

Caring for the environment and for people

by Stanley Baya

The Arabuko-Sokoke Forest in Kenya is what remains of an East African coastal forest which used to extend from Somalia to Mozambique. It is now only 40km long and needs urgent international protection. It holds many plants, animals and birds, like the wonderfully named Golden-rumped Elephant Shrew, which are at risk of dying out. It is a very beautiful place. Within its shrinking boundaries there is an almost unimaginable diversity of life. If the forest disappeared, a whole treasure-house of species would disappear too. This fragment of remaining coastal forest is truly important.

Since the Kenyan branch of the conservation organisation A Rocha started in 1998, the team has included local people who work alongside volunteers and visitors from wealthier places. Together they began to look for solutions to prevent the destruction of the forest by local people for their livelihoods. They found that experts said

different things. Some said that it was more important to protect the environment, and others said it was more important to help local people out of poverty. This suggested a conflict between the environment and the people. However, A Rocha studies were showing that the forest was closely related to the well-being of the creek that

supported local fishing, the local climate that was essential to the crops being grown and the soils on which the planting was done.

After a long process of consultation, the team finally began to understand why the forest was being destroyed. Drawing on the hard-won trust of their local friends, they learnt that most of the wood was being cut to fund secondary school fees. Everyone knew that education was the only way for any family to find its way out of poverty. Only one out of ten children who gained the necessary grades was able to continue from free primary schooling to secondary education because of secondary school fees.

To satisfy the urgent needs of the people and the forest, in 2001 the A Rocha team began a programme called ASSETS – the Arabuko-Sokoke Schools and Eco-Tourism Scheme. The idea was simple. The programme trained local guides to work with the hotels in nearby Watamu so that tourists could visit the forest for a small fee. The United Nations Development Programme and other agencies provided



Tourists using the Mida Creek hanging walkway, which was built to raise funds for sending children to secondary school and to communicate a strong commitment to conservation.

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Footsteps

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Footsteps is free of charge to grassroots development workers and church leaders. It is available in English, French, Portuguese and Spanish. Donations are welcomed.

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

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Steffen Forster

Sokoke Scops Owl *Otus irenae* – one of the most endangered species of bird found in Arabuko-Sokoke and Africa's smallest owl.

start-up funds for a tree-hide and a spectacular walkway out through the mangroves at Mida Creek. Through this project the forest and the creek has become the basis for a business providing sustainable income. Tourists enjoy seeing such amazing places and the money they spend is directed to providing secondary school fees for local children.

Now two hundred children are in secondary school and an extensive re-forestry and education programme is going on in many of the villages around the forest. People

have understood that Mida Creek needs the secure rainwater supply from the forest to survive. The creek's mangrove fringes, once cut for wood, are now secure as nurseries for the fish species on which local people depend for their protein.

In their minds, and now in ours, it all holds together in the way that God intended. At first it is difficult to see the connection between school fees and the survival of the Sokoke Scops Owl, but we now understand that human prosperity goes hand in hand with the well-being of the wider creation.

Stanley Baya, Co-ordinator

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This story is also told in Kingfisher's Fire: A story of hope for God's world by Peter Harris.

A Rocha is an international conservation organisation working to show God's love for all creation. A Rocha currently has conservation projects in 19 countries around the world.

Website: www.arocha.org

EDITORIAL



*Helen Gaw
Editor*

'The earth is the LORD's, and everything in it, the world, and all who live in it.' (Psalm 24:1)

There is a rich diversity of life on this earth. In editing my first issue of *Footsteps* I have learnt about plants and animals that I had never seen before. The conditions for life are finely balanced. We rely on natural resources constantly. Those of us who live in towns and cities are often less aware of this than those in rural areas and forget that we may be damaging natural resources, for example by contributing to pollution.

The opening article shows that we do not need to choose between helping people and looking after the world we live in. By caring for the environment, we can care for people too. When we are affected by changes to the natural resources we use every day, there is hope: we can find

solutions that improve our relationship with the environment. This is a theme throughout many of the articles in this issue.

On the centre pages, there is a step-by-step process for community facilitators, which demonstrates how everyone can be involved in managing shared natural resources. We share new ideas for rainwater harvesting (page 4), a training method for increasing biodiversity on farms (page 10) and a framework for understanding and responding to the linked threats of climate change, environmental degradation and natural hazards (page 12).

One day the earth will be fully restored. As we continue in hope, we continue in our responsibility to care for the earth.

The next issue will be an update on the Millennium Development Goals.

Helen



Michael David

Processing herbs in the SOLAI centre.

Natural resources and livelihoods

by RT Rajan

'We have not inherited the world from our forefathers but we have borrowed it from our children'. This Kashmiri proverb emphasises our responsibility to look after nature in all its diversity. Human intervention in nature has caused pollution, contributed to climate change and led to the unsustainable use and destruction of natural resources.

Excluded communities

Poor communities who are traditionally self-employed and dependent on natural resources for their livelihoods are often the worst affected by climate change and environmental degradation. Their culture is based on genuine love towards nature and they live close to nature. They are often overlooked by development organisations and government. Existing human rights provisions have not adequately covered them.

Marginalisation and market forces

In our experience, labour groups dependent on natural resources have difficulty gaining access to capital, knowledge and information, local infrastructure and facilities for processing raw materials such as herbs (pictured above) and production and marketing. The increasing availability of technology means that their labour is undervalued. As a result they often have

to sell their primary products at a loss when they need income urgently. They then find it increasingly difficult to meet their basic needs such as food, health, housing, literacy and water.

Finding solutions

We need to focus on environmental sustainability, adapting to climate change, conservation and finding solutions that:

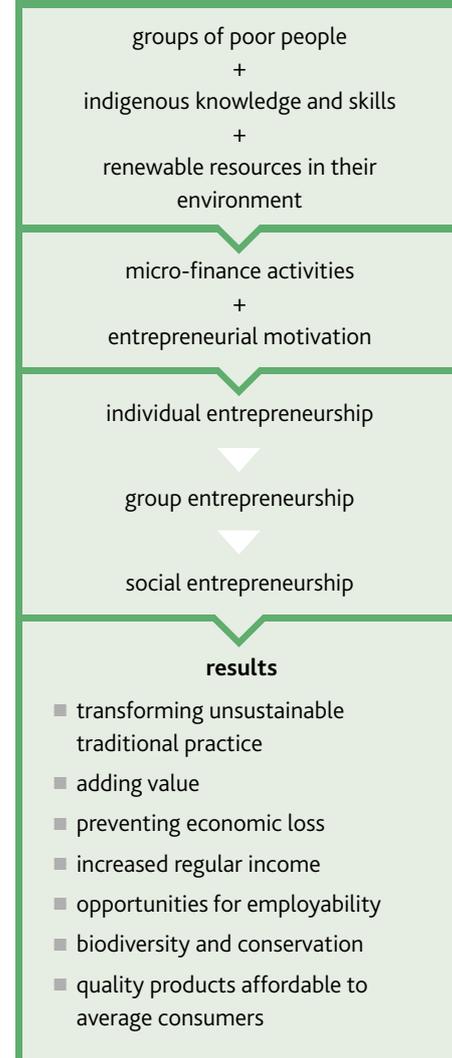
- protect the environment
- protect and develop livelihoods
- are acceptable to the people affected.

