin A	Mangoes, pumpkin
	Anaemia	Extreme tiredness	Iron	Green leafy vegetables, red meat
	Goiture	Extreme tiredness, swelling in neck	Iodine	Fortified salt
	Beriberi	Extreme tiredness, swollen, numb legs	Vitamin B1	Maize/rice husks
	Angular stomatosis and cheilosis	Sore cracked lips, swollen tongue	Vitamin B2	Groundnuts, eggs
	Kwashiorkor	Muscle wasting, swelling, reddish hair	Protein	Meat, fish, eggs, beans, groundnuts
	Pellagra	Cracked, dry skin, stomach pain, diarrhoea	Vitamin B3	Maize and rice husks

4.1.2 Physiological diseases

These diseases can be caused by pollution and anti-social/unhealthy habits such as smoking, alcohol and drug abuse or eating too much sugar, salt or fat. *Physiological* diseases cause a breakdown in bodily structures and functions and include diabetes, heart disease, high blood pressure/stroke and cancer. (Fill in the local names for these diseases in Table 14). Special drugs may be used to control some of these diseases, but it is difficult to cure them.

Table 14: Physiological Diseases - Causes and Prevention

Local name	Scientific name	Cause	Prevention
	Alcoholism, liver sclerosis	Alcohol abuse	Drink no more than 5 glasses of beer (or other alcoholic beverage) per week
	High blood pressure/stroke	Excess salt, stress	Reduce salt intake, reduce stress
	Diabetes (late onset)	Excess sugar	Reduce/eliminate sugar from the diet
	Heart disease	High fat diet	Reduce/eliminate fat from the diet, take regular exercise
	Lung cancer	Smoking tobacco	Don't start/stop smoking
	Tooth decay	Excess sugar and fizzy drinks	Reduce/eliminate sugar and fizzy drinks

4.1.3 Infectious diseases

These diseases are caused by tiny microbes. There are four types of microbe that can cause infectious disease; these are viruses, bacteria, fungi and parasites. Most of these microbes are too small to see with the naked eye, however some microbes, such as parasitic worms and fungal spores can be seen through a magnifying glass. A powerful microscope is needed to see bacteria and viruses, see Information Box 6. Microbes breed in dirty, moist, unhygienic places and are passed from one person to another through exposure to faeces, mucous, spit or other bodily secretions, particularly in enclosed, over-crowded conditions, such as dormitories and minibuses.

Many diseases in Africa are caused by poor environmental conditions, such as unclean water, bad housing and lack of sanitation. We should remember that before 1950, people living in Europe used to suffer from all the same diseases, such as cholera, typhoid and TB[4] that people in Africa do to today. The disappearance of these diseases did not only depend on doctors and nurses and on the invention of new drugs, but most importantly on the provision of good housing, clean water, and hygienic sanitation for the whole population. This means that people who want to do Positive Living must begin by identifying the health hazards in their own environment and then help mobilise their community to eliminate them. Ask participants to help you complete Table 15 by writing down the local names for these diseases.

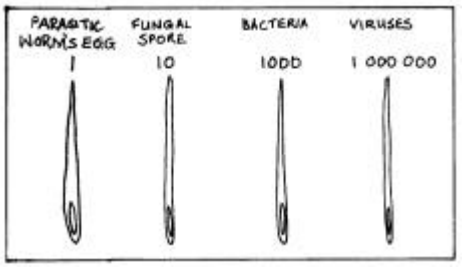
Information Box 6: The comparative sizes of microbes that cause disease

Parasitic worm Fungal spore Bacterium Virus

They are all too small to be seen by the naked eye.

- How many microbes can fit on the tip of a needle?

Answer:
One parasitic worm's egg
Or ten fungal spores
Or one thousand bacteria
Or more than one million viruses



[4] Although not HIV/AIDS as it did not exist then.

Table 15: Infectious Diseases - Causes and Prevention

Infectious Diseases		Microbes responsible	Infection method	Prevention
Local name	Scientific name			
	Cholera	Virus	Contaminated water	Boil or sterilise drinking water
	Typhoid	Bacteria	Contamination by faeces/flies	Wash hands with soap after visiting the toilet
	Malaria	Parasite	Bite from infected mosquito	Drain breeding sites, use nets and repellent
	Bilharzia	Parasite	Paddling/swimming near infected water snails	Avoid urinating in rivers and lakes, prevent over-fishing to reduce the snail population
	HIV	Virus	Unprotected sex, direct blood to blood contact with an infected person.	Abstinence, faithfulness, use of condom, use of gloves when treating open wounds
	Ascaris	Parasitic worms	Contamination from faeces	Wash hands with soap after visiting the toilet. Prevent children from eating things from the ground. Prevent close contact with dogs and other livestock
	Flu	Virus	Contact with infected person, e.g. when sneezing	Strengthen the immune system by eating plenty of fresh fruit and vegetables
	Ring worm	Fungus	Contact with infected person, e.g. sharing combs	Keep hair and skin clean, avoid sharing combs
	Tuberculosis	Bacteria	Contact with infected person, e.g. when coughing	Avoid over-crowed places, get plenty of fresh air
	Meningitis	Virus	Contact with infected person	Avoid overcrowded, unventilated places

Diseases that are caused by bacteria can normally be cured by antibiotics such as penicillin. There are also effective medications to treat diseases caused by fungi and parasites. Unfortunately, there is currently no cure for those that are caused by viruses, although diseases such as polio, measles, hepatitis and meningitis can be prevented by vaccination/immunisation.

Exercise 19 demonstrates how infectious diseases such as cholera are spread:

Exercise 19: Demonstrating how microbes are spread

Materials required:
A bag containing 0.25 kg fine, white flour to represent a bag full of microbes. (Each flour grain is about the same size as a fungal spore)

Procedure:
Ask a participant to dip his/her right hand into the flour until it is completely covered. S/he should first shake off the excess flour, then shake hands with six other participants.

- Has the flour (microbes) transferred to the hands of the other people?
- What happens if these people now shake hands with six more people?
- Discuss the results of this exercise in terms of what happens when someone does not wash his/her hands with soap after visiting the toilet.

Exercise 20: Demonstrating how mosquitoes spread malaria

Materials required:
A syringe or drinking straw
5 transparent drinking glasses/jars
A cup of strong, black coffee (without milk or sugar)
Clean water
Labels for the glasses as follows: "person infected with malaria" x 5, "healthy person" x 4

Procedure:
Fill the first glass with coffee and place it on a table with the label "person infected with malaria". Fill the other 4 glasses with water and place them alongside the first glass, each labelled "healthy person". Using the syringe or straw to represent a mosquito, suck up some of the coffee or "blood" from the "person infected with malaria" and squirt it into the first glass labelled "healthy person". Give this glass a new label: "person infected with malaria". Now suck up some of the blood from this newly infected person and squirt it into the next glass labelled "healthy person". Again give this glass the new label: "person infected with malaria". Repeat this process until all the blood of all 4 "healthy people" has become "infected with malaria".

- What happened to the blood of the healthy people after the mosquito fed on a person infected with malaria?
- How can we protect ourselves from malaria a) at household level b) at community level?
- Which other insects transmit disease to a) humans b) animals c) plants?
- How can we reduce the incidence of these diseases?

Note that HIV cannot be transmitted by mosquitoes.

Exercise 21 will help participants understand why it is important to boil drinking water.

