FOOTSTEPS

No.33 DECEMBER 1997 INSECT-BORNE DISEASES

Diseases, insects and environment

by Professor Malcolm Molyneux

WHEN YOU COME TO THINK ABOUT IT, a surprising number of different diseases can be spread between people by insects. Some of these diseases will be discussed in this issue of *Footsteps*. They are among the most important and serious diseases in the world, especially in areas which are not yet industrially developed.

Insects are part of our environment, the natural world which surrounds us, and they are therefore greatly affected by things that change this environment. Environmental changes can influence diseases by affecting how insects behave or survive. This also means that we can attack insect-borne diseases by controlling the environment in which we live.

Changes in the natural environment, and the ability of insect vectors (insects which spread diseases) to react to these changes can have an important effect on the spread of disease.

IN THIS ISSUE

Agricultural developments Irrigation schemes create new breeding sites for some insects, especially the anopheline mosquitoes that spread malaria. When farmers move into forests to hunt or to clear and farm new ground, they may find tsetse flies that carry sleeping sickness parasites from wild game, or mosquitoes carrying the yellow fever virus from monkeys. In Thailand it is the gem miners working in the forests who are at particular risk of malaria, because mosquitoes live in the forested mining areas.

War and social change Uganda and the new Democratic Republic of the Congo are examples of countries where war, by changing the environment, caused epidemics of insect-borne disease. As a direct result of war, lantana thickets and other bushes were left to grow wild, providing ideal breeding grounds for tsetse flies. Cases of sleeping-sickness increased and hundreds of people died. Clearing the excess vegetation greatly reduced the problem.

Population movements In highland areas it is too cold for malaria parasites to grow

Photo: Dr S Lindsay, WHO

FOOTSTEPS

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Footsteps is a quarterly paper, linking health and development workers worldwide. Tear Fund, publisher of *Footsteps*, hopes that it will provide the stimulus of new ideas and enthusiasm. It is a way of encouraging Christians of all nations as they work together towards creating wholeness in our communities.

Footsteps is free of charge to individuals working to promote health and development. It is available in English, French, Portuguese and Spanish. Donations are welcomed.

Readers are invited to contribute views, articles, letters and photos.

Editor: Isabel Carter
83 Market Place, South Cave, Brough, East Yorkshire, HU15 2AS, UK.
Tel/Fax: (0)1430 422065
E-mail: imc@tearfund.dircon.co.uk

Language Editor: Sheila Melot

Editorial Committee: Jerry Adams, Dr Ann Ashworth, Simon Batchelor, Mike Carter, Jennie Collins, Bill Crooks, Paul Dean, Richard Franceys, Dr Ted Lankester, Sandra Michie, Nigel Poole, Louise Pott, José Smith, Mike Webb

Illustrator: Rod Mill

Design: Wingfinger Graphics, Leeds

Translation: L Bustamante, R Cawston, Dr J Cruz, S Dale-Pimentil, S Davies, T Dew, N Edwards, J Hermon, J Martinez da Cruz, R Head, M Leake, M Machado, O Martin, N Mauriange, J Perry

Mailing List: Write, giving brief details of your work and stating preferred language, to: Footsteps Mailing List, Tear Fund, 100 Church Road, Teddington, Middlesex, TW11 8QE, UK. (Tel: (0)181 977 9144.)

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CHRISTIAN CONCERN IN A WORLD OF NEED

inside mosquitoes, so the disease is not spread (even though there may be many mosquitoes around). People living there do not get malaria, and therefore do not build up any resistance or immunity to it. When individuals or whole populations move from high to low ground, as happened in Ethiopia during the 1980s, malaria is spread in the new, warm environment and there are epidemics of the disease, which can be severe or fatal.

By recognising the danger in circumstances like these, it is possible to take precautions against outbreaks of disease.

Economic hardship When people lack basic resources it can be difficult to maintain the fight against insect-borne diseases. For example, in South America the bugs that transmit chagas disease can be kept away by cementing cracks in hut walls, or by replacing thatch roofs with metal. However, these changes cost people money, and without them the conditions remain for the insects to flourish. Similarly, treated bed nets can protect against many insect-borne diseases, but lack of resources to buy or re-treat the nets can limit the effectiveness of this approach.

Begin where you are

By understanding how the environment influences insects and the diseases they carry, we may all be able to play a part in reducing the spread of those diseases. A useful community exercise is to hold a group meeting to discuss the following questions…

- *What insect-borne diseases are causing major problems in our community?*
- *Are there any things we could do locally to reduce the spread of these diseases amongst us?*
- *What are the obstacles or difficulties that prevent us from taking such steps?*
- *Where could we get either advice or help to change things for the better?*

The pages that follow may give you some ideas about what you might usefully do to reduce the effects of insect-borne diseases in your own community. Many such measures are readily available and may be possible even with very limited resources. There is a proverb of the Achewa people in Malawi: '*Konza kapansi kuti kamwamba katsike*,' meaning 'Attend to the problem at your own doorstep, and more distant goals will then be easier to reach.' This is a good message for environmental control – we do not have to wait for governments and national programmes to act. There is a lot we can do for ourselves, 'on our own doorstep'.

Professor Molyneux is co-director of the Wellcome Trust Clinical Research Centre and Malaria Research Project in the College of Medicine, PO Box 30096, Chichiri, Blantyre 3, Malawi. He is an honorary professor in the College of Medicine, University of Malawi, and in the School of Tropical Medicine, University of Liverpool, UK.

Photo: TALC

Forested mining areas in Thailand are breeding grounds for the anopheline mosquito.

Insecticide-treated nets

by Professor Chris Curtis

MALARIA is by far the most important insect-transmitted human disease. Latest WHO estimates are that there are 2.5 million deaths each year from malaria, mainly among African children.

There are two main ways of reducing bites from malaria-carrying mosquitoes:

■ **Insecticide spraying** In the 1950s and 1960s governments in many countries organised programmes of house spraying with insecticides, especially DDT. However, this was expensive to maintain and mosquitoes became resistant to DDT. Modern pyrethroid insecticides work better than DDT; however the use of treated bed nets is now recommended to reduce insect bites.

■ **Insecticide-treated bed nets** When people sleep under treated nets, their protection from malaria is as good as it is from the spraying of homes – but much less insecticide is needed. The pyrethroid chemicals used to treat nets (and curtains) are safe even when in close contact with people. Mosquitoes are attracted to people by the air they breathe out and their body odour. If nets are untreated, mosquitoes keep searching for a hole or for a place where an arm or leg is touching the net and then bite the person. However, as they touch a treated net they either die or fly away.

Insecticides for dipping nets

chemical name	trade name	concentration	written as	dosage
permethrin	Peripel	200	20%	200mg/m^2
	Imperator	500	50%	200mg/m^2
deltamethrin	K-Othrin	25	2.5%	25mg/m^2
lambdacyhalothrin	Icon	25	2.5%	10mg/m^2
cyfluthrin	Solfac	50	5%	50mg/m^2
etofenprox	Vectron	100	10%	200mg/m^2
alphacypermethrin	Fendona	100	10%	20mg/m^2

$$\text{The amount (in ml) of insecticide needed} = \frac{\text{recommended dosage (mg/m}^2\text{) x area of net (m}^2\text{)}}{\text{concentration of insecticide (\%) x 10}}$$

For example, if you have bought deltamethrin (K-Othrin) and are using a circular net with a total surface area of 6.5 sq m:

$$\text{Amount of insecticide needed} = \frac{25 \times 6.5}{2.5 \times 10} = \frac{162.5}{25} = 6.5\text{ml}$$

If one net soaks up 300ml of water, you will need to put 300ml of water in a bucket and add 6.5ml of chemical.