These solutions should enable poor communities dependent on natural resources to:

- protect the resources they depend on for income
- understand the market for their products
- earn a predictable income.

SOLAI (Social Life Animation India) has started a new project to address the major issues in the local environment and to develop a natural resource-based livelihood model. SOLAI offers training and advice that helps individuals and groups to develop and sell products while protecting their natural resources. Micro-finance programmes create capital and SOLAI offers access to facilities for processing raw materials. The model is pictured below. It can be adapted and used by others.

How the model works



RT Rajan is the Director of the SOLAI Programme.

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New ideas for rainwater harvesting at home

by Murray Burt

In rural areas, the main water sources are normally groundwater borewells or surface water, rivers and lakes. However, an often overlooked, easily accessible and sustainable source of safe drinking water during the wet season is rain. In tropical and sub-tropical climates the quantity of water collected from rainfall can be substantial.

There are clear advantages to rainwater harvesting at home:

- improved health
- easy access
- low cost
- it is easy to manage.

Traditional rainwater harvesting

Traditional methods of rainwater harvesting used in Uganda and Sri Lanka include rainwater collection from trees, using banana leaves or stems as temporary gutters. Up to 200 litres may be collected from a large tree in a single storm.

Rooftop rainwater harvesting

Very low cost domestic rainwater harvesting systems can be easily installed on most corrugated iron or clay tile rooftops in rural and urban areas, using various forms of guttering, first flush diverters and plastic or ferro-cement tanks for collection and storage.

Rainwater harvesting without rooftops

However, in some rural areas most people live in simple thatched roof structures, which are not suitable for traditional rainwater harvesting. Tearfund has therefore researched and tested an innovative and

Case study – Omdurman, South Sudan

Plastic sheeting, together with other locally available materials, was used to catch rainwater and channel it into suitable collection containers. All the materials used were available locally, including storage containers, which in many cases were locally-made clay pots.

Several designs were tested. The most successful design involved simply tying a plastic sheet at its corners to four poles buried in the ground. Water was then channelled into collection containers, positioned either at the edge of the sheet, or under a hole at the centre of the sheet (see picture on opposite page). Women, men and children took part in designing new methods. Children, who often bear the burden of water collection, came up with some of the most innovative methods, which were then tested.

During testing, an 8m² plastic sheet collected 70 litres of water during a 30-minute period of rain. Based on average monthly rainfall for Juba, the nearest major town in South Sudan, the average amount of rainfall that could be harvested from an 8m² plastic sheet would be 30 litres per day during the six months of the wet season. This would provide enough drinking water for a family of six during the wet season, based on 5 litres each per day.

One environmental challenge was strong winds which often occur before rainfall. The winds sometimes made the lightweight plastic sheet structures unstable. As a result, some changes were made to strengthen the structures. For example, each edge of the plastic sheet was attached to timber poles, which were attached at an angle to the vertical poles in the ground.

Following the demonstrations, many community members constructed similar systems at their homes. This meant that a high proportion of the community was collecting rainwater as a primary water source during the wet season. Following training, some members volunteered to spread knowledge about rainwater harvesting to neighbouring communities.



Very low cost rooftop rainwater harvesting using corrugated iron roof, hard plastic pipes and ferro-cement jars for storage at a home in Cambodia.

simple 'ultra low cost' way of harvesting rainwater without using rooftops.

Using plastic sheeting

In many populations on the move, especially in emergency and post-emergency situations, plastic sheeting is a basic commodity that many households own. It is either given through distributions at refugee camps or camps for internally displaced persons, or purchased on the local market. Plastic sheets are used for many purposes including as shelter for homes or shops. They can also be used for rainwater harvesting. Calculations based on rainfall data from Colombo, Sri Lanka,



Rainwater harvesting off the roof of a latrine in Cambodia, using an old soft drink bottle, hard plastic pipe, corrugated iron and a brick storage tank. This concept is especially useful as it provides water for hand washing right at the door of the latrine.



Ultra low cost rainwater harvesting system in Southern Sudan, using a plastic sheet, wooden poles and plastic jerry can.

show there would be an average daily yield of more than 60 litres over six months of the year from rainwater harvesting using an 8m² plastic sheet for collection.

Designing your own rainwater harvesting system

Using plastic sheeting is one option for rainwater harvesting without using a roof. Other locally available materials can also be successfully used, such as single corrugated iron sheets and cloth.

There are no rules for construction. Think of new ideas using whatever materials you have available to catch and collect the rainwater. The principle is always the same:

Catch the rainwater on a clean surface before it hits the ground, and channel into a clean collection container.

Scaling up

It is easy to scale up rainwater harvesting systems. In emergency situations, rainwater harvesting can be made available to all and can even contribute as a significant water source in large communities and camps. Remember to promote good hygiene at the same time, making sure that each part of the system is clean. Cover the water container and make sure the stored water is not removed by dipping hands or scooping using dirty cups or other dirty

What people said

'Rainwater tastes clean; it has no smell.'
(Agul Tour, 19 years, at Omdurman Market demonstration)

'We are coming out of war ... we are happy to learn how to harvest water ... we are open to new ideas.'
(Marc Tuc, 60 years)

'I tasted the water at the church. It was good – it is the kind of water that does not make one sick.'
(Nyibol Ngor, 17 years)

'The community is happy about rainwater harvesting as they now will have more water to use, especially during the dry season.'
(Daniel Aleu, 25 years)

items. Rainwater which has been stored for a long period may require disinfection. Protect water containers with a screen to stop mosquitoes breeding and keep out sunlight to prevent the growth of algae.

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First flush diverter for rooftop rainwater harvesting

What is a first flush diverter?

Contaminants (eg dirt, insects) from a roof are usually concentrated in the first few minutes of flow off the roof. After this runoff has passed and washed the roof, the water is much cleaner. A 'first flush diverter' simply diverts the 'first flush' of contaminated water away from the container, and then allows the rest of the rainwater to be directed into the container. (See diagram.)

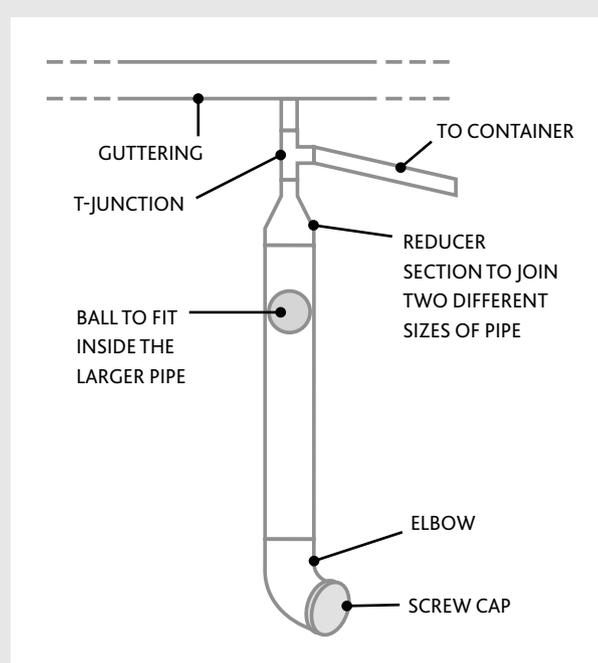
How it works

The first rainwater will fall down into the downpipe and the ball will float on top and rise with the water up to the reducer section. This reducer section will stop the ball from rising any further and will keep small debris from the roof inside the downpipe.