Exercise 21: Observing microbes in water

Materials required:
Magnifying glasses
Several clean glasses or jam-jars
Facilities for boiling water

Procedure:
Collect water from several different sources, e.g. the local river, bore-hole, pond, irrigation channel and pour it into clearly labelled glasses or jars. Ask participants to view the water in each glass/jar through a magnifying glass and describe what they can see.

- What colour is the water?
- Does the water contain soil particles?
- Does the water contain debris?
- Did you see any microbes moving around in the water?
- Which diseases are spread in untreated water?
- Would you like to drink this water?

Now heat the water and boil it for 3 minutes, then ask participants to observe it again.

- What has happened to the microbes?
- Would you like to drink this water?

Health hazards may be found both within and outside the home. The following exercises will help participants to identify some of the most common health hazards.

Exercise 22: Spotting health hazards in the village

Provide one photocopy of Figure 7, which appears in two halves on the following pages, for each group. Ask each group to describe each of the 19 health hazards shown in the picture, then present their findings to the whole group.

Potential hazards:

1. Man urinating in the river.
2. Cattle going to bathe in the river that is used for drinking by the community.
3. Woman collecting contaminated water from the river.
4. Using old pesticide containers for drinking water.
5. Woman inhaling dust whilst winnowing grain that has been stored with pesticides.
6. Woman inhaling smoke whilst cooking.
7. Dog sniffing faeces.
8. Baby being given a fizzy drink.
9. Woman washing her hands *without soap*, in a communal bowl.
10. Child defecating in public.
11. Man inhaling asbestos dust whilst sawing asbestos roofing material.
12. Man with leaking knapsack spray.
13. Young woman chatting to a man who is drunk.
14. Man drinking too much beer.
15. Man smoking.
16. Woman pouring pesticide into a milk container.
17. Pesticides being stored in the bedroom.
18. Pots left out in the open to catch rainwater.
19. Food left on the ground, uncovered.

- Which diseases may be caused by these health hazards?
- Which of these health hazards occur in your village?
- Why are children more susceptible to disease than adults?
- What can be done to eliminate these health hazards?
- Put the suggestions into your action plan.