If you are treating 15 similar nets you will need to put 5 litres into the bowl or bucket and add 6.5ml x 15 = 97.5ml of chemical (approx 100ml).

Get help if necessary in working out these calculations. It is very important to get them right. Once you have worked it out, record the information (and mark measuring containers) for when the nets are treated again so you will not need to work it out each time (unless the chemical or number of nets changes).

Treating nets

Nets are treated by dipping them into a mixture of liquid insecticide and water. There are five steps involved:

1 PREPARE

Treat nets outside. Wear long rubber gloves to protect the skin. If none are available, use large plastic bags. Collect a small measure, a large measure and a mixing container – a bowl or bucket. Wash all used nets before treatment and dry them.

2 MEASURE AND DILUTE

You need to know…

- how many nets need dipping
- what size they are
- how much water they absorb
- how much chemical is required.

Finding the size (area) For a rectangular net, use the following formula – typical figures are shown for example:

Total surface area in square metres (m^2)
= 2 x sides (2 x 1.5m x 1.8m = 5.4m^2)
+ 2 x ends (2 x 1.5m x 1.3m = 3.9m^2)
+ 1 x top (1 x 1.3m x 1.8m = 2.34m^2)
(= 11.64m^2)

For a circular net, lay the net flat. Measure the curved base and the height:

Total surface area in square metres (m^2)
= base x height (3m x 2.2m = 6.6m^2)

How much liquid does each net soak up? Cotton nets will soak up a lot more liquid than polyester nets. To find out how much liquid each net will soak up, measure an

Photo: Richard Hanson, Tear Fund

exact amount of water into a bucket or bowl – for example, 2 litres. Soak the net. Then wring into the bowl and let the net continue to drip into the bowl until it stops. Measure how much water is left. Subtract this amount from the 2 litres. Now you know how much liquid one net will hold. If all the nets are of similar size and material take this figure, multiply by the number of nets to be dipped and add a little extra (10%) for safety.

For example, if 1 net soaks up 300ml and you want to treat 15 nets, you will need:

300ml x 15 = (4500mls or 4.5 litres)
+ approx 10% (450mls)
= 5 litres approx of liquid

3 DIP
Nets should be clean and dry. Soak each net in the diluted insecticide until thoroughly wet. Wring the net well and allow to drip into the bowl until it stops.

If you are treating several nets, each one can be wrung, then placed in a plastic bag and carried home to dry.

4 DRY
Nets can be hung up or laid over beds to dry. Placing over beds has the advantage of killing bedbugs! As they dry, turn them a few times to make sure the insecticide is evenly distributed.

5 CLEAN UP SAFELY
Packaging and leftover insecticide should either be placed in a pit latrine or buried in a pit. Never put into a river or pond. Thoroughly wash all equipment, hands and clothes with soap and water.

Increased protection

Nets should be treated twice a year. It is best not to wash them in between as this reduces the amount of insecticide.

Buying or making mosquito nets is expensive, but an investment that will protect your family for many years. Just one net can protect several young children sleeping together. Could you form savings groups to help raise funding to buy netting – both to provide nets for group members and for sale to others at a slight profit? If mosquito netting is too expensive, is there another thin, light material which could be used? (For example: old sari material in Asia, fine muslin or shamma cotton in Ethiopia.) If you have no funds to make or buy nets, consider using door and window curtains. Treat in exactly the same way with insecticide.

Professor Curtis works at the London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT, UK.

With thanks also to AHRTAG for permission to use some of their information. AHRTAG print a very useful directory for obtaining both nets and insecticide (see page 14).

FROM THE EDITOR

MALARIA THREATENS 40% of the world's population and kills about 2.5 million people every year. Most are children under five or pregnant women. In sub-Saharan Africa an estimated 70 million pre-school age children are at risk of dying of malaria. In addition, malaria among adults affects their ability to do productive work. All this means malaria is one of the biggest public health problems in many developing countries. Like the other diseases that we look at in this issue, malaria is transmitted by insects. Often people despair of their ability to do anything in the battle against malaria, especially as health budgets may be reduced or essential drugs become unavailable. In this issue we try to look at positive steps which can be taken 'on our own doorstep' without access to large resources – just as Dr Molyneux encourages. Much of the issue looks at malaria control, partly because this is such a widespread and serious disease, but also because the same control measures will help against other diseases such as yellow fever and filariasis.

Future issues will look at community-based veterinary workers, micro enterprise and resolving local conflicts over the use of resources.

Once you have finished reading this issue, you may like to encourage discussion of these matters with others in the community. Here are some ideas for role plays which may help get people thinking…

■ *A wife is sick with malaria but her husband tells her she is being lazy and trying to stop work. He will not pay for treatment. She takes some leftover chloroquine from her son's last treatment and herbal teas. Her condition becomes worse. In the end she is so sick she has to be carried by stretcher and admitted to hospital. Her life is saved but her husband has to pay a very large bill.*

■ *Local people blame the mango for malaria, as outbreaks always occur just as the fruit are ready to eat (a month after the rains begin). Although the fruit are one of the village children's main sources of vitamins, villagers want to cut down all the mango trees near their village.*

■ *The daughter of a local family has lived for many years in the highlands where there is no malaria. Now she is returning to her family in the lowlands, pregnant and with two young children. What would your advice as a health worker be to her parents?*

Isabel Carter

Malaria – some new approaches

by Dr D C Warhurst

Photo: R Da Silva, WHO

Taking blood samples from school children in Nigeria to check for malaria infection.

IN COUNTRIES where malaria is very common, many adults may carry the infection without any symptoms, but infants and pregnant women are much more likely to become ill with malaria. Drugs are mainly used to control the illness. However, they can also be used to prevent it for certain high risk groups such as pregnant women, sickle cell anaemia sufferers and visitors who have no natural immunity.

Each country needs an agreed anti-malarial drug policy which takes into account the distribution of malarial mosquitoes and drug resistance. Health services also need to consider the risks and benefits of different drugs, their cost and how easy they are to obtain and prescribe.

For many patients, malaria is diagnosed whenever other likely causes of fever or illness have been excluded. This approach is appropriate where inexpensive and safe drugs such as chloroquine are effective and patients are monitored for other possible causes of fever. However, if more expensive and potentially more toxic drugs are needed, then anti-malarial treatment should be limited to 'true' malaria attacks only (those confirmed by blood slide examination).

Treatment of malaria

In uncomplicated malaria attacks there will be fever and chills. Such cases usually respond well to treatment with chloroquine as a first line drug. However, new strains of malaria mean that treatment with chloroquine may not always be effective. Also, when patients delay seeking treatment (often due to health fees) this allows the parasite to multiply so that one course of treatment may not be sufficient.

If chloroquine fails to clear the infection, a second line drug – sulfadoxine or pyrimethamine – can be used. In countries where there is known resistance to chloroquine, prescribing this first may place lives at risk. In these areas sulfadoxine and pyrimethamine should be used first. Alternatively, amodiaquine may also be used as a first line drug in chloroquine-resistant areas.

Mefloquine is a relatively new drug which is effective in treatment but resistance to this is already growing in South East Asia.

Quinine, a natural product, is another alternative in Africa. This can be given by mouth, intravenous infusion or intramuscular injection. If resistance to quinine develops, then the usual five-day course needs to be followed up with tetracycline or sulfadoxine and pyrimethamine.

Artemisinin is another natural product, from the wormwood, *Artemisia annua*, which is increasingly used as a first line drug if resistance to other drugs is developing. It can be used as a suppository (Artesunate) for emergency treatment of children, as it seems to have a rapid effect and few side effects.

Research in Gambia has revealed that chloroquine resistance is likely in about 20% of cases treated. At this level its use as a first line drug is still recommended.