The falling rainwater will then be directed into the container.

At the end of the rainfall, the screw cap at the end of the elbow pipe should be removed to let out the water in the downpipe. The ball will drop and the screw cap should be replaced ready for the next rain. The container should be covered with a lid large enough so that the container can be drained and fully cleaned every so often to ensure the quality of the water being used.

If you cannot find a ball and a reducer pipe, you can just use a downpipe, which removes the larger dirt but not floating items like leaves. Cover the top of the downpipe with mesh to catch items like leaves and ensure the mesh is cleared regularly.



Growing vegetables on limestone and corals

Thank you very much for continuing to send issues of *Footsteps*. I would like to assure you that I enjoy very much reading the publication, and have been greatly enriched by it. Just as an example, in 2003 I was working at my church head office in the Western Province of Solomon Islands. In one particular issue [*Footsteps* 54] I read about a farming technique for soil that is not suitable for planting. My wife and I always plant vegetables outside our house but there was practically no top soil there – only corals, limestones and stones. We followed the instructions in the issue and soon we had what we called the ‘green refrigerator’ at the back of our home. Our backyard vegetable garden became an attraction and learning opportunity for the many people all around us. A dentist from the area who worked at the church hospital visited our home once and was so surprised to find vegetables growing on limestone and corals. He then inquired if my wife and I had such strong faith or if we had some kind of magic or new planting technique! We basically told him the truth.

So thank you and I look forward to receiving future issues of the publication.

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Managing mangoes successfully

In the majority of places in the north west of Benin and in Ouaké in particular, the mango tree is the third most common plant after the *nére* and the *shea* trees. During March, April and June there are mangoes absolutely everywhere. These mangoes begin to rot after a few days and cause huge health problems in the community.

I have heard something about drying mangoes. If other *Footsteps* readers know about this concept I would be really pleased to pass on their experiences to the people of Ouaké. I would like to receive



Geoff Crawford / Tearfund

ideas, advice, and training, not only to better manage our fruit but also to increase the income of our good people.

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EDITOR'S NOTE *In Footsteps 21 there are instructions for how to dry mangoes. You can find this article on the tilz website.*

Moringa, yam and yukka

I would be grateful if any readers would kindly tell me how to obtain technical information and costs for moringa, criollo yam and yukka.

I need information regarding:

- agricultural studies
- fertilisers
- ecological pesticides
- yields per hectare / year
- consultancy.

Ing. Armando Lau
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EDITOR'S NOTE *Footsteps 20, 28 and 46 share information on the uses of moringa. Visit the tilz website to find out more.*

Technology for biogas

I am a trustee of a small charity, Health Aid Moyo, which helps mainly in the supply of medical equipment, training and general aid to church hospitals in Malawi, notably in Chilambwe, Likoma, Nkhotakota and

Malindi. Over the years we have realised that problems with cesspits could be turned into a benefit by the production of biogas. We know something of the technology but have not been able to find local sources of equipment and expertise. We would be most grateful to learn from the experience of *Footsteps* readers or contacts in Malawi.

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EDITOR'S NOTE *Please turn to the Resources page for sources of information about biogas.*

Studying people and plants

I am working on ethnobotanical studies concerning the tribal people of the Terai region of Uttar Pradesh, India. I would like to write a book on contact therapy practices. If anyone is able to provide me relevant information or literature support, please contact me.

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EDITOR'S NOTE *Ethnobotanical studies look at how a people of a particular culture and region make use of plants which have always grown locally.*

Migration

I am involved with the issue of migration at a grassroots level and would be happy if a like-minded reader who shares this concern wishes to correspond with me.

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Fuel efficient stoves

Deforestation is a major problem in Malawi because wood and charcoal are the main sources of fuel for cooking. Fuel efficient stoves provide a practical alternative to traditional cooking methods.

Fuel efficient stoves have many benefits. Households that use them:

- spend less money on firewood
- spend less time finding firewood
- protect their health by producing less cooking smoke
- help prevent deforestation
- protect natural resources
- protect habitats of plants and animals.

There are many designs of fuel efficient stoves. The clay stove pictured below directs the heat to the pot, resulting in faster cooking. Stoves can be made entirely with local resources and are cheap to produce.

Fuelless cookers can be used to further reduce the use of firewood. Just cook a pot of rice for five minutes or a pot of beans for 20 minutes on a clay stove, then place the hot pot inside a basket insulated with shredded banana leaves or straw until the rice or beans have finished cooking.

Andre Van Woerden works for Emmanuel International, an organisation which makes and promotes fuel efficient clay stoves in Malawi. Email: alexandre.vanwoerden@gmail.com

EDITOR'S NOTE *The article 'Cooking without fuel' in Footsteps 16 shows how to make your own fuelless cooker.*



Fuel efficient clay stove promoted by Emmanuel International. The pot sits on the top of the clay stove and the fire sits inside.

Natural resource management

by Judith Collins

In the past, the way in which people living in the Mosquitia region of Honduras used their natural resources had little lasting impact on the area's vast expanses of forests and wetlands. However, rapid population growth, the influx of new colonists and a gradual move from subsistence to a market economy are all putting pressure on the area's fragile ecosystems. Current problems include deforestation, over-fishing, over-hunting, erosion, and soil and water pollution.

Community identification of the problem

For a long time, local leaders had recognised that the over-use of natural resources was threatening the health, welfare and even the survival of their communities. However, a series of workshops, facilitated by Tearfund partner MOPAWI, helped the communities to work out for themselves what the nature and scale of the threat was.

Men, women and children from 15 different communities – as well as representatives from local organisations and authorities – worked together to develop an action plan for the rational use and conservation of their shared natural resources. They used the six steps shown on pages 8–9.

Community action

Since the workshops, various community groups have carried out different aspects of the plan. For example:

- Erosion along the edges of lagoons is being tackled by replanting mangroves and other tree species.
- Wherever possible, rubbish – which used to be thrown onto the ground, burnt or buried – is being reused, recycled or composted. The compost is used to grow vegetables; a new activity for many local residents.
- To protect water quality and improve community health, basic sanitation issues are being addressed through health education in schools and the construction of latrines.
- Farmers have been trained in the use of sustainable agroforestry techniques.
- Local groups have been lobbying local and national government officials for greater application of the law, particularly in relation to extraction of timber, fishing, hunting and the influx of new colonists into the area.



Steve Collins

Local college's tree nursery for reforestation of mangroves on lagoon shore.

Lessons learnt

It is important to have:

- **sensitive and experienced facilitators** who can successfully guide the process without imposing their own ideas
- **a high level of community participation**, resulting in empowerment and a feeling of ownership
- **the involvement of local organisations and authorities** such as schools, health centres, police, local government and agencies responsible for the protection and/or management of the area's natural resources
- **plenty of time** for participants to discuss and analyse the interconnected historical, cultural, spiritual, social, and economic issues affecting the use of their natural resources
- a group of people who are responsible for the overall **co-ordination, monitoring and evaluation** of the action plan. This group might also be involved in activities such as fundraising and lobbying.

See pages 8–9 for the process, which you can adapt and use in your community.