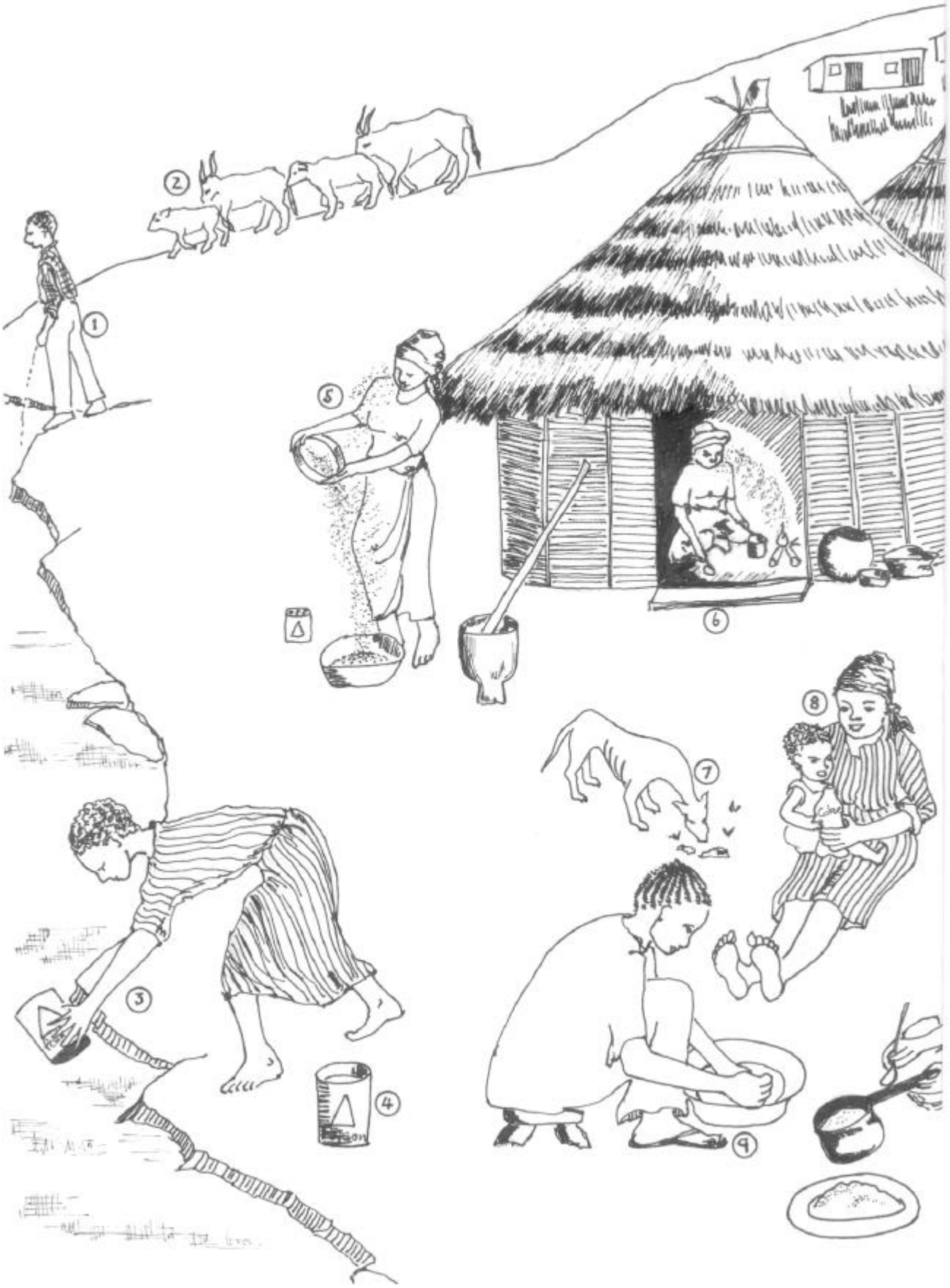

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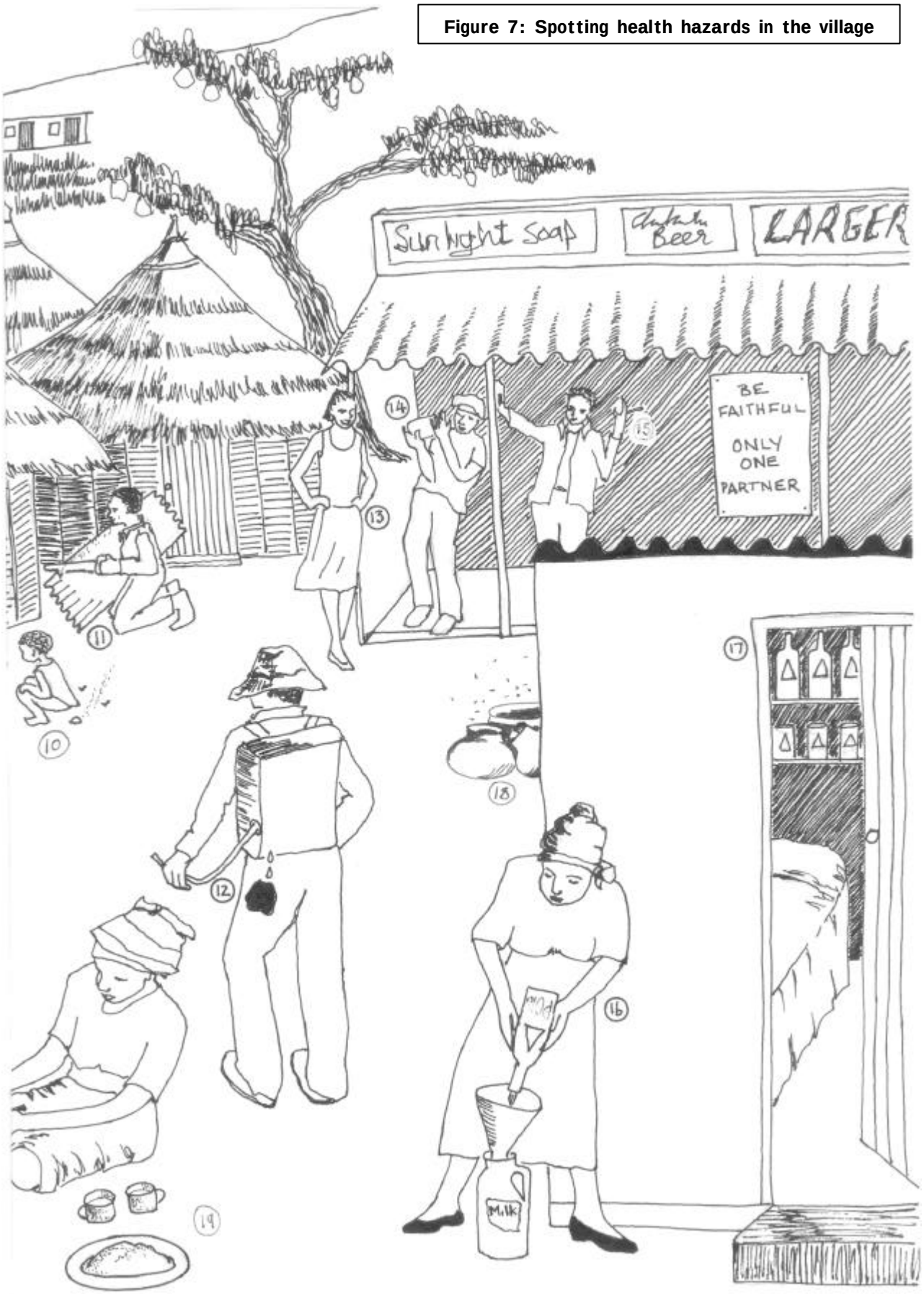
Figure 7: Spotting health hazards in the village



Exercise 23: Surveying your community for health hazards

Materials required:
Paper, pens and clipboards

Procedure:
Select 3 or more homesteads where the occupiers are willing to be inspected for health hazards. Ask one group of participants to visit each household and then answer the following questions;

1. Is the yard swept clean?
2. Is there a toilet?
3. Is the toilet clean?
4. Are there facilities for washing hands with soap after visiting the toilet?
5. Are there any bathing facilities?
6. Are the bathing facilities clean?
7. Where is the water source for bathing?
8. Where is the water source for drinking?
9. Is the drinking water source protected?
10. Are there places where mosquitoes can breed?
11. Are flies a problem here?
12. Is the kitchen large and well ventilated?
13. Is there a door on the kitchen to keep out dogs and other animals?
14. Are there any animals kept close to the house?
15. Where are the pesticides stored?
16. How big are the bedrooms and how many people sleep in them?
17. Do they use mosquito nets?
18. Are the rooms clean, tidy and well ventilated?
19. How often is the bedding washed?
20. How often are the clothes washed?
21. Where are these items washed?
22. Do they use soap/soap substitute?
23. When was the last time any of the children who live in this homestead had any of the following illnesses; diarrhoea, vomiting, malaria, scabies or ringworm?
24. Is anyone who lives in this homestead sick at the moment?
25. What illnesses do they have?
26. Suggest the underlying causes of these illnesses.
27. What are the most serious health hazards in and around this homestead?
28. Suggest methods of overcoming these health hazards.
29. Which of these methods can be implemented in individual households?
30. Which of these methods needs the support of the whole community?
31. Which of these methods should be included in the Action Plan?

4.2 Ways of improving our natural defence to infectious disease.

4.2.1 The role of T-cells in promoting immunity

Our ability to defend ourselves against infectious disease depends on the strength of our *immunity.* Strong immunity depends on a properly functioning immune system. This is present in the body as an internal network of tiny tubes that connect with the blood system. However, these tubes are not filled with blood but with a transparent fluid called *lymph*. The tubes of the immune system also connect to the thymus gland, which is situated in the chest, see Figure 9 and compare it with Figure 10, which shows the blood system. The thymus gland is responsible for making special cells that act like soldiers and kill off harmful bacteria, fungi and viruses that enter the blood stream, by engulfing or "eating" them, Figure 8. These special cells are stored in small swellings or nodes, which are present at intervals along these tiny tubes in the groin, neck, armpits and main body. One of the most important of these "soldiers" is the *T-cell*[5]. Healthy people normally have between 900 and 1,600 T-cells in each millilitre of blood.

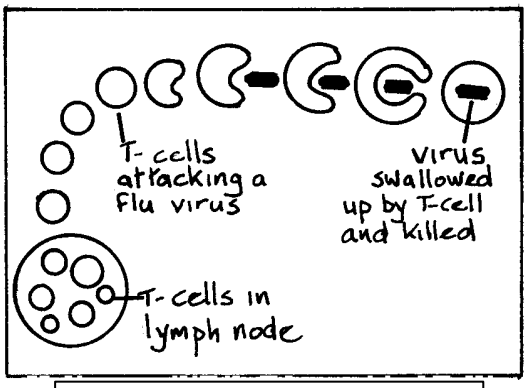


Figure 8: T-cells killing a virus

4.2.2 The underlying causes of infectious disease

Most human diseases are caused by the poor conditions that result from poverty and lack of education: Poor nutrition, pollution and drug abuse may cause a decline in T-cell production, while poor hygiene and untreated water will cause a build up of microbes, such as parasites, fungi, bacteria and viruses that cause disease.

[5] Doctors measure the numbers of T-cells in our blood by counting marker cells known as CD4 cells