New drugs

Each new drug should only be used where there is known resistance to other drug combinations. Atovaquone is based on a natural product. It is usually combined with Paludrine as Malarone. Another combination drug is Co-artemether, again naturally based and fast acting in severe attacks, though it cannot be injected. No resistance has yet been observed to either of these.

New research hopes to identify how resistance to various drugs develops.

Dr David Warhurst works at the London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT, UK.

Photo: Chevalier, WHO

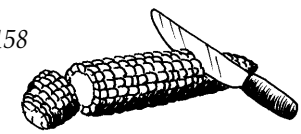
LETTERS

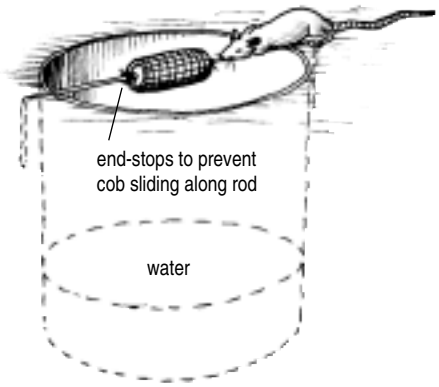
An effective rat trap

I FARM OSTRICHES in Zimbabwe. Recently I have had such a plague of rats, which even began attacking adult ostriches. Poison proved very expensive and I also lost some young ostriches that may have eaten the poison. In desperation I tried to make a rat trap which I had heard about in Mozambique. In 21 days with 9 traps I have caught 934 rats!!

To make the trap you need a 20 litre bucket or large clay pot which holds water. Bury this in the ground near known rat holes or feeding sites. Take a dry corn cob and cut off the ends. Push through a thick wire 1 metre long. Make sure the cob can spin freely. Fasten the cob in position in the centre of the wire with some small pieces of wire wrapped around. Bend the wire as shown and push firmly into the ground either side of the bucket. Put a depth of about 15cm of water in the bucket. Each evening, coat the corn cob with peanut butter, posho, mealie meal or some other kind of food which will stick to the cob. Remove drowned rats each morning. The trap works best during a new moon.

Nick Dexter
PO Box AC 158
Ascot
Bulawayo
Zimbabwe





Networking in West Africa

WE HAVE CREATED a liaison and information bulletin for our region of French-speaking West Africa, which is at present suffering financially. We would like to establish contact with other similar groups. We are interested in networking and encouraging training, seminars and conferences. For example we recently took part in a training conference held in Lomé on 'The role of NGOs in reinforcing democracy and promoting human rights'.

Mr Ignace Djagnikpo
ONG-FAST-ENFANCE-VIE
BP 4019
Lomé
Togo

Animals as fertilising agents

THE FARMERS OF BABANKI TUNGO, in the north-west of Cameroon, use animals to improve the fertility of their soil. A farmer who wants to start cultivating a piece of infertile land surrounds it by a fence. Inside the plot, he builds a hut for the guard responsible for looking after the livestock. If this farmer does not have cattle, he negotiates an agreement with a cattle farmer to allow his cattle to stay on the plot every night. Then, each day after grazing, the cowherd leads them to the enclosed plot for the night.

Farmers estimate it takes three months for fifty cattle on a one hectare plot to provide enough urine and manure for the plot to remain fertile for three to four years.

This technique has many advantages:

- The natural environment of the farmer provides all the required resources, apart from a salt lick, which he has to buy.
- Soil structure, texture, water-holding ability and resistance to erosion all increase.
- A lot of organic fertiliser is spread onto the field. The farmer's yield is doubled, even tripled, compared to other farmers.
- It was proved that farmers using this technique get higher yields than one who applies 17 sacks of mineral fertiliser per hectare per year.

These advantages justify the interest that CIPCRE gives to promoting this technique. Its greatest merit is that it has been developed by the farmers themselves, without the intervention of rural advisers.


Photo: I Carter

Nocturnal penning of livestock.

Magloire Ndjang
CIPCRE
BP 1256
Bafoussam
Cameroon

Fax: (237) 44 66 69
E-mail: CIPCRE@geod.geonet.de

(From *Ecovox No.11* Jan–March 1997)

A giant guava

WHEN VISITING LOKANDO VILLAGE in South West Cameroon last year, Takwi Ndiche, an Agricultural Assistant, showed us a most remarkable example of 'companion' or 'guild' planting at the compound of Otte Aaron, the village chief. A leucaena seed had by chance fallen into and germinated in the same pot as a guava seedling in the nursery, and when planted out together they both grew vigorously. In just 7 months, that particular guava tree had reached a height of over 2 metres, twice the size of other guava tree seedlings planted in the village at the same time.

Bob Mann
Methodist Relief and Development Fund
8 Upper Manor Road
Milford
Surrey
GU8 5JW
UK

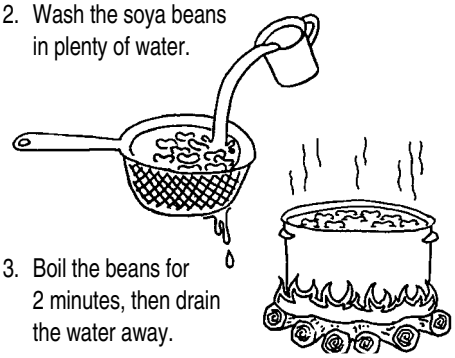
The importance of soya in human nutrition

WE WORK WITH A PROGRAMME aimed at preventing malnutrition in Guayaquil. We encourage the growth and use of soybeans. Though they are not traditionally grown in this area, local

people have accepted them readily. Soya is a very useful food, high in protein, which can be substituted for meat, cheese, milk, eggs or fish.

How to prepare soya milk

1. Clean the soya beans, removing any sticks and stones.
2. Wash the soya beans in plenty of water.



3. Boil the beans for 2 minutes, then drain the water away.
4. Soak the soya beans overnight.
5. Either pound the beans or use a mincer to produce a smooth paste. (Use a liquidiser instead of a mincer, if one is available).
6. For every pound of ground soya, add 3 litres of clean water, and then mix.
7. Strain the diluted mixture through muslin or a sieve, squeezing well. The resulting liquid is soya milk.
8. Boil the milk for 30 minutes, and add cinnamon and brown or white sugar.
9. The surplus soya solids can be used to prepare many types of 'tortillas' (pancakes). Add flour or grated plantains or manioc, shape into cakes (tortillas) add onions or spices and fry in hot oil.

Wilma Campoverde Celi
The Nutrition for Christ Programme
Casilla: 5520
Guayaquil
Ecuador

Children and smoking

SOME TIME AGO *Footsteps* published a letter from Richard Kandonga of Zambia saying how difficult he was finding it to get information to warn people of the dangers of smoking.

This has been a subject of concern for TALC, particularly at the present time when tobacco companies are making such great efforts to sell their products in developing countries.

So we are pleased to announce that we have recently brought onto the market a new slide set entitled *Children and Smoking* which describes the development of smoking at an early age and provides suggestions on how to stop children smoking.

TALC is also planning to produce a book specially written for people in developing countries on the dangers to health caused by smoking, which is expected in late 1998.

Dick Dawson
TALC
PO Box 49
St Albans
Herts
AL1 5TX
UK

Church-based community development

THANKS for sending your magazine *Footsteps* to us. To my surprise I saw the opening article on Church-based Community Development in Issue 31. This concept is very new in this part of the world. People believe development is only carried out by NGOs (often foreign and with a lot of money) or the government. Recently I have been teaching a course on church-based community development in a bible training institute to give future church leaders a vision for this vital topic. If people are interested in this topic, they are welcome to contact me.

