Footsteps 85

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TREES

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Community reforestation

by Hamisi Mushamuka

Eleanor Bentall / Tearfund

Planting cassia trees on terracing to prevent erosion at Borkeshe, Ethiopia.

Trees represent life. They have many practical uses and they are part of our lives whether we live in an area with many trees or just a few. Trees play an important part in our environment, our health, our economy, our culture and our society.

- Trees provide firewood and charcoal which are often the main sources of energy.
- They are part of the local water cycle. If trees are removed, water is lost.
- They provide materials for construction, furniture, paper, musical instruments and for producing works of art.
- The leaves and bark of some trees can be used for food and medicine for people and animals.
- They fertilise the soil and protect it from erosion, landslides