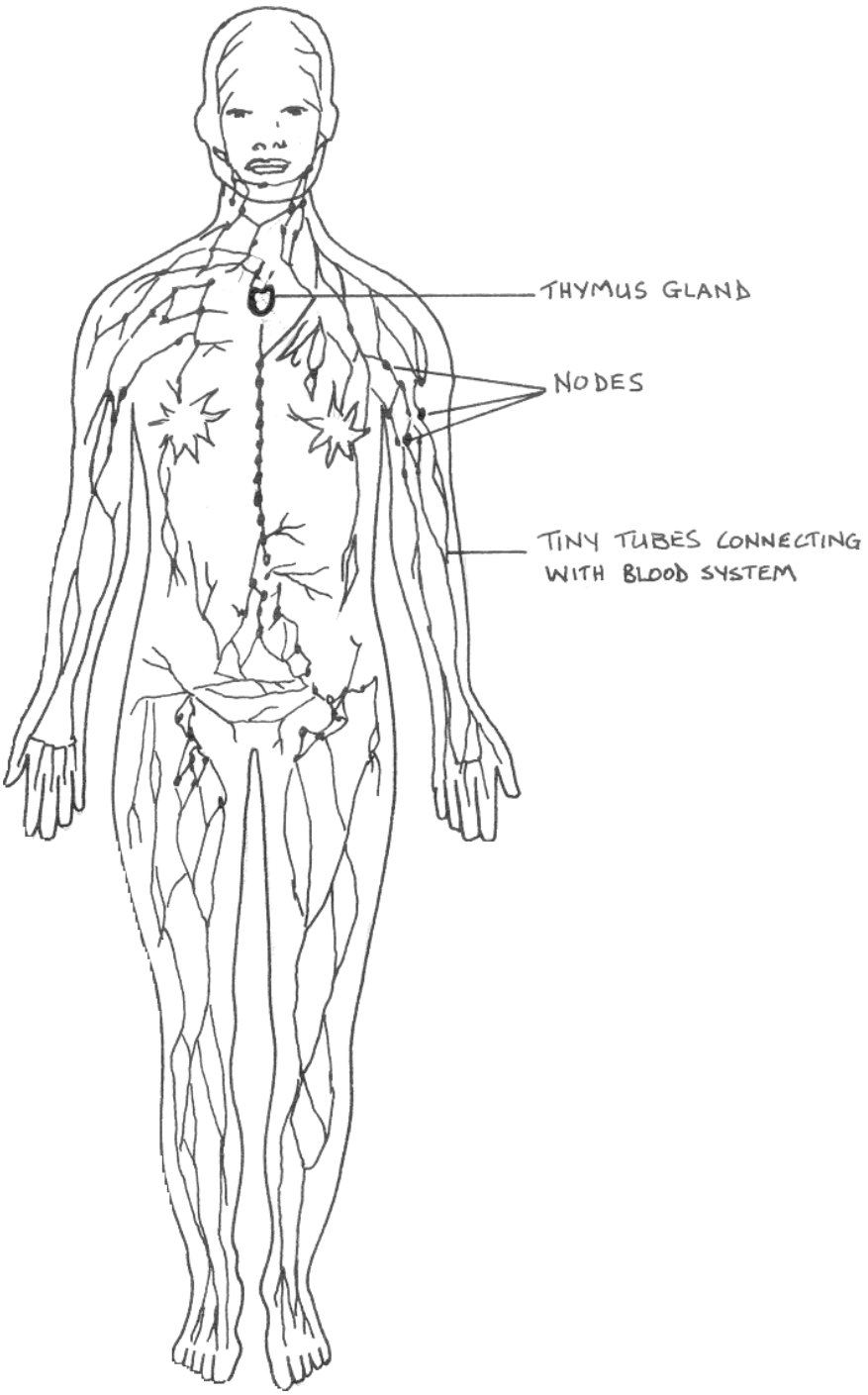


Figure 9: The human immune system

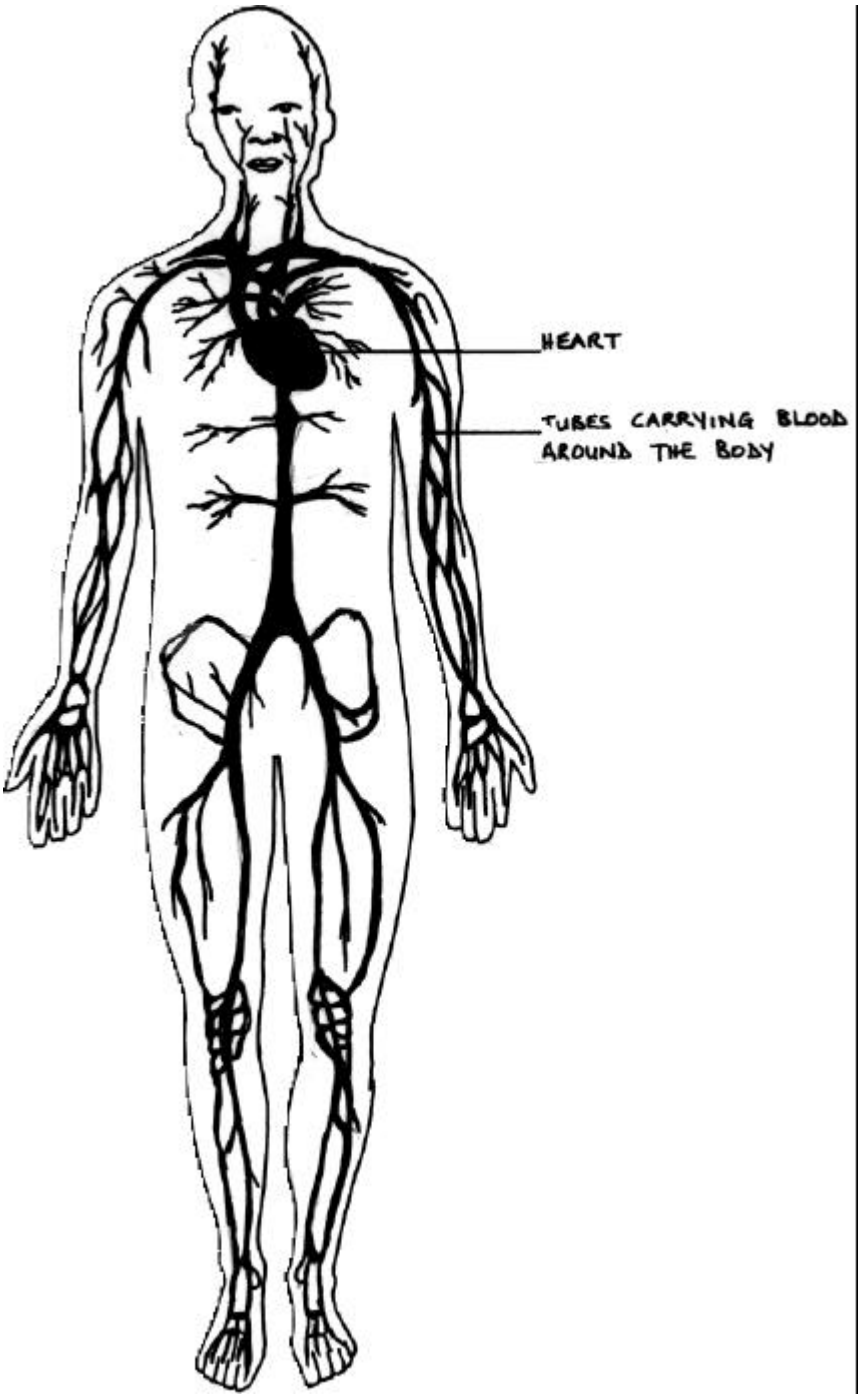


Figure 10: The human blood system

Therefore there are two underlying causes of infectious disease:

1. **A decline in T-cell production due to poor nutrition, exposure to pollution and anti-social habits.**

2. **A build-up of microbes in the environment due to poor hygiene, unclean water and overcrowding.**

Why do T-cells decline?

T-cells decline when malnutrition prevents the intake of essential vitamins and minerals, especially selenium, zinc and vitamin C. Hard physical labour can also slow down the production of T-cells. Air pollution caused by dust from smoke or asbestos[6] can result in serious lung disease and this can also reduce T-cell production. Burning plastic also causes pollution by releasing carcinogens (cancer-forming agents) into the atmosphere. Some pesticides kill off T-cells directly when they are absorbed into the body through the skin, inhaled into the lungs or even consumed with food that has been stored with these chemicals. Farmers are particularly at risk from this type of poisoning.