Willem R Klaassen
Rural Ministries
PO Box 387
Veni
Swaziland
Africa

Baby milk campaigns

ADVERTISING by baby milk manufacturers has obviously led to some mothers stopping breast feeding. However, a great deal has been done to promote 'breast is best', focusing on the negative results of bottle feeding. But in many parts of the world – particularly as a result of the AIDS and other epidemics – there are many orphans who can only survive through bottle feeding. Bottle feeding, however undesirable, cannot be avoided, but maybe the number of babies dying as a result of diarrhoea (often through bottle feeds prepared with dirty water) could be reduced.

Can we suggest that baby milk manufacturers are challenged on the wider issues of improving water supplies, better sanitation and training mothers on how to prepare bottle feeds safely?

Ronald and Theresa Watts
Ngwelezana Hospital
P/Bag X20021
Empangeni 3880
South Africa

Build stone houses

A SERIOUS PROBLEM which adds to deforestation is the clearing of woods for house building. Here in Merhabete, each house requires about 400 poles, clearing about a quarter of a hectare.

We are encouraging people to build houses out of stone, using mud mortar, with some success, hand in hand with an afforestation programme.

Bekele Millian
PO Box 36
Alem Ketema
North Shoa
Ethiopia

Passion fruit

JUST IN CASE readers have begun growing passion fruit (*Footsteps 31*), they may be interested to know that it contains plenty of vitamin C, iron and niacin. Each fruit contains about 90 calories.

Marilyn Gustafson
2690 No Oxford St #205
St Paul, MN 55113-2027
USA

Protecting stored grains and seeds

IN ORDER TO DISCOURAGE INSECTS from attacking stored grain or seeds, dried hot peppers can be used. First of all, dry the peppers in the sun. When they are completely dry, reduce them to a fine powder and mix with the seeds. Be careful not to get the powder in your eyes, nose or mouth. Instead of crushing them, some farmers mix whole peppers with their seeds.

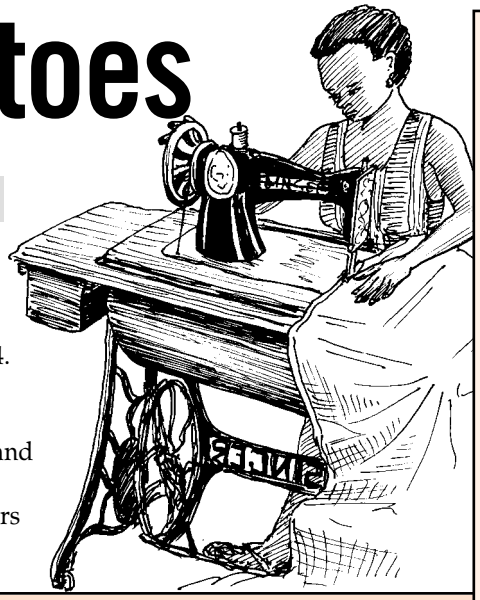
Wash the grain before you cook it.

A L'Affut Paysans

From *Rural Radio Network No 34*

Keeping out mosquitoes

compiled by Uzo Okoli, Rod Mill and Isabel Carter



KEEPING MOSQUITOES OUT of your home is the most important way of protecting your family from malaria and other mosquito-borne diseases. Here are a number of practical steps you can take.

The importance of treating bed nets and curtains to protect from mosquito bites and malaria is explained on pages 3 and 4. Remember that all curtains and nets are many times more effective when treated. Insecticide-treated curtains on windows and doorways will prevent some mosquitoes from entering the house and kill any others on contact.

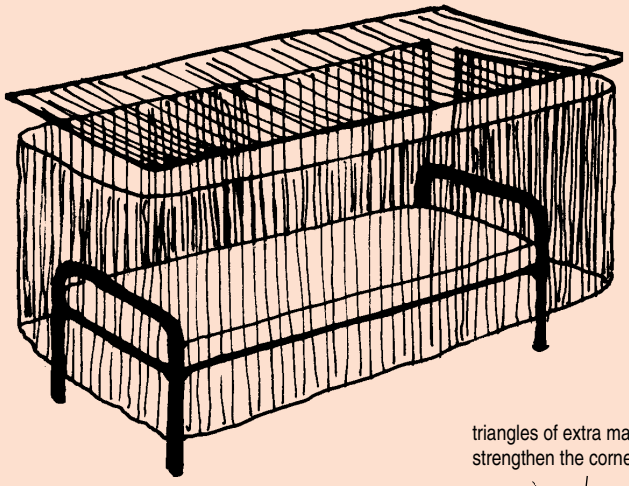
Making mosquito nets

It is much cheaper to buy netting in bulk and sew your own nets. The Preventive Health Programme in Sierra Leone, run by EFSL, trained local tailors to make nets and sold them at a subsidised price. (AHRTAG's directory, reviewed on page 14, gives details on how to buy bulk netting and chemicals.) Tailors could make 15 nets a day and people preferred them to imported nets. Heavy denier (100 or 75) is better, as the nets will be much stronger and less likely to tear. The cost was US $5 per double net when buying netting in large quantities.

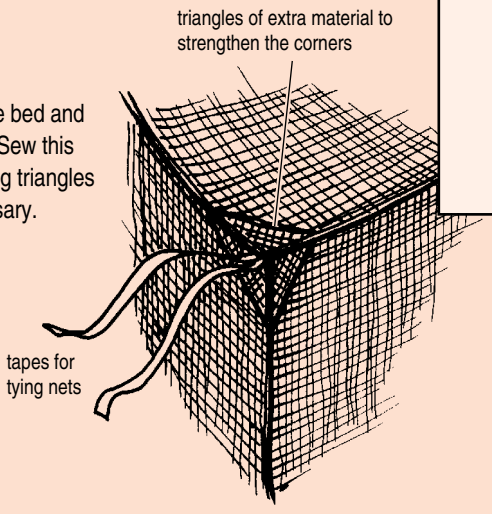
Square nets are easier to sew, give more protection and are more useful when several people are sharing the net.

Circular nets use less netting and are easier to hang, but they are more likely to allow contact with mosquitoes and are more difficult to make.

1 Cut out two pieces of netting. First measure around the bed and cut out this piece: (length + width) x 2, plus 20cm for hem. Allow plenty of drop for the net so it can be tucked in. If people sleep on mats on the floor, nets will need to be longer. Sew up the side seam.



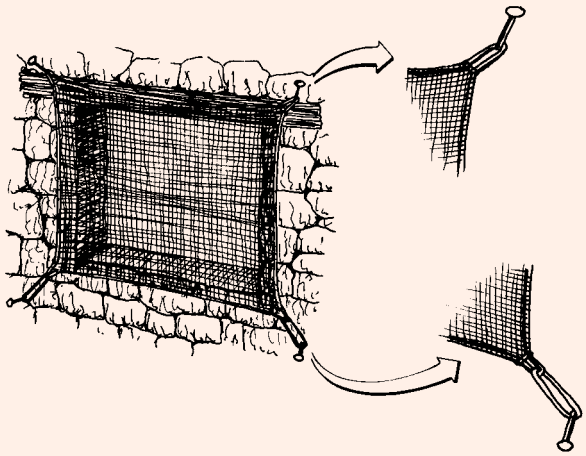
2 Then measure the area of the bed and cut out to give the top piece. Sew this in, adding tapes and strengthening triangles in the four corners. Hem if necessary.



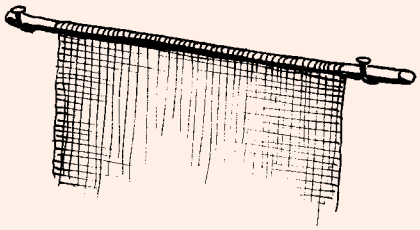
oors, windows and roof spaces

1 If possible, make frames for each window and door and fit mosquito wire.

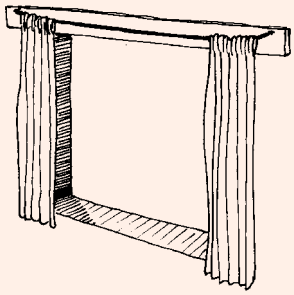
2 If nets and wire are too expensive, consider fitting netting to the windows and doors. Hem a piece of netting, run string through the hem (use a safety pin) and hang the net onto nails.