Develop a community action plan for shared natural resources

STEP 1

Thinking about the local area

For most of the activities/questions below, arrange the participants into small groups of five or six. You may decide to split the participants into groups of men, women and children as their answers will reveal a lot about their differences in perspective. After each activity ask the groups to present their ideas and allow plenty of time for general discussion.

- Draw a map of the geographical area. Include key points of interest/importance. What are the geographical limits of the focus area?
- What natural resources/ecosystems are there in the focus area? If you haven't already done so, mark them on the map.
- How are these natural resources used by the men, women and children in the area?
- Are there any traditional beliefs and/or myths associated with these natural resources?
- What is happening to these natural resources?
- Are there any conflicts associated with the use of these natural resources?
- Are there any problems of pollution (water, soil, air) in the focus area? Mark them on the map.



Thinking about the local area: woman presenting map for Step 1 at workshop
Photo Judith Collins

STEP 2

What do we need to manage and protect?

Bring everyone together and ask: which of the natural resources present in the focus area are most important in terms of usefulness and the need for more careful management / conservation?

In groups of two, rank the listed resources in order of importance (eg if there are 10 natural resources in the list, a score of 10 should be given to the one thought the most important followed by 9, 8 etc so the least important is given a score of 1). Add all the scores together to produce a ranked list.

In the following example, mangroves, broadleaf forest and dune vegetation – and possibly manatee – would be chosen as things that need managing and protecting as a priority. These are called conservation objects.



Broadleaf forest from above.

Photo Steve Collins

Natural resource	Rank
Mangroves	53
Broadleaf forest	24
Dune vegetation	22
Manatee	18
Fish of the lagoon	12
Water of the lagoon	4
Rivers and streams	2

STEP 3 What are the threats to the conservation objects?

Form small groups and ask each group to talk about one of the priority conservation objects. Ask them:

- What are the most serious threats to the conservation object?

Avoid talking about the causes of the threats at this point, just focus on what is actually happening to the conservation

object. For example, the threats to the broadleaf forest might be: forest clearance; removal of mature trees; reduced length of traditional fallow period.

Ask each group to prioritise up to three of the threats and write them on coloured pieces of card. These cards can then be stuck onto a large piece of paper, as shown opposite.

STEP 4

What causes the threats?

Ask the same groups:

- What are the causes of destruction or degradation of the conservation object? (human activity or natural phenomena)

Write the answers on pieces of card and add them to the diagram, as shown opposite.

STEP 5

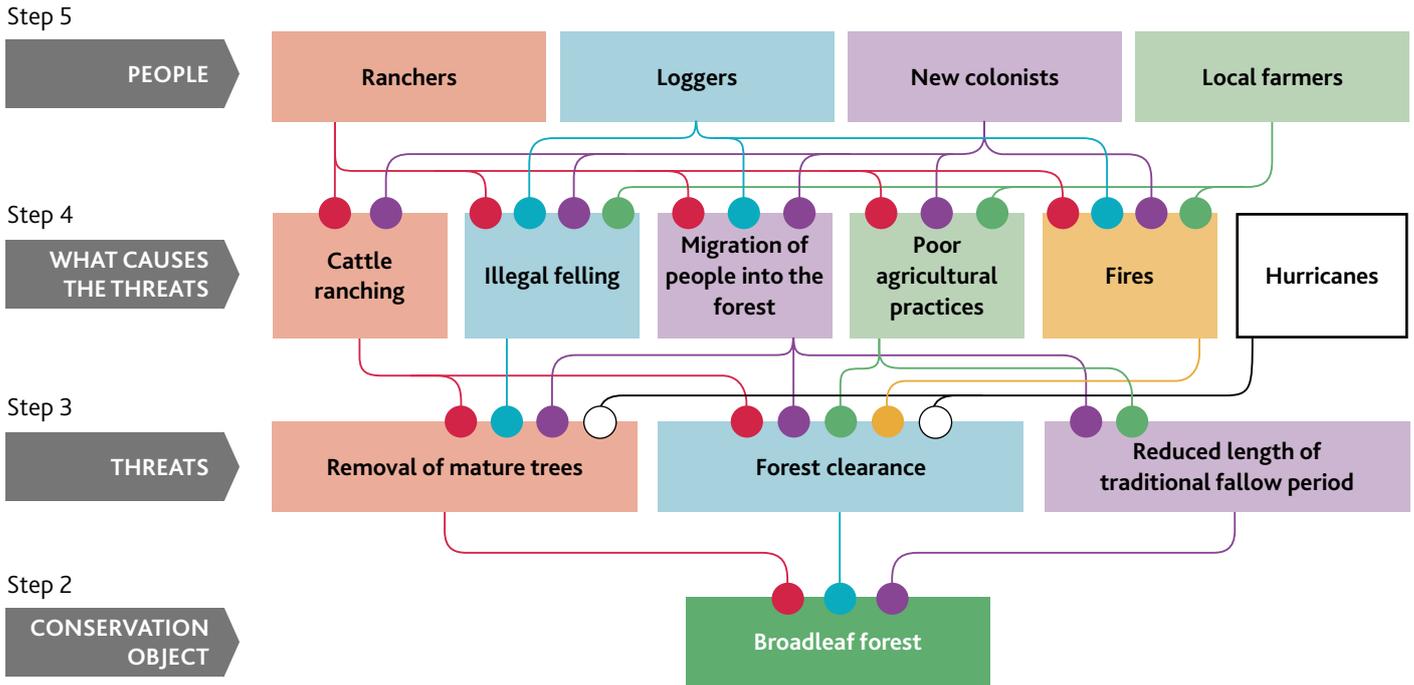
Who is responsible for the threats?

Ask the same groups:

- Who are the main groups of people causing this destruction and degradation?

Write the answers on pieces of card and add them to the diagram, as shown opposite.

LOOKING AT BROADLEAF FOREST AS AN EXAMPLE OF THE PROCESS



STEP 6 Development of a community action plan

Ask the groups to fill in the table below for their conservation object, using the 'trees' of coloured card they have developed.

Although this seems like a big task, by this stage the participants will have thought deeply about each aspect of the problem and will find it surprisingly easy to fill in the table. The strategies and activities should not only take into account the threats and causes of the threats, but also the people responsible, aiming to involve them in

tackling the problem wherever possible. At this point, think about any previous initiatives in order to learn from their failures and build on their successes.

Now put together the tables developed for each conservation object. You will have a community action plan for the rational use and conservation of the most important (and/or most threatened) natural resources in the focus area.

BROADLEAF FOREST AS AN EXAMPLE

Threats	What causes the threats?	People	Ways to reduce the threats	Activities	People responsible for each activity
eg Reduction in traditional fallow period	Poor agricultural practices Migration of people into the forest	Ranchers Colonists Local farmers Loggers	Train farmers, colonists and ranchers in more sustainable agroforestry techniques etc	Run a series of training events in ten different communities Establish demonstration plots on five different farms Etc	Local NGO Local farmers' co-operative with technical input from local NGO

Glossary

agroforestry growing crops and trees together so both benefit
colonists people connected with another region or culture who settle in an area
conservation object a species, a group of species, an ecosystem or a habitat identified as needing conservation
ecosystem communities of plants, animals and other living things, together with the

non-living parts of the environment such as rocks and weather, which together form a working system
manatee marine mammal sometimes known as a sea cow
mangroves tropical evergreen trees and shrubs that can survive and thrive in saltwater coastal areas

MOPAWI is a Christian NGO dedicated to the integrated human development and conservation of the Honduran Mosquitia.
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 Website: www.mopawi.org
 Judith Collins was seconded by Tearfund to MOPAWI as an environmental advisor between 2000 and 2005. She is currently a freelance consultant and technical editor.