Information Box 7

What is HIV?
Human Immunodeficiency Virus

What is AIDS?
Acquired Immune Deficiency Syndrome

Understanding the meaning of these words:
"Acquired" = something that you "get"
"Immune" = resistant
"Deficiency" = lacking
"Syndrome" = disease

The impact of HIV on T-cells

The Human Immunodeficiency Virus, which is known as HIV (see Information Box 7 and Figure 11) kills off T-cells. The rate at which T-cells are lost depends on the ability of the thymus gland to make more. The ability to make more T-cells depends on the health of the patient. The patient's health can be improved by eating nutritious food, getting plenty of rest and reducing stress. People who are HIV

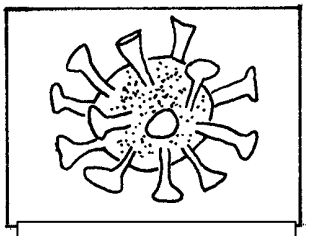


Figure 11: HIV virus (x 1 billion)

[6] For example, in some parts of Africa corrugated asbestos is used as a roofing material. This substance releases a highly toxic, cancer-causing dust when it is sawn into sections.

positive must also avoid substances that reduce T-cell production and live in an environment that does not allow the build-up of disease-causing microbes.

Why do microbes build up?

Poor hygiene provides a breeding ground for viruses, bacteria, fungi and parasites that cause diseases such as cold sores, dysentery, typhoid, ringworm and scabies. Unclean water causes the build up of bacteria and parasites that cause diseases such as cholera and malaria. Overcrowding (for example, in small unventilated bedrooms and buses) can lead to the rapid transfer of viruses and bacteria that cause TB, meningitis and flu from one person to another; while unprotected sex can transmit a range of microbes that cause diseases that include genital herpes, gonorrhoea, syphilis and HIV/AIDS, see Figure 12.

When someone with declining T-cells eats poor food and lives in an unhealthy environment s/he is bound to get sick. The flow chart in Figure 12 shows the most common underlying causes of disease in Africa.

The HIV virus is unique because it is a microbe that kills off T-cells directly.

Encourage participants to play the Survival Game, described in Exercise 24, in order to learn more about what makes each of us susceptible to disease.

Exercise 24: The Survival Game.

Materials:
1 photocopy of Figure 12: "The Underlying Causes of Infectious Disease", for each participant
6 cards, each measuring approx. 25 x 10 cm
felt tip pen
re-usable adhesive
coin

Procedure:
Copy the following the captions, 1 and 2 onto either side of each card;

1. EATS PLENTY OF FRUIT AND VEGETABLES EVERY DAY (HEADS)
2. EATS ONLY PLAIN RICE AND DRINKS BEER EVERY DAY (TAILS)

1. GROWS CROPS ORGANICALLY (HEADS)
2. SPRAYS PESTICIDES (TAILS)

1. FAITHFUL TO HIS WIFE/HER HUSBAND (HEADS)
2. MARRIED, BUT ALSO HAS A GIRL/BOYFRIEND FRIEND (TAILS)

1. HAS A VIP TOILET AND HAND-WASHING FACILITIES (HEADS)
2. HAS A LATRINE WITHOUT HAND-WASHING FACILITIES (TAILS)

1. DRINKS WATER OBTAINED FROM A BOREHOLE (HEADS)
2. DRINKS WATER OBTAINED FROM A RIVER (TAILS)

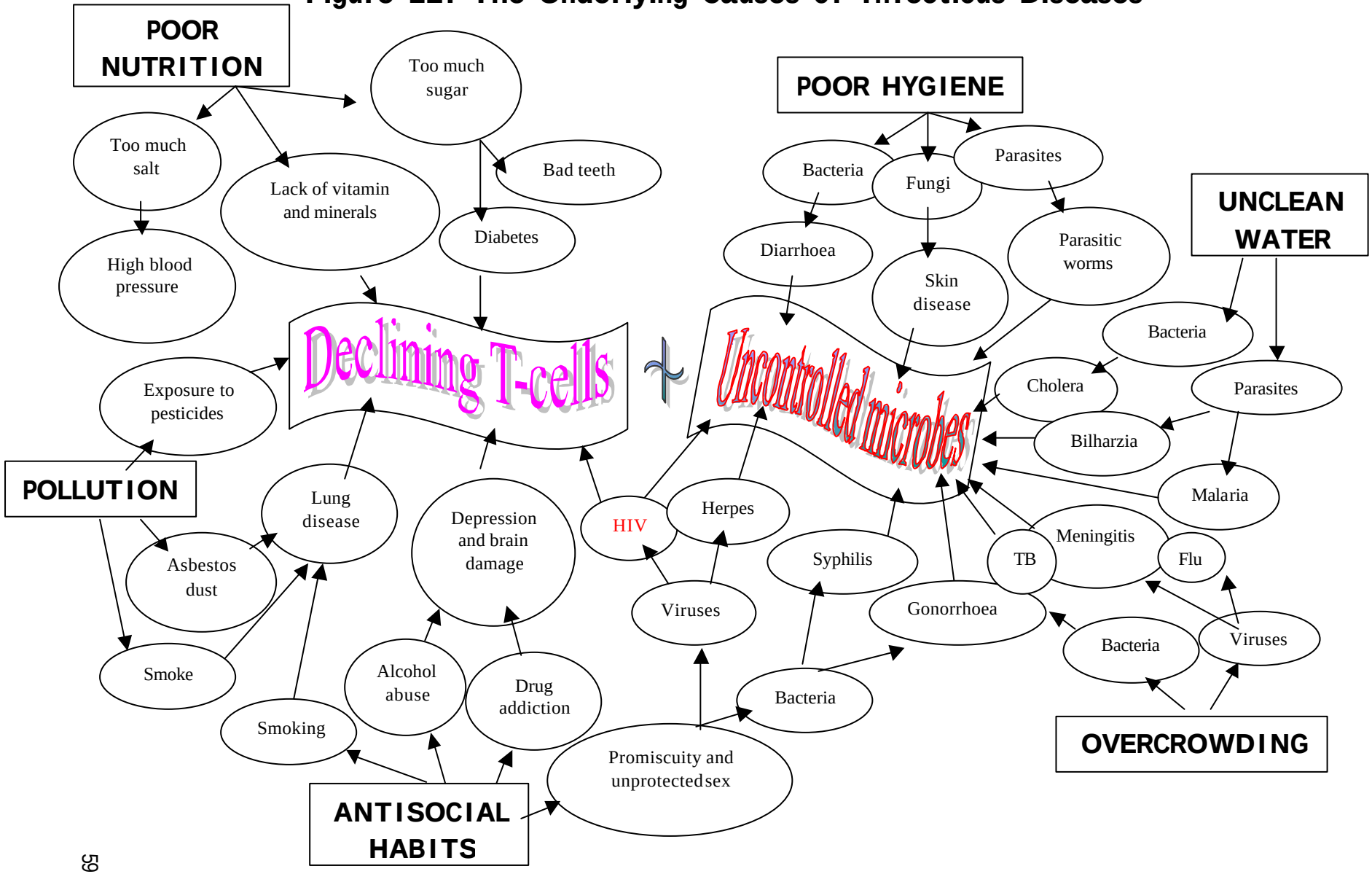
1. HAS A LARGE BEDROOM AND A MOSQUITO NET (HEADS)
2. TRAVELS TO WORK IN A CROWDED MINI-BUS EVERY DAY (TAILS)

Ask one of the participants to toss the coin and call out whether it lands on "heads" or "tails". Give this participant the first card and ask her/him to stick it on the wall or other display area showing the side that corresponds to the way that the coin fell, i.e. "heads" or "tails". Repeat this procedure until all the cards are displayed according to chance, as determined by the coin. Now ask the other participants to look at the cards that are displayed and then at Figure 11.