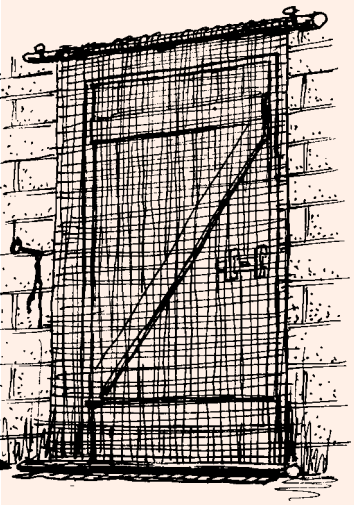


3 Alternatively, if you want to be able to quickly move the netting away each day, hem the top and bottom and push a thin piece of wood through both. Hang the top, using hooks or bent nails. The weight of the wood will let the net hang, covering the window. It can quickly be hung up on the nails.

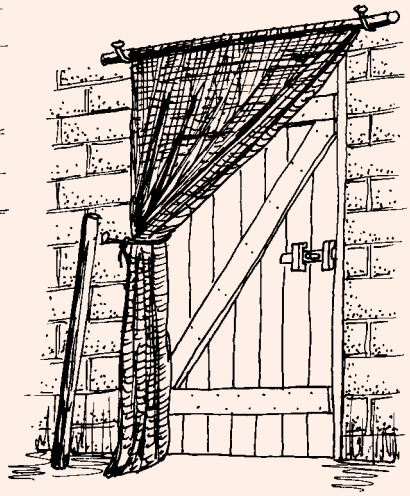


4 If you already have ordinary curtains, treat these with insecticide.

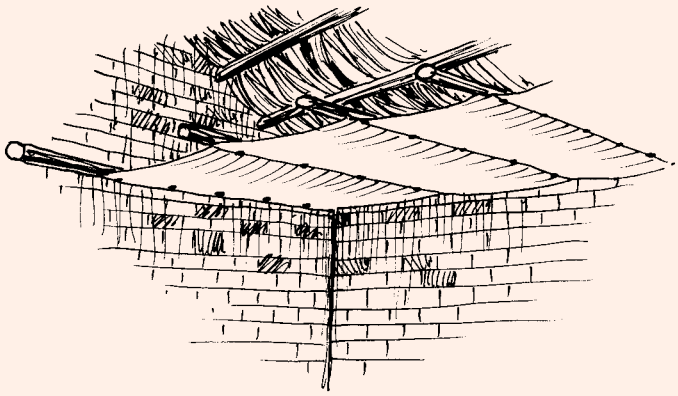




5 Make door curtains in the same way, hemming the top to hang them. At night use a piece of wood to keep the net in place. Tie the curtain back during the day to avoid damage.

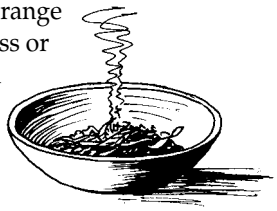


6 If the house rafters are exposed, mosquitoes can enter easily. Make lightweight wooden frames and cover with local matting for a cheap but effective ceiling. Check for cracks and fill with scraps of netting. Alternatively, hang treated netting to cover the gap between the roof and the walls.



Other ideas…

■ Burn dried orange peel, lemon grass or mint leaves in a pot. This is supposed to make mosquitoes sleepy. Peppermint oil, citronella and geranium oils are also fairly effective.



■ Sprinkle neem leaves on the floor. Are there other local leaves which are believed to keep away mosquitoes?

■ Close windows and shutters before sunset to prevent large numbers of mosquitoes entering the house.

■ Clear vegetation around the house to prevent mosquitoes breeding.

■ Drain any containers (old tins, tyres etc) holding stagnant water. Even 1cm of water may be enough for larvae to grow.

■ Fill up any pits or holes in the compound where mosquitoes can breed. If some open areas of water still remain – water butts, wells, etc – then try adding a little cooking oil. This will float on the surface and prevent mosquito larvae from breathing.

FACT FILES

ON INSECT-BORNE DISEASES

Information compiled by Isabel Carter and based largely on information from IAMAT and WHO publications, including press releases, Tropical Disease Research *and* Control of Tropical Diseases.

Dengue fever

INSECT-BORNE DISEASES

INTRODUCTION

Dengue fever is spread by mosquitoes and in recent years has become a major health concern. It occurs particularly in urban areas. There are an estimated 50 million cases of dengue infection every year (WHO). In addition, there is a complication known as dengue haemorrhagic fever and over 40 countries around the world have now had epidemics.

INFECTION

Dengue is spread by *Aedes* mosquitoes in the same way as malaria – except that these mosquitoes bite during the daytime. They breed in the dirty water which often results from poor sanitation and drainage in urban areas.

SYMPTOMS

Dengue fever is a severe 'flu-like illness with high fever, headaches, pain behind the eyes, joint pains and a rash. Dengue haemorrhagic fever is a deadly complication with very high fever, sometimes accompanied by a swollen liver and fits.

TREATMENT

There is no set treatment for dengue, but good nursing care can often help to save lives.

CONTROL

The only effective control measures are to prevent mosquitoes from biting and to remove their breeding sites. Cover arms and legs and, if possible, use insect repellent – especially if there is known to be a local outbreak.

FUTURE POTENTIAL

There are four different viruses which can cause the disease, making it very difficult to produce an effective vaccine, but progress is being made.

Lymphatic filariasis

INSECT-BORNE DISEASES

INTRODUCTION

120 million people around the world are infected with this disease

INFECTION

The disease is spread by mosquitoes which are infected with the larvae of a worm.

Photo: Jim Loring, Tear Fund

This woman's leg shows the unpleasant effects of elephantiasis.

SYMPTOMS

In a third of those known to be infected, the adult larvae develop in the bloodstream and lymph system. This can lead to blockages causing:

- elephantiasis (swelling and enlargement of limbs, usually legs) – 15 million people
- genital damage (hydrocoele: swelling of the scrotum) – 27 million men
- lymph infection (pain and swelling of lymph nodes, often with nausea, fever and vomiting) – 16 million people.

In the other two thirds the damage to their lymphatic and renal systems may remain hidden but their health suffers and many days are lost from work.

TREATMENT

Previously treatment was limited and had severe side effects. New drugs are now available to treat infection. With elephantiasis, simply washing with soap and water and applying antibiotics has proved very effective.

CONTROL AND FUTURE POTENTIAL

Recent research has found that the disease can be controlled very cheaply and effectively by one dose each year of drugs (Ivermectin with DEC or albendazole) which prevents the larvae from developing in the blood stream. It costs only US $1 to treat 20 people in this way.

Malaria

INSECT-BORNE DISEASES

INTRODUCTION

There are an estimated 300–500 million cases of malaria every year. Malaria is one of the five leading causes of death in children under five. WHO estimates that over 1 million children and up to 1.5 million adults die each year from malaria. 90% of deaths are in Africa. Children under five and pregnant women are those most at risk from severe attacks.

INFECTION

Malaria is passed on only by *Anopheles* mosquitoes. You can tell these from other mosquitoes by the way their 'tails stick up'. When mosquitoes bite, they suck up blood. If the person they bite has malaria, parasites in this blood breed and develop in the mosquito. When the mosquito feeds on another person, these parasites are injected with the mosquito's saliva. This person may then develop malaria.

Almost all *Anopheles* mosquitoes feed between sunset and sunrise. After feeding they usually rest on the walls or ceiling while they digest the blood.