The six steps were adapted from an approach called 'site conservation planning' developed by The Nature Conservancy, www.nature.org

Training farmers in biodiversity

by Sam Rich

Sitting under a mango tree with a small group of Ugandan farmers eight years ago, I thought I had found the perfect placement as a volunteer. We would discuss the relative benefits of chilli pepper and onions as insect repellents one week and various designs of fuel-saving stoves the next. Working for a small NGO (non-governmental organisation), talking to farmers every day, using participatory methods to help them find solutions to their problems, and seeing small improvements week by week, was an experience I'll never forget.

But I soon realised two things:

- there was a huge demand for this kind of basic knowledge
- this demand was never going to be met by teaching small groups of farmers under mango trees.

I needed teaching materials to help these messages reach a bigger audience, and to enable farmers to teach themselves. But all I found were lengthy black and white textbooks with too few illustrations and too much technical language. Teaching materials seemed to be designed more for scientists than for farmers.

Since arriving in Uganda, I had been impressed by the educational campaigns about HIV. On the roadside, there were colourful billboards showing condoms, and in bars and restaurants there were posters about faithfulness and abstinence. You could see how the country had become a success story by halving HIV prevalence in ten years.

I began to wonder why agriculture and livelihoods were not getting the same attention as HIV and the health sector. Why were there no billboards about growing fruits and vegetables? Why were there no posters about making compost

and mulching? And that was the moment I realised I wanted to try to do for agriculture what had already been done for HIV.

The design process

I set up Fourthway in 2004 to publish teaching materials for farmers that were the same standard as those in the health sector. The original idea was to design materials demonstrating simple techniques to improve yields that would cost farmers nothing. The first prototypes (draft versions) showed how to make compost, liquid manure, and simple organic pesticides. They were designed with lots of pictures and few words to make them easy to understand.

We took our rough prototypes around some local Ugandan NGOs. Their first reaction was one of surprise: *'We've never seen anything like this before, but I can already tell you we need these a lot,'* said one. *'You mean we're allowed to suggest changes?'* said another. It sometimes took a while to explain that we wanted to develop materials in participation with the NGOs.

Working with NGOs gave us practical and technical expertise. Extension workers also made the following suggestions:

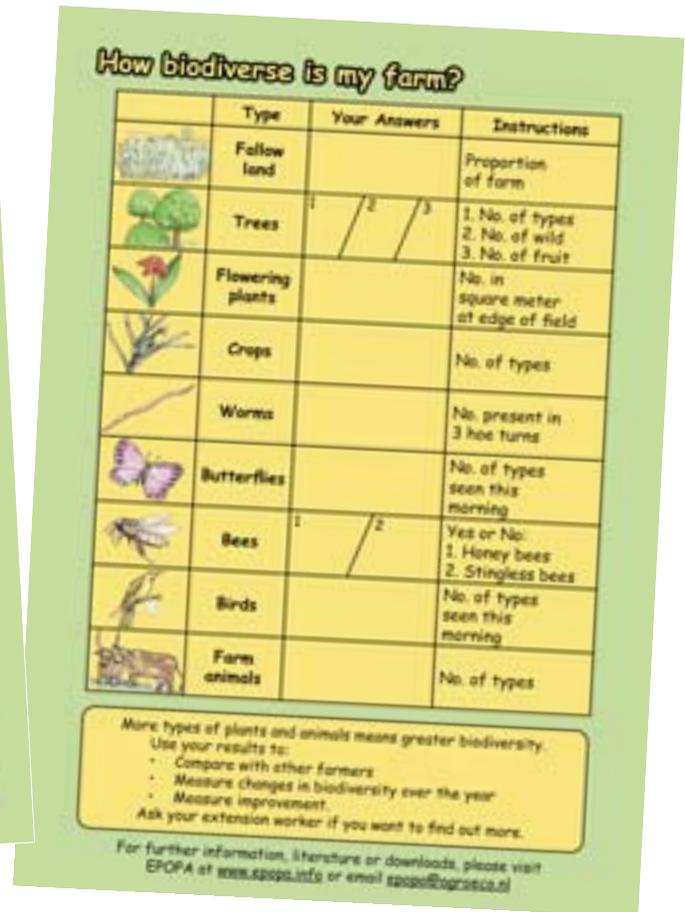
- make posters instead of books – things that can be pinned up and be seen everywhere
- make them look modern, to challenge the idea that agriculture is old-fashioned.

Further development with farmers helped us to simplify instructions. They told us to include photos and quotations to show how the posters were rooted in real-life practice.

Since 2004, this cycle of development has continued. We produce prototypes, test them with extension workers, and then with farmers. We have produced hundreds of thousands of posters around East Africa for government and NGOs. Mass production has enabled us to keep costs down. Five years on, some health-related organisations are coming to look at agriculture for new ideas in design.



A farmers' workshop using one of the posters.



Biodiversity and organic farming leaflets

We developed a range of materials on biodiversity with EPOPA, an NGO working with organic farmers in Uganda. We started the project because we wanted to demonstrate that biodiversity is important and not just a Western agenda aimed at African farmers. For farmers who had already adopted organic practices, the aim was to demonstrate the connection between organic farming and biodiversity.

Understanding biodiversity means understanding how a farm runs as a complete system. A farm needs insects and birds as well as crops and animals. For example, one farmer we came across decided to start growing his coffee under a net. Only when he failed to get any yield in the following season did he realise that the net had stopped bees from pollinating the coffee flowers, and ruined his harvest.

Just as we need insects for pollination, we need birds to eat caterpillars and other pests on our plants.

We drew a 'food web' to show that biodiversity means seeing the farm as a

system of interlocking organisms. Just as the food web shows how insects and animals relate to each other, a 'soil web' would show how plants absorb nutrients in the soil, but also return them to the soil as nitrogen fixers, or in manure, mulch, compost, or ash.

Once farmers could see how the systems work, they wanted to find out how biodiverse their own farms were. We developed a simple biodiversity scoresheet to allow farmers to measure this, and compare one farm with another.

In the future, this kind of biodiversity scoresheet may provide a direct financial benefit to farmers. At the moment, organic farmers are paid more for their produce than non-organic farmers. In the next five years, farmers may also be paid more for produce that comes from biodiverse farms.

Sam Rich has set up a consultancy to design and publish teaching materials for farmers all over East Africa.

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You can find the full range of posters (and even the Organic Game) at:
<http://fourthway.co.uk/posters/index.html>
Email Sam to buy copies or find out more. A set of nine A2 posters (twice the size of an open copy of *Footsteps*) costs US \$9 or €6, plus postage and packing.