- Are this person's T-cells in decline?
- Are the microbes in this person's environment under control?
- Will this person get sick?
- Which diseases is this person susceptible to?

Repeat this exercise with two or three other people and discuss the results in terms of common health hazards in everyday life

Figure 12: The Underlying Causes of Infectious Diseases



4.2.3 Why do people who are HIV positive get sick?

Exercise 25: Which diseases affect AIDS patients?

Ask participants to tell you the names of all the diseases that affect AIDS patients and write them down on flip-chart paper. These are called *opportunistic infections*.

- Why do AIDS patients get so many opportunistic infections?
- How can we protect them from these infections?

The diseases that affect AIDS patients are called "opportunistic infections". This is because they take the "opportunity" to infect people whose immunity is weakened due to the loss of T-cells. This means people who are HIV positive only get sick once the AIDS virus is able to kill off more T-cells than are being made in the thymus gland. The rate at which this happens depends on the lifestyle of the person concerned. People who are HIV positive, suffer from malnutrition and live in an unhealthy environment are likely to loose their T-cells much more quickly than those who are HIV positive, but are practising Positive Living by eating nutritious food and living in a clean and healthy environment.

If T-cell levels fall below 500 per ml of blood, weight-loss and some treatable opportunistic infections may occur. Once the level of T-cells falls below 200 per ml of blood full-blown AIDS begins and the patient is no longer able to defend him/herself from disease. This means that death due to one or more incurable opportunistic infections is likely to follow, Table 16. However, this table also tells us that if HIV positive people are able to keep their T-cell levels above 500 per ml of blood through Positive Living then they will be able to avoid serious infection for many years to come.

Table 16: Impact of Declining T-cells on Vulnerability to Infection and Life Expectancy

No. of T-cells per ml of blood	Vulnerability to opportunistic infections	Life expectancy (yrs)
More than 900	Low	More than 15
More than 500	Moderate	More than 5
Less than 200	High	Less than 5

Fortunately, it is never too late to begin Positive Living: By improving the health of someone who is HIV positive, his/her immune system can be

strengthened, T-cells will increase and remain above 200 per ml of blood for a much longer time. This means that instead of developing AIDS within 3-5 years, as now happens in poor parts of Africa, an HIV positive person can live a full and productive life for at least 15-20 years. And with improved access to drugs in the future, this time could be considerably lengthened.

4.2.4 Ways of increasing T-cells

- **Use of anti-retroviral drugs for people who are HIV positive**

These are drugs that kill HIV and keep the viruses at a low level allowing the thymus to make more T-cells. Some of the drugs can also prevent mother to child transmission of HIV. There are several drugs that can do this and in some countries these are freely available in clinics and hospitals. Doctors normally wait until the numbers of T-cells have fallen below 350 per ml of blood before prescribing these drugs because of possible unpleasant side-effects.

- **Taking nutrient supplements**

Nutrients such as vitamins A, C and E and the minerals selenium and zinc have been shown to protect T-cells and increase immunity. People who are living with HIV need extra amounts of these important vitamins and minerals. Unfortunately, diet alone will not meet this need and vulnerable people should be given nutrient supplements. Ways of doing this should be discussed during you action planning (see 3.1.4).

- **Adopting healthy habits**

Support from family and friends is crucial to the elimination of harmful, anti-social habits such as smoking, alcohol or drug abuse. Guidance from family, community leaders and representatives of faith-based organisations should be sought in order to resolve conflicts, reduce vulnerability to HIV and build hope for the future.

- **Cleaning up the environment**

Pollutants should be eliminated from the soil, air, water and food in order to protect our T-cells and increase immunity. Farmers can avoid using

pesticides by practising farming and storage methods that depend on natural, non-chemical methods of pest management[7]. Asbestos and other poisons should be eliminated and exposure to smoke in a confined space, should be minimised by building large, tall, well-ventilated kitchens. Waste plastic should be re-cycled or buried in a pit, rather than burned.

4.2.5 Ways of controlling microbes

- **Improving hygiene**

This means ensuring that every household has a clean toilet (see Information Box 9) with facilities close by for washing hands with soap or a soap substitute. Each household should also have private bathing facilities, allowing family members to bathe on a daily basis. The run off could be used to irrigate trees and vegetables that have been planted around the homestead. All clothes and bedcovers should be washed regularly with soap, particularly if they are being used by people who are suffering from sickness or diarrhoea. Animals (and humans) should not be allowed to foul areas where children play or where food is prepared. Hand washing *with soap* should become a ritual that is practised before every meal. Table 17 gives a list of plants that have leaves, roots or pods that can be used as substitutes

Table 17: Sources of Natural Soap

Local name	Latin name	Part used
	Albizzia versicolor	Roots
	Ceratotheca sesamoides	Leaves
	Dolichos trinervatus	Roots
	Lagenaria sp.	Fruits
	Piliostigma angolense	Un-ripe pods
	Phytolacca dodecandra	Berries
	Sesamum angolense	Leaves

[7] Botanical sprays made from neem, tephrosia and chilli peppers can be used to control many insect pests and wood ash provides a good natural grain protectant.

for soap. You need to fill in the local names for these plants, before checking that they are available in your locality.

It is extremely important to practise good hygiene whilst preparing food in order to protect children and people who are HIV positive from food poisoning. There are now many orphaned babies and toddlers in some parts of Africa and it is also vital to give these children nutritious food that has been prepared in a hygienic way. Exercise 26 will help participants learn how to observe the rules for hygiene and food safety whilst making a nutritious weaning food for young orphans. Grandmothers can help with this exercise.

Exercise 26: Making weaning food hygienically

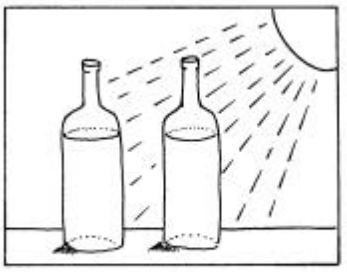
Procedure:
Ask a local grandmother to give details of a type of weaning food that she used to make for her children. Collect the ingredients for making this food and ask the participants to prepare it whilst obeying the rules for hygiene and food safety shown in Information Box 8. Feed the prepared food to one or more of the participants' babies.

Discussion:
- Did the participants correctly follow all the rules for hygiene and food safety?
- What were the problems that they encountered?
- What did the food taste like?
- Did the baby like it?