Female mosquitoes feed on blood every two or three days. It provides them with protein for developing their eggs. They lay eggs in shallow water (puddles) or ponds. The eggs hatch into larvae which take about a week to emerge as adult mosquitoes. Mosquito larvae float horizontally in water unlike other types of larvae.

SYMPTOMS

Symptoms develop from 10 to 28 days after being bitten by an infected mosquito. Symptoms can vary, with each person having their own 'pattern'. They include fever, headaches, anaemia, fits (in children), nausea, vomiting and diarrhoea.

Photo: Richard Hanson, Tear Fund

Use bed nets to protect your family from mosquitoes and the diseases they carry.

TREATMENT

There is growing resistance to the more commonly available drugs. Quinine and chloroquine are most commonly used. Delay in seeking treatment allows the malaria parasites to multiply rapidly within the body. The introduction of charges for health treatment often means people try traditional cures, or self-medication before attending a clinic. Such delay can be fatal.

CONTROL

Clear all possible areas of standing water near homes. If there are muddy areas near wells or pumps, dig this out to a depth of about 1 metre and fill with large stones, using gravel and small stones on the surface. Check for old tin cans, broken pots or broken glass on top of walls which may hold water. Cut grass and small shrubs short near the house. Plant neem trees near homes.

Use treated bed nets or door and window curtains (see pages 8–9). Take particular care of babies, young children and pregnant women. Give them priority if there are not enough nets.

Research has found that the use of treated bed nets can reduce malaria outbreaks by a half.

Do not take prophylactics (preventive) treatment unless medically recommended. It will reduce natural resistance. People who spend a long time living in malaria-free areas – such as highlands – or overseas students will lose their natural resistance after about a year. If they return for short visits they should take prophylactic treatment. If, however, their return is more permanent, they should not take preventive medicine but instead allow their natural resistance to build up again (even though they are likely to suffer a few attacks of malaria while this is happening).

Mosquitoes are attracted to sleeping people. Treated nets act like a baited trap. The chemical held in the treated net is often sufficient to kill a mosquito. Torn nets give little protection. Researchers know that the best place to look for well fed mosquitoes is inside the average net in a village home! Treated nets will help to keep out mosquitoes from small holes. Tears and holes should be mended immediately they are noticed.

FUTURE POTENTIAL

Trials are under way for a number of vaccines. Some show signs of proving very effective, but it will be many years before any are likely to be widely available. It has also proved very hard to find funding for research.

Yellow fever

INSECT-BORNE DISEASES

INTRODUCTION

Yellow fever is found in many parts of Africa and Latin America. It is a virus disease spread by mosquitoes. The virus can live in humans and monkeys.

Photo: Richard Hanson, Tear Fund

INFECTION

The bite of either an infected mosquito or a mosquito carrying infected blood from a human or monkey passes on the infection.

SYMPTOMS

Some attacks are mild, causing fever, aching joints, nausea, vomiting and headaches. The patient usually recovers and is then immune from further attacks. During epidemics, symptoms tend to be more severe, with jaundice and haemorrhages; up to half of those infected may die.

TREATMENT

There is no treatment except good nursing care.

CONTROL

Vaccination for people living in or entering infected areas lasts for 10 years. Some governments are introducing the vaccine into their national immunisation programmes. Otherwise, control measures are the same as for malaria – trying to protect people from mosquito bites.

Sleeping sickness

INSECT-BORNE DISEASES

INTRODUCTION

About 55 million people in Africa are exposed to the risk of infection from sleeping sickness (or trypanosomiasis). Though in many countries it was almost eradicated in the 1950s, it is now reaching epidemic proportions. Shortages of the drugs for treatment have increased the infection and death rates. This is a disease of rural areas where cases are often unreported and treatment is not available.

INFECTION

The disease is spread by the tsetse fly – a large fly with crossed wings which lives on river banks, forests or low shrub. The flies become infected by sucking the blood either of an infected animal or person. The parasites multiply in the fly and are then injected with the saliva into another person.

SYMPTOMS

Sleeping sickness begins with a hard swelling where the fly has bitten. Fever, headaches, itching and joint pains follow in the early stages. After several weeks, the body's nervous system is affected and tiredness, shaking, swellings and wasting of the body follow. The patient's behaviour and mood change. During the day, exhaustion means that even eating and talking become a huge effort. At night the patient is unable to sleep. Without treatment the person will die after 6–9 months, often with friends and family convinced that such a painful death must be the result of witchcraft or madness.

Photo: C. Laveissière

Traps and insecticides can help to control the numbers of tsetse flies.

TREATMENT

Treatment is expensive and usually requires hospitalisation. The drug Melarsoprol is most commonly used. This is the cheapest medication but still costs about $50 per person. However, its future production is threatened due to concern over damage to the environment during its manufacture in Germany. Alternative drugs, Eflornithine and Nifurtimox, are even more expensive (about $200 per treatment). Treatment is not without risk, but without it the chances of recovery are nil.

CONTROL

Clearing the bush may prevent the flies surviving the dry season. People should not settle in tsetse fly infested areas. Tsetse fly traps and insecticides can help to control the numbers of flies. Remove potential animal sources of infection such as dogs, cattle etc.

FUTURE POTENTIAL

Campaigns to eradicate the tsetse fly almost succeeded several decades ago. However, cutbacks in government spending meant that widespread spraying largely stopped. Now this dreadful disease is affecting alarming numbers of people.

Leishmaniasis

INSECT-BORNE DISEASES

Photo: TALC

Clearing rubbish from near homes and spraying with insecticide can help control the spread of leishmaniasis.

INTRODUCTION

Leishmaniasis is a group of related parasitic diseases which together affect 12 million people in 88 countries around the world. Large movements of people – for example the settling of new regions in the tropical plains in South America, or growth of migrant labour – bring increasing numbers of unprotected urban people into contact with the disease in rural areas and greatly increase its spread. People already infected with HIV are much more likely to suffer from more severe infection.

INFECTION

The diseases are spread by the bite of a tiny sandfly. Only the female bites, feeding on blood to develop its eggs. The painful sting can pass on the parasites.

SYMPTOMS

The disease can lead to a range of symptoms:

- Many ulcers can form on exposed parts of the body such as the face, arms and legs. These lead to permanent scarring.
- The infection can destroy tissues in the nose, mouth and throat, leading to severe disfigurement, with victims sometimes cast out of their community.
- Infection can be internal, causing fever, weight loss, swelling of the spleen and liver and anaemia. If left untreated, this form often leads to death. It is known as *kala-azur*.

TREATMENT

Infection may be difficult to diagnose. The disease can be treated but this must be done in the early stages. Antimonial drugs are used but treatment is expensive, often involving hospital care.

CONTROL

- Dogs and rodents are the main reservoirs of infection. Rodents should be eliminated and dogs tested for parasites. If present, they should either be treated or killed.
- Remove possible breeding sites for sandflies by clearing vegetation, rubbish or building rubble from near homes. Spraying insecticide (particularly at the same time) is effective.
- Use treated bed nets and curtains.

Chagas disease

INSECT-BORNE DISEASES

INTRODUCTION

16 to 18 million people are infected with chagas disease in Latin American countries. About 45,000 people are known to die from this disease each year. Many more deaths may occur but are recorded as due to other causes.

INFECTION

The disease is passed to people by a bloodsucking bug which is brown, oval in shape and about 2cm long. These bugs live in the cracks of poorly plastered homes in mainly rural areas. At night the insects leave their cracks to feed on the blood of sleeping people. They are also known as the 'kissing bug' as they prefer to feed on the faces of their sleeping victims. During feeding, parasites are passed into the blood supply of the victim. The infection is passed from mother to baby and can also be passed on through blood transfusions.