We wanted to demonstrate that biodiversity is important and not just a Western agenda aimed at African farmers

Adaptation – protecting natural resources

Compiled by Bob Hansford

Natural resources are essential for all of us. Every time we prepare a meal, we use natural resources. For many of us, trees, bamboo and grasses provide the raw materials for housing. Natural vegetation feeds our cattle, natural fibres clothe our bodies, wood and coal provide much of the energy for lighting and heating, and wild plants are the source of herbal medicines. Perhaps the most precious resource of all is water – for drinking, bathing, cooking and agriculture.

Natural resources include all plants, animals and insects, as well as the non-living world. The complex interactions between them are essential for sustaining life. God has created an intricate web of relationships between all these parts of creation, each dependent upon many others. People are caretakers of God’s world. If we abuse our position and misuse or destroy one resource, such as water or an animal species, we damage the sensitive balance of all these systems.

And yet these resources are under threat. Some scientists tell us that over a third of all plants, animals and insects are at risk of extinction, with over 70 per cent of all plant species threatened. By the year 2025, around six billion people will be living in countries facing water shortages. Each year, an area of forest the size of Bangladesh is destroyed. Areas which were previously productive fields, dense forests or cattle grazing areas will change into unproductive desert. Many more countries will suffer food shortages and poor people will be worst affected.

Why are natural resources under threat?

- climate change
- environmental degradation
- natural hazards.

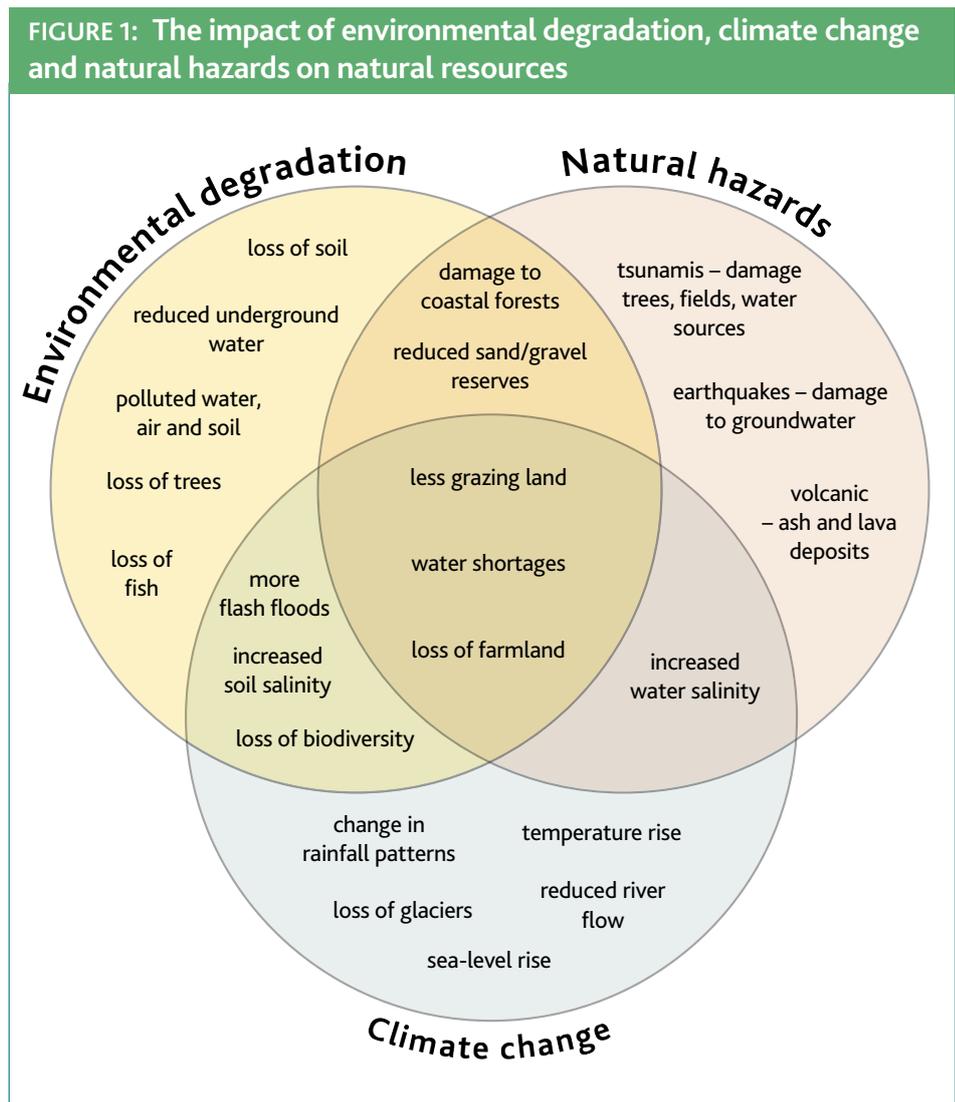
CLIMATE CHANGE is leading to more frequent and severe weather events, such as wind-storms. It is also leading to big changes in rainfall patterns, causing floods and droughts. The growing conditions for plants and food crops are changing – some will adapt and survive, others will disappear. This is undermining livelihoods (eg farming), forcing people to move to

vulnerable locations, or forcing them to exploit natural resources to survive (eg by tree cutting).

ENVIRONMENTAL DEGRADATION is mostly man-made and due to the over-exploitation or pollution of natural resources. For example, the excessive removal of underground water by farms and factories, the over-extraction of

minerals and the pollution of water courses will all affect the environment. Cutting down trees reduces the ability of soil to absorb heavy rain and reduces the land’s ability to support natural vegetation.

NATURAL HAZARDS, both weather-related (eg floods, cyclones and droughts) and geo-physical (eg earthquakes and volcanoes) have always been present. When natural hazards affect a vulnerable population, disaster is the consequence. Around nine out of ten disasters are related to the climate. Some of these hazards have a devastating impact upon natural resources: cyclones flatten trees, tidal surges pollute fields and ponds with salty water, and drought takes away water-holes and pasture for cattle. (See figure 1.)



So what can be done? Natural resources can be protected and conserved in various ways:

PERSONAL RESPONSIBILITY

The fate of our natural resources lies partly with each of us, in the day to day choices we make. We can live as responsible caretakers, minimising our use of resources and avoiding damage and exploitation. We can do this whether we live in a rural area, a town, or a city. To protect our local environment, we can:

- use a fuel efficient stove
- use a different fuel in place of wood
- use a bicycle instead of a car for short journeys
- grow trees and vegetables
- start composting
- collect rainwater.