Information Box 8: Rules for hygiene and food safety for Positive Living

- Always wash hands with soap before food preparation and eating, and after visiting the toilet
- Keep all food preparation surfaces clean and use clean utensils to prepare and serve food
- Cook food thoroughly
- Avoid contact between raw foodstuffs and cooked foods
- Serve foods immediately after preparation and avoid storing cooked food
- Wash raw fruits and vegetables in boiled/sterilised water before serving
- Use only water that is boiled or sterilised for drinking
- Use clean cups and bowls and never use bottles for feeding babies
- Protect foods from insects, rodents and other animals
- Store non-perishable foodstuffs in a safe place (separate from, pesticides, disinfecting agents or other toxic chemicals).

• Making Drinking Water Safe



All drinking water should be obtained from protected wells. Water obtained from any other natural source should be filtered and either boiled or sterilised. This is particularly important for people who are HIV positive.

Drinking water should be stored in a cool place in covered clay pots, or clean plastic or metal containers that have never been filled with pesticide or any other poison. Ask participants to do Exercise 27 to learn out how to sterilise water with sunlight.

Exercise 27: Sterilising water with sunlight

Materials required:
Clean, clear plastic or glass bottles with screw tops – one for each participant. (Do not use scratched bottles.)
Clean, cotton cloth, approximately 0.5 diameter
Large sieve or colander
Clean jug
Clean bucket

Procedure:
1. Fill the jug with water.
2. Place the cloth inside the sieve or colander, hold the colander over the bucket and pour the water through it. This will filter out any large particles.
3. Pour the water back into the jug, then carefully pour it into the bottle until it is three-quarters full.
4. Screw the top onto the bottle and shake the contents until there are air bubbles in the water.
5. Now fill the bottle completely with clean, clear water and replace the top.
6. Place the bottle in direct sunlight, preferably on a black surface, for at least 6 hours, 2 days if it is cloudy.
7. Store the bottles, unopened in a cool place until required.

Sterilised water can also be used for making an oral re-hydration drink, which should be administered to adults and children whenever they have diarrhoea. An easy way of making this drink is described in Exercise 28.

Exercise 28: Preparing an oral re-hydration drink from sterilised water

Materials required:
Sterilised water (boiled or treated with sunlight)
Salt
Sugar
Teaspoons
Clean, 1 litre bottles

Procedure:
Add half a teaspoon of salt and 8 teaspoons of sugar to 1 litre of sterilised water. Screw down the top and shake well.

- One litre of oral re-hydration drink per day is sufficient for a young child with diarrhoea.
- An adult with diarrhoea will need 1.5 to 3 litres of oral rehydration drink each day.

• Using herbal remedies to reduce infection

There are many herbal remedies that are effective in reducing infection. These remedies can supplement medicines that are obtained from the clinic and in many cases may be the only treatment available to poor communities. Many of the herbs can be grown around the homestead or in the garden, then dried to be used as required, when they can be easily processed into teas or tinctures. Many of the remedies can relieve opportunistic infections, such as thrush, cold sores, shingles, fevers, coughs and colds. Examples are given in Table 18. Encourage participants to do Exercise 29 in order to try out some of these remedies.

Table 18: Uses of herbal remedies

Target ailment	Herbal remedy	Preparation method	Application method/Dose
Chronic cough, halitosis, gum sores	Mint, *Mentha spp.*	Add 5-10 fresh leaves to a 200ml cup of boiling water and leave for 2-3 minutes	Drink with honey up to 3 times per day
Diarrhoea/ headache Fever, colds, rashes, scabies, lice	Worm-wood *Artemisia afra* Fever tea, *Lippia javanica*	Add 2-3 fresh leaves to ½ cup (100ml) of boiled water and leave for 2-3 minutes Add a handful of tender leaves to boiling water	Drink the tea Strain and add honey to the tea and drink twice a day
Fever, diarrhoea, infections	Baobab, *Adansonia digitata*	Mix fruit pulp with sterilised water	Drink as often as required
Fever	Rosemary *Rosemary officinale*	To a cup of boiling water add 5-10 fresh leaves, and leave for 2-3 minutes	Drink the tea without sugar
Indigestion, nausea, lower back pain, rheumatism, itching	Ginger, *Zingiber officinale*	Add a teaspoon of finely sliced ginger to a cup of boiling water and leave for 2-3 minutes	Drink the tea first thing in the morning
Nausea, poor appetite, depression (AIDS-related)	Hashish, *Cannabis sativa*	Dry the leaves and flowers. (THIS PRACTISE MAY BE ILLEGAL IN YOUR COUNTRY)	Inhale the smoke from a pipe-full of burning hashish when required
Parasitic worms, weight loss	Pumpkin seeds	Roast 1kg of pumpkin seeds, remove the seed coats and pound to a powder. Add two tablespoons of the powder to boiling water. Simmer for 5 minutes	Serve with any side dish e.g. vegetables or fish.
Parasitic worms, weight-loss	Whey	Separate whey from sour milk	Drink 3 cups (600ml) per day
Shingles, chronic sores, burns	*Aloe vera*	Squeeze out and collect the juice from fresh leaves	Drop juice directly onto blisters and let it air-dry, twice each day
Sores, esp. genital sores	Thyme, *Thymus*	Add a handful of leaves to a 200ml cup of boiling water. Leave for 2-3 minutes	Drink strained tea, or use it as a mouth of body wash
Sores, ulcers, syphilis	Sausage tree *Kigelia africana*	Dry and pound the large fruits into a powder	Use as a dressing on the affected parts
Sores (genital) thrush	Garlic oil *Allium sativum*	Peel ten cloves and slice them into small pieces. Add garlic pieces to 100ml of cooking oil	Rub the garlic oil onto the affected areas

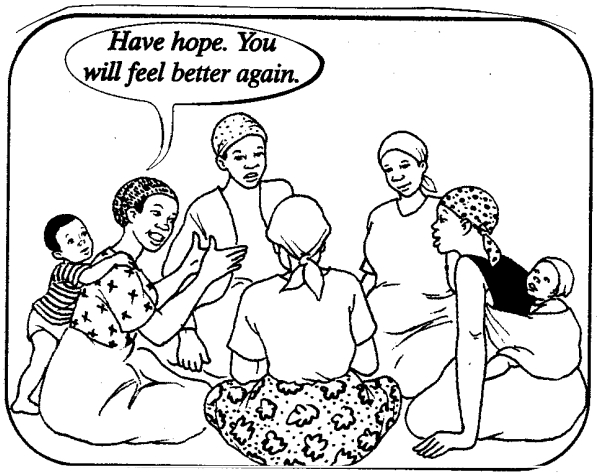
Some of the information provided above was obtained from a Network of African People Living with HIV/AIDS (NAP+) publication; Food for people living with H.I.V.\ AIDS, Institute for Traditional Medicine, Common alternative therapies, HIV support: proposed treatments for HIV " the Natural Pharmacist". Also consult Home Based Care Herbal Treatment Guideline, National AIDS Control Programme, Malawi.

Exercise 29: Preparing herbal remedies

Materials required:
Sharp knife
Small pestle and mortar or stone grinder
Chopping board
Clean screw-top bottles and jars
Herbs, e.g. aloe vera, garlic, mint, ginger, pumpkin seeds
Boiling water
Cooking oil

Procedure:
Consult Table 18 and follow the preparation method for each herbal remedy. Administer the remedies to any volunteers amongst the participants.

- Did the remedies relieve any of the volunteers' symptoms?
- Which remedies were the most effective?