SYMPTOMS

After a week a hard purple swelling appears, known as a 'chagoma', as the body tries to protect itself from local infection. Some parasites will escape and pass into the blood stream, infecting the heart, brain, liver and spleen. Two weeks after being bitten, some patients, especially small children, will develop general symptoms, including fever, rash, enlarged liver and spleen and swelling of the lymph nodes. Adults are more likely to suffer from an infection of the heart, leading to death in 10% of cases. These symptoms may last up to two months, after which the patients seem to be healthy again. However, they still carry the parasites, acting as a source of infection for others. In addition, the parasites continue to multiply in body organs – particularly the heart – often leading to death through heart failure 10 or 20 years later.

TREATMENT

There are no drugs which can prevent infection. The drugs benznidazole and nifurtimox are effective in killing the parasites in the early stages of infection.

CONTROL

Traditional methods of control have relied on spraying homes with insecticides. Improved smooth plastering of homes can help reduce the sites where the bugs can live. Recent developments include fumigant canisters and paints containing insecticide which have proved more effective and longer lasting in their effects than spraying. Many countries in Latin America are committed to trying to wipe out the disease by the year 2000. Careful monitoring of blood banks is also very important. Bed nets covered with a cloth to prevent faeces falling through the net (from the roof) will guard against one source of infection, as will sleeping in the middle of the room, away from the walls.

FUTURE POTENTIAL

Vaccines are still in experimental stages. A new drug (D0870), which has proved very effective during research, is undergoing trials.

Quinine from fever trees

The bark of the cinchona tree (*Cinchona officinalis*) contains quinine. It is commercially harvested to manufacture quinine tablets. If you have no access to clinical malaria treatment then here is a recipe to extract your own quinine:

- Harvest small pieces of bark and dry in the sun. Grind to a powder.
- Boil 10g or 3 teaspoons of bark in 1 litre of water for 10 minutes, filter and drink in portions within 24 hours. This is equivalent to about 350mg of quinine – an adult dose. For children, use proportionally less according to their size.

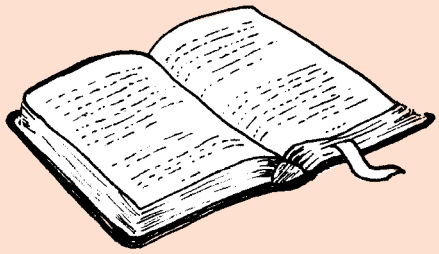
We recommend that you always seek medical help and treatment and only use this in an emergency.

Recipe from *Natural Medicine in the Tropics* by Hirt and M'Pia

BIBLE STUDY

God's plan for holistic development

by Dr Ted Lankester



TO DISCOVER A WONDERFUL PICTURE of how the kingdom of God will develop after Jesus returns, read Isaiah Chapter 65: 17-25. Understand that this is how God would like things to be right now if everyone was responsive to his will.

Verse 19 We read that there is to be an end of sadness and weeping.

Verse 20 A healthy old age should be expected for everyone, with no deaths of young children or babies.

Verse 21 No-one is to be exploited by landowners or landlords and all will have their own homes. There will be food security and an end to bonded labour for everyone.

Verse 22 Work will be enjoyable and productive. Poverty will no longer exist. Everyone will have access to social justice.

Verse 23 There will be political and social stability. The well-being of the next generation will be guaranteed.

Verse 24 There will be open communication with God.

Verse 25 There will be ecological and environmental harmony with an end to violence and cruelty.

Reflect on this wonderful picture and pray for its fulfilment when Christ returns. Contrast the present situation. Is there anything you could do to bring about one small part of this in the lives of those around you?

Dr Lankester is a director of InterHealth, London, UK, with many years' experience in India.

Malaria: a continuing threat

Issue No 6 of *Child Health Dialogue* was on the subject of malaria and its control. This newsletter is free to readers in developing countries. For further information write to the Publications Secretary at AHRTAG, address below.

Insecticide Treated Nets for Malaria Control

Mosquito nets treated with pyrethroid insecticides have been found effective in protecting against malaria. Their use is increasingly being encouraged. Obtaining supplies of the relevant materials is essential. AHRTAG, UK, and PATH, Canada, have therefore produced a directory of suppliers of insecticides and mosquito nets. It contains information on the treatment of nets and details of where to obtain nets, bulk netting, insecticides and a list of useful contacts and resource materials. Single copies are available free of charge; organisations requesting bulk copies will be asked to contribute to postage. Highly recommended for anyone wanting to use or treat mosquito nets. Write to:

Mary Helena
AHRTAG
29–35 Farringdon Road
London
EC1M 3JB
UK

Fax: +44 171 242 0041
E-mail: ahrtag@gn.apc.org

Soil Fertility Management

This is the latest booklet produced in the series on Dryland Farming by Studio Driya Media. As with the others in the series, clear illustrations take up more space than text. It is full of practical information on improving soil fertility, including erosion control, organic fertilisers, improving water retention and cropping systems.

The booklet costs US $4 (discounts available for bulk copies) in English and is available from:

World Neighbours
5116 North Portland Ave
Oklahoma City
OK 73112
USA

Fax: +1 405 752 9393

Poverty and Health: Reaping a Richer Harvest

by Marie-Thérèse Feurstein

This new book is aimed at those working to reduce both poverty and ill health. It examines the effects of poverty on human health and shares ideas for improvements. It emphasises participatory and people-centred development. It provides a helpful overview of the links between poverty and health. It is well illustrated with plenty of checklists, charts and diagrams.

The book costs £9.65 including postage from:

TALC
PO Box 49
St Albans
Herts
AL1 5TX
UK

Tecnologías Campesinas del Café

This is a series of small booklets in Spanish produced by CETEP in Venezuela. Titles include: *Varieties of Coffee, Selecting Beans, Propagation and Sowing, Pests and Diseases, Pruning* and *Marketing*. The booklets are aimed at small-scale producers wanting to produce good quality coffee. The language used is simple and the explanations are clear, with illustrations to help.

This is part of a wider collection of booklets on rural technology. CETEP is an independent, nonprofit-making organisation, aiming to support groups and organisations with technical information for grass-roots development.

Each pamphlet costs US $2 including airmail post. The series of seven pamphlets costs US $10 including airmail post. Please send cheques made out to CETEP. Order from:

Javier Vazquez
CETEP
Apartado Postal 9
Barquisimeto
Venezuela

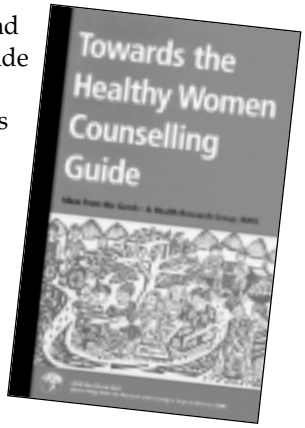
Tel/fax:
+58 51 313372

Towards the Healthy Women Counselling Guide

This book provides ideas on developing health materials for women. It is based on research with three communities in Kenya, Sierra Leone and Nigeria. Health clinics may often be almost totally concerned with family planning and child survival so women may not think of using clinics for other health concerns. Women often lack information about their general health. In addition, they are less likely to seek advice about their own health from medical staff, through lack of money, embarrassment or because they put their children's needs first. Their traditional knowledge of herbal cures and remedies is often ignored.

Information needs to be provided in ways which are appropriate and meet their real needs. The book considers issues which affect women's health and diseases and illnesses which cause them most concern. The research carried out in producing this guide reveals that many women disregard or ignore obvious symptoms of ill health because they are ashamed to see male doctors.

This very useful and well illustrated guide is available free of charge. See address below.



Mucoore (trusted friend) – Let's share with others!