PROJECT IMPACT ASSESSMENT

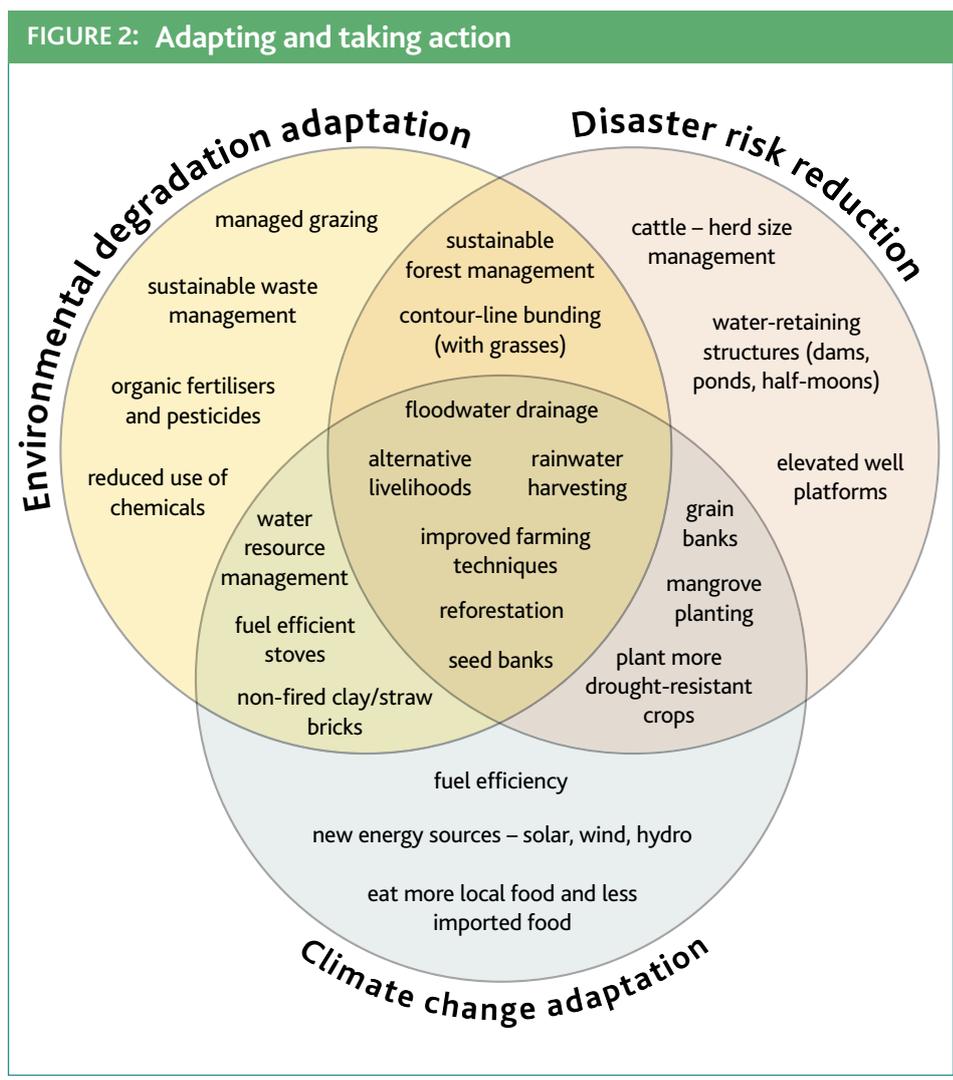
Several guides have been produced for development workers to help measure the likely impact of project activities upon the environment, including upon natural resources (see the resources page for more information). By careful project design, we can ensure that our work protects natural resources, not only in the present, but in the changing conditions of the future.

SPECIFIC PROJECT INTERVENTIONS

Within each of the three circles on the diagram (figure 2), there are specific project activities which can reduce or reverse the impact of natural hazards, environmental degradation and climate change. Sometimes, the strengthening of a natural resource can help reduce the impact of natural hazards, including those made worse by climate change. For example, if damaged coastal mangrove forests are restored, they can protect against tidal surges. Activities in the central overlapping area will work against the effects of all three – natural hazards, climate change and environmental degradation.

Advocacy for change

We can take action at local, national and international levels to help protect natural resources. Several community groups or



NGOs (non-governmental organisations) can work together to present a common opinion to local or national decision-makers. For example, when water policies are being developed, we can encourage the planning authority to take account of the predicted effects of climate change, so that increases in floods or droughts will not make those policies ineffective. Communities can work together to prevent local industries using excessive amounts of groundwater, so that their wells and water sources do not dry up.

Bob Hansford is Tearfund's Disaster Risk Reduction Advisor.

Case study

Archaeologists have studied the ancient Nazca civilisation in Peru, which disappeared suddenly around 1500 years ago. Research has shown that the society was heavily dependent upon the huarango forests. These huge trees had very deep roots, and were a source of food, forage, timber and fuel for the Nazcas. They also maintained the groundwater level and fertilised the soil for other plants. When those forests were over-exploited and cut down, and maize was planted instead, large areas of lowland became much more vulnerable to flooding caused by El Niño (the warming of the Pacific Ocean – an event that happens every few years). As the trees disappeared, a 'tipping point' was reached and in a short space of time, the large Nazca civilisation disappeared as well. If we cannot learn to look after our natural resources, will we suffer the same fate?

God has created an intricate web of relationships between all parts of creation

tilz website www.tearfund.org/tilz Tearfund's international publications can be downloaded **free of charge** from our website. Search for any topic to help in your work.



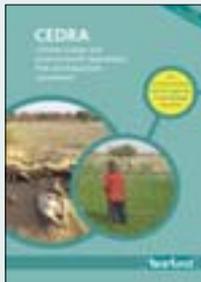
Environmental Sustainability

Book 13 in the ROOTS series is about Environmental Sustainability. It contains Bible studies, case studies and practical tools. Section 5 includes a basic environmental assessment tool to help development organizations understand how a project may harm the environment.



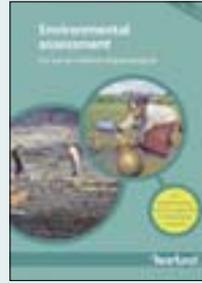
CEDRA

CEDRA is a climate change and environmental degradation risk and adaptation assessment. It is a way of assessing how the climate may change and ensuring that community projects help people to cope with these changes. It is designed to be used by people who are experienced in planning and managing development projects.



Environmental Assessment

This is a tool for use in projects which have a more obvious interaction with the environment, such as projects that focus on water and sanitation and agriculture.

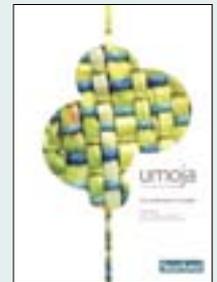


The *Environmental Assessment* and *CEDRA* are available free of charge from the Environmental Sustainability section of tilz: www.tilz.tearfund.org/Topics/Environmental+Sustainability/

Email: cedra@tearfund.org

Umoja

Umoja is a Swahili word meaning 'togetherness'. Umoja helps church leaders and their congregations work together with the community to bring about positive changes for the whole community. It seeks to inspire and equip people with a vision for determining their own future with their own resources. The *Umoja Facilitator's*



Guide provides everything you need to know to help a church and community become inspired and start working for transformation in the community. The *Umoja Co-ordinator's Guide* provides everything that an organisation or church denomination needs to know to start and manage an Umoja programme across a number of local communities.

For more information, go to the Churches zone on the tilz website: www.tilz.tearfund.org/Churches/Umoja/

Email: umoja@tearfund.org

Boiling Point

This is a journal for those working with household energy and stoves. It deals with technical, social, financial and environmental issues and aims to improve the quality of life for communities in the developing world. It can be downloaded free of charge from the HEDON (Household Energy Network) website: www.hedon.info/boilingpoint



Useful websites

www.arochoa.org

A Rocha is a Christian nature conservation organisation. A Rocha projects are frequently cross-cultural in character, and share a community emphasis, with a focus on science and research, practical conservation and environmental education. The website is available in English, Arabic, Chinese, Czech, Dutch, Finnish, French, Portuguese and Spanish.

Footsteps 41: Looking after our land

In *Footsteps 41* there is a range of articles that complement the articles in this issue. To find articles about reforestation, using worms to help produce compost, farming in arid conditions and much more, visit the *Footsteps 41* page on the tilz website.

www.nature.org

The Nature Conservancy works around the world to preserve the plants, animals and

natural communities that represent Earth's diversity of life – by protecting the lands and waters they need to survive.

www.practicalaction.org/energy/biogas_expertise

Biogas is used as fuel for cooking and lighting in a number of countries. It is a gas mixture of around 60% methane and 40% carbon dioxide that is formed when organic materials, such as dung or vegetable matter, are broken down in the absence of air, at warm temperatures (most effective between 30–40°C or 50–60°C). The Practical Action website has links to technical information and case studies.

www.practicalaction.org/water-and-sanitation

The Practical Action website also shares advice on rainwater harvesting and other ways of using and protecting water.

Tearfund resources can be downloaded free at: www.tearfund.org/tilz in English, French, Spanish and Portuguese.

Printed copies are available from:
Tearfund International Publications
100 Church Road
Teddington
TW11 8QE
UK

Email: roots@tearfund.org



Comparing the tin lamp and the solar light.

Solar power

by Anna Wells

Bob Kokonya and his family in north-west Kenya used to rely completely on tin lamps for lighting their home between 6–10pm each day. The lamps used a half a litre of kerosene a day, which cost Bob 60 Kenyan shillings (around US \$23 each month). Also, the family's nostrils would be blackened by the morning because of the sooty smoke produced when kerosene burns in the open air. 'The house was very smoky and we were coughing all the time', Bob said.

Kerosene is a non-renewable fuel. Fumes from burning kerosene pollute the air and

lead to ill health. The fumes also contribute to climate change. Solar power, on the other hand, is a clean and renewable energy source. Solar-powered devices turn the energy in sunlight into electricity.

Bob purchased a solar-powered light. In his area, such lights cost between 1500 and 1800 Kenyan shillings (around US \$19–23) – roughly the same cost as a month's supply of kerosene. 'In my daily life, I have seen a huge change', he said. 'When I was buying kerosene and using tin lamps, I would struggle with providing my family with basic needs. 70% of my income was spent on kerosene. Now I can afford bread daily!'

'Around 50 families out of the 150 or so in my community are already using solar products.'

And those who don't have them are yearning for them'.

Using solar power instead of non-renewable fuel protects natural resources and the environment, protects health and protects household income from the impact of unpredictable fuel prices. Solar products can seem expensive but over time a lot of money can be saved that would have been spent on fuel. Another important benefit is that solar power can be used to charge batteries which provide electricity when the main power supply is cut off or when there is no other access to electricity.

Anna Wells works for Solar Aid. Solar Aid trains communities to sell small-scale solar devices.

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Do you have experience of using solar-powered products that you can share with other readers? Please write to the Editor using the details on the Letters page.

BIBLE STUDY Our stewardship of natural resources

As a couple, we are experienced in environmental science and church leadership. We are enthusiastic about the many references to nature in the Bible and God's call to us to work with creation in a way that protects and cares for what God has made.

Opening discussion

Describe how you look after nature. This might be a garden, a small vegetable plot, an animal, or even a houseplant.

- What are the important factors in helping your part of nature flourish?

Read Genesis 2:1-15

- How did God ask Adam to care for the garden?
- What does this mean for how we care for the natural world and our use of natural resources?

Read Genesis 1:26-2:3

The term 'dominion' (Genesis 1:28 in some Bible translations) has sometimes been misunderstood to mean we can do whatever we like with nature. It actually means 'to rule over' and gives humans the responsibility of leadership.

- What does biblical dominion involve?
- The word 'stewardship' is sometimes used to explain biblical dominion. How does this help?

Read Leviticus 19:1, 9-15, 23-24

- How does biblical stewardship focus on God while balancing the needs of humans and the natural world?

Discussion

- How could you apply the principles of biblical stewardship to your local surroundings?
- Who would you need to involve?

- How could you develop a plan and see it through to completion?
- If the environment you live in is under stress, how can you improve it?
- If there is serious human need as well as environmental stress, how can you help the environment and people at the same time?

Practical action

Find out whether organisations in your area look at environmental management and human care together. How can Christians work with others in the community to help do this?

Martin Hodson is an environmental scientist. Margot Hodson is a church pastor. They are husband and wife, and co-authors of *Cherishing the Earth*, how to care for God's creation.

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Breeding small animals

by Julio de la Cruz Torreblanca

The Lindero Ecological Farm (La Granja Ecológica Lindero) is a beautiful place, with a lot of vegetation and a desirable climate. The farm has productive activities such as breeding cattle and guinea pigs, poultry farming, a restaurant and accommodation facilities.

Breeding guinea pigs

Guinea pigs are rodent mammals that are native to the South American Andes. They were domesticated by ancient civilisations in Peru. Guinea pig breeding is important because the meat is rich in protein and low in cholesterol. The market is large because eating guinea pig is a widespread custom in South America. Breeding is simple, practical, and easy to start. A pen 1.5m long, 1m wide and 0.5m deep is required for a group of seven females and one male.

We breed Type 1 guinea pigs, which have short, straight fur, lying flat against the body. They are the most common, and with them we get the best performance in terms

of fertility, productivity, speed of growth, and economic income.

Pregnancy in Type 1 guinea pigs lasts for 2 months and 1 week. There are 2–5 pups in each litter. They are weaned 15 days after birth. The females begin their reproductive cycle from three months, with 700–800 grams of live weight. The male is fertile from 3.5 months, with 750–950 grams of live weight.

In the Lindero Ecological Farm we feed them with corn, sorghum, ryegrass, elephant grass, alfalfa and clover. The fodder plants are ecologically cultivated. We use organic fertiliser such as compost. Guinea pig excrement is used to make the fertiliser. Guinea pig meat raised on the Lindero Ecological Farm does not contain chemical products that affect human health because we minimise the use of medicines.

Helping others

The farm is visited by students, families and local people who want to see the guinea pig facilities and the systems of breeding and feeding. Visitors are then able to adapt these techniques and put them into practice in their own settings – either for production at the family level or as a business. Guinea pigs can be bred by people living in towns and cities as well as in rural areas. Other people go to visit the farm's restaurant, which serves traditional guinea pig dishes.



Lindero Ecological Farm.

We use part of the profits from guinea pig breeding to maintain and improve the productivity of the guinea pigs. We use the rest to provide care for boys, girls and adolescents who are victims of sexual abuse, as well as women who are victims of domestic violence, who are currently staying in our accommodation on a temporary basis. A new shelter is currently under construction and the farm will have an important role in sustaining it. At the same time, the young people receiving shelter are involved in productive activities. When they return to their homes they will be able to share the skills they have learned in guinea pig breeding and other activities with their families. In this way they can improve their families' agricultural production.

Julio de la Cruz Torreblanca is the manager of Lindero Ecological Farm.

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Please write emails in Spanish.

Small animals can be bred in a sustainable way that does not place heavy demands on natural resources. Their meat is a source of protein, which is important for health.

For further advice on how to breed guinea pigs and other small livestock such as rabbits and poultry, see *Footsteps 10*.



Andean guinea pigs.

All photos José Trejo Liviás