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4.3 Action planning for cleaning up the environment to prevent diseases

4.3.1 Improving hygiene

- **Protecting the drinking water source from contamination**

Wells and boreholes should be covered to exclude sunlight and discourage the growth of aquatic weeds that could act as a food source for microbes. The area around the water source should be fenced with thorny bushes to prevent livestock and other animals from entering. The responsibility for keeping drinking water safe lies with all those who use it.

- **Constructing improved latrines**

In order to prevent contamination, latrine toilets must be sited more than 50m from the nearest well or borehole. The pit should be dug to a depth of at least 3m, such that the bottom of the pit remains above the level of the water table. The "ventilated improved pit" (VIP) latrine has a vertical ventilation pipe that is inserted into the pit. This is designed to promote the flow of air down through the squat hole and out through the top of the pipe, thus removing odours and flies from the latrine, see Information Box 9.

Exercise 30 will teach participants how to make a VIP latrine, however you will need access to the Internet so that you can download the detailed instructions for this.

Exercise 30: Making a VIP Toilet

Materials required:
Instructions downloaded from www.wateraid.org.uk/site/in_depth/technology_notes/303.asp
Spades
Cement
Sand
Metal rods for re-inforcing the concrete
Plastic pipe (minimum diameter 100mm)
Mosquito netting for fly screen

Information Box 9

The design of the VIP latrine

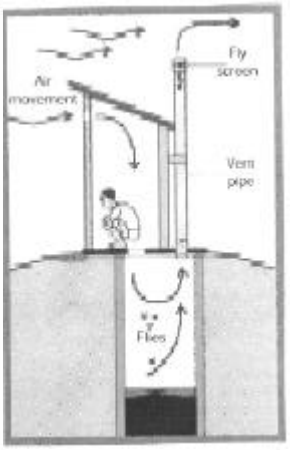
The VIP latrine is similar to a conventional pit latrine, but has an offset pit that permits the installation of a vertical ventilation pipe (or structure) beside the latrine superstructure.

The design of the VIP latrine causes air to flow down into the latrine pit through the latrine squat hole and up out of the ventilation pipe, thus removing odours from the latrine. Flies are always attracted by the smell from latrines, but in a VIP latrine they are attracted to the top of the vent-pipe rather than to the latrine squat hole. There they are prevented from entering the vent-pipe by a fly screen fixed across the top of it.

Some flies inevitably find their way into the latrine pit by other routes, and may breed in there. However, flies are attracted to light, and the VIP design makes use of this fact to get rid of them. The interior of a VIP latrine is always kept semi-dark, so that the flies inside the pit are drawn towards the light at the top of the vent pipe, where the screen traps them and they fall back into the pit or die.

The effectiveness of this fly control was demonstrated by an experiment in Zimbabwe, which compared the number of flies found in an unvented pit latrine to that found in an otherwise identical VIP latrine. Over a three-month period in 1975, an average of 179 flies per day were caught in the unvented latrine, compared to only 2 flies per day in the VIP latrine. [2]

VIP latrine



WEDC/ROD SHAW

Information taken from VIP Latrines in Zimbabwe: From Local Innovation to Global Solution, by Andy Robinson, 2002: **www.wsp.org/pdfs/af_bg_zim.pdf**

Facilities for hand washing should always be installed beside the toilet; e.g. a pot filled with clean water that is changed each day.

• Preventing unhygienic, anti-social behaviour

Anti-social habits such as urinating/defecating in the bush or waterways, or spitting in public should be discouraged in order to prevent the transmission of typhoid, TB, bilharzia, parasitic worms and other infectious diseases, see Table 15.

4.3.2 Getting rid of health hazards

• Safe disposal of hazardous materials

Hazardous materials, such as plastic, asbestos, unused pesticides and empty pesticide containers should be buried at a communal site, far away from the water source and in a place which cannot be interfered with by either children or livestock.

• Eliminating mosquito-breeding areas

Mosquito larvae provide good food for fish, this means that ponds and streams should well stocked with these creatures and over-fishing should be discouraged. The numbers of malaria-carrying mosquitoes can also be significantly reduced by filling in shallow ponds and puddles close to human settlements and by ensuring that pots and other containers are not left out in the open to collect water during the rainy season. The need to do this can be easily demonstrated in the following exercise, which is best done during the rainy season.

Exercise 31: Observing mosquito larvae in stagnant water

Materials required:
Jars that have been left outside, filled with rainwater for one week.
Magnifying glasses

Procedure:
Pour a little of the water into several glass jars and ask the participants to view the contents through the magnifying glasses.

- Can you spot the mosquito larvae? (They are transparent wriggley creatures that rise to the surface to breathe every now and again.)
- Where did they come from?
- How long has the water been standing in the jar outside?
- How many mosquito larvae do you estimate are in the jar?
- How can we prevent these larvae from turning into mosquitoes?
- How can we prevent mosquitoes from breeding in future?

• Eliminating water snails that carry bilharzia

Water snails can be killed by a natural chemical known as saponin. An Ethiopian scientist discovered that this chemical is contained in the green, unripe berries of endod, the soapberry bush (*Phytolacca dodecandra)*[8]. The endod plant is known as gopo in Shona. Endod berries must be soaked in water to release the saponin and then applied to stretches of affected water 2-3 times a year, especially during the dry season, as demonstrated in Exercise 32.

Exercise 32: Using Endod to kill water snails

Materials required:
Measuring stick
Bucket
Litre measure
At least 5 kg of endod berries

Procedure:
Count the number of snails present in 1 metre stretches, at intervals along the side of the affected river or lake. Use sticks to mark the areas where the snails have been counted.

Measure the depth of the stagnant river or lake in three or more places. Multiply the average depth by the length of the section of water to be treated, to find the volume. Crush the endod berries and soak them in a bucket of water overnight. Next morning apply the suspension of crushed berries and water at intervals, along the edge of the river/lake, at a rate of 5 kg per 50 litres of water. Take care to avoid getting juice from the crushed berries into the mouth or eyes.

- Check the number of dead snails after 8 hours.
- What percentage of snails died?
- What happened to the fish?
- Under what conditions could this method be used to control water snails in future?

Fish and ducks will also reduce the number of water snails. This means that fishing should be controlled and ducks and other fowl encouraged to feed in ponds and lakes. The community is responsible for ensuring that rivers and lakes are managed sustainably and are free from human excrement.

8 For more information go to www.dfh.dk/endod/indexuk.htm

4.3.3 Making the most of your natural resources

- **Conserving trees and other natural resources**

Indigenous trees are an important natural resource and have a range of important uses. Exercise 33 provides an opportunity for participants to reflect on the value of trees and may encourage them to come up with a strategy for conserving them.

Other natural resources that need to be conserved because of their contribution to the local economy include grazing areas, indigenous herbs, edible insects, shells and wildlife.

Exercise 32: What is the value of trees?

Materials required:
Pens and paper

Procedure:
Ask the participants to each make a list of all the different uses of indigenous trees.

- Who has come up with the most uses for trees?
- How many uses are there?
- What types of trees do we need in our environment – what function do they have?
- Which important trees are currently missing from our environment?
- How can we replace them?
- How can we conserve our trees and forests in future?
- How can we prevent tree cutting?
- Who is responsible for conserving trees?

Include these suggestions in your action plan.

Exercise 33: Making an Action Plan to clean up the environment

Problem	Activities planned to address the this problem	By whom?	With whom?	Completion date