This book is a follow-up to the above guide and looks at various ways of encouraging information sharing about gender and health issues. First it identifies health issues of importance to women. Then it uses ideas from role plays, radio scripts, stories and discussion starters as ways to pass on information on these issues. The book contains examples which can be adapted and gives useful guidelines for producing further material. This book will encourage anyone involved in communicating health messages to think more imaginatively about many different methods of effective communication.

These two useful books are available free of charge from:

The Gender, Health and Communication Teams
UNDP/World Bank/WHO
Avenue Appia
CH-1211 Geneva 27
Switzerland

Health Workers for Change

This is a very practical manual to be used in half day workshops or training sessions with health workers. It aims to help health workers look at their jobs and the way they do them. It helps them explore reasons for poor quality health care. It focuses on women. Each exercise has been well tested and contains useful comments and case studies. The manual is attractive with plenty of illustrations from Africa. The six workshops included should produce interest, enthusiasm and valuable information. There is additional information on ideas to help relax participants and improve communication.

This very useful and practical manual is available free of charge. Write, describing your work, to:

Special Programme for Research and Training in Tropical Diseases
UNDP/World Bank/WHO
Avenue Appia
CH-1211 Geneva 27
Switzerland

Se Prendre en Charge

An excellent series of cartoon strip books using cartoons written in Lingala with a French translation underneath. There are nine in the series, called *Taking responsibility for oneself*. They cover four different areas – hygiene, health, gardening and livestock – with subjects such as malaria, raising pigeons, ducks and rabbits, clean drinking water and growing beans. The cartoons are clear and bring the subject to life. Practical details are provided in both Lingala and French.

Write for more details or with a donation of 6 Belgian francs for each booklet (US $3 for the whole series) to:

Sister Rosario Zambello
BP 335
Limete - Kinshasa
Democratic Republic of the Congo
Central Africa

Malaria Control in Three Communities

This slide set with 47 slides gives details of different approaches to malaria control in Sudan, India and Thailand and concentrates on health education, self-help and community participation. The slides are easily understood by anyone concerned with malaria control, as they do not require medical knowledge.

They are available from TALC at the address above. Cost (including airmail postage): £15 ready mounted, or £12 self mounting.

Sample seeds

SETRO are a small, private tree seed centre who will supply small samples of seeds for rural development. They stock seed of a number of tropical forest species. They will provide small samples free of charge and at cost price for larger quantities.

Write with details of climate and vegetation to:

SETRO
PO Box 116
Siquatepeque
Honduras
Central America *Fax +504 73 0767*

Solar cooking in the Gambia

by Rosalyn Rappaport

Photo: Rosalyn Rappaport

OVER 90% OF PEOPLE IN THE GAMBIA cook on wood fires and must spend their income or time fetching wood. The country is semi-arid. Both forests and the open, dry woodlands are shrinking as the growing population chops down trees and burns charcoal to supply its cooking stoves.

The Gambia Renewable Energy Centre and the Methodist Mission Agriculture Program are working to promote solar cooking. Sam Davis, the MMAP director, persuaded thirteen women in and near Marakissa village to learn to use solar cookers and reduce their dependence on wood or charcoal. They, in their turn, could train others.

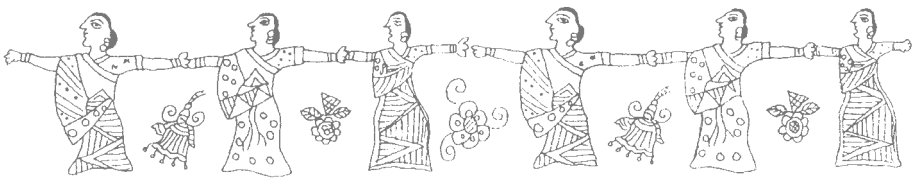
Visiting trainers demonstrated several different solar cookers, including the 'Kookit' and Box Cooker. The impact on the women when they observed a pot of water boiling was sensational. For the women, the possibilities were exciting and they formed a solar cooking club. But learning by trial and error can be frustrating and the technique remained an agreeable Sunday activity at first, not part of their domestic routine.

One problem was that the normal sized cooking pots tend to be too large to fit conventional solar cookers. Also there are no locally available 'crisp' plastic bags which are required by box cookers (see *Footsteps 21*).

The following conclusions were reached after the training sessions:

- Women will only be convinced of the benefits of solar cooking if they are encouraged and supported in experimenting with cooking methods. Demonstrations by 'outsiders' will achieve little. The policy of working closely with a small group of women over time and then using them to train others is ideal.
- Solar cooker designs must be easy for local craftsmen to produce and cheap to buy.
- Women were very quick to understand the techniques of solar cooking, the limitations and possibilities. They needed support to find the right design and to experiment.

Rosalyn Rappaport is an author who has worked as an extension agent with USAID and as a horticulturist in Zambia and Mauritania.



A support system for women

THE MAHILA SAMAKHYA PROGRAMME of Bihar, India, began in the late 1980s with the aim of empowering women. In the state of Bihar, seven out of ten women are unable to read and write. The caste system is very strong. In addition, the ratio of women to men which used to be 1,060 to 1,000 is now only 911 to 1,000 – showing an alarming rise in the death rate of women.

The Mahila Samakhya aims to encourage the education and confidence of poorer women. *Sahayoginis* are selected and trained by Mahila Samakhya. They are then responsible for ten villages in their area and encouraging groups to form.

Each small group of women is known as a *samooh*. Their growth has been slow and not without problems. Sometimes the men are very opposed to the samooh. But gradually most samoohs begin to take shape. Meetings become regular, more women come, their confidence in each other grows and they discuss more issues. Gradually the samooh becomes a second home for the women. From among the members they will select one or more animators to become *sakhis*. Over time, they tend to take over the role of the sahayoginis more and more. Training and information is shared through the movement. There is the opportunity for literacy training, women's opportunities and potential are developed and a deeper understanding of women's issues and rights is shared.

Roshana's story

'We always felt that we were destined to suffer shame, discrimination and hunger because, besides being women, we are the poorer, small people of the village. The 'big' people controlled us in every way. We were afraid of them.'

As a widow, Roshana knew this only too well. A landlord had forcefully occupied her treasured piece of land, forcing her to return to her parents for her survival. The sakhi, who had just returned from her training, met Roshana and promised her support if she would just come to the samooh meeting and share her troubles with all the samooh members. Roshana was only too happy to find a group of willing listeners. The samooh women gave so much courage to Roshana that she sowed peas on her land with a view to reclaiming it.

As the peas were ready for harvesting, the landlord's men came to harvest the crop. Roshana pleaded with them not to touch her crop. But they abused and assaulted her.

Photo: Ian Stillman, Tear Fund

The samooh women were informed. Quickly they organised themselves, moved together into the field and stopped the harvesters. They filed a case in the police station against the landlord. He had arrived there before them and had managed to accuse many of the samooh members' husbands in a false case. However, the samooh members were brave and very determined and won their case. A few days later they harvested Roshana's crop safely.

*'What I got back is not just my land, but a second **life**… I will never leave this samooh,'* says Roshana.

A growing movement

The samooh is the basic building block of the Mahila Samakhya. It is not only a physical shelter to share their fears and experiences – it is also a powerful tool for discovering their inner strengths and realising their hopes. There are now well over 1,000 samoohs in Bihar State, with over 25,000 members and over 1,500 trained sakhis. The issues which they have supported include:

- primary education in the villages
- enrolling and keeping girls in the school system
- encouraging health care
- drinking water
- action against sexual harassment
- credit and loan schemes
- action against bribes and corruption
- action for environmental protection
- skills training, such as building, screen printing and hand-pump maintenance.

Mahila Samakhya
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Editor: Isabel Carter, 83 Market Place, South Cave, Brough, East Yorkshire, HU15 2AS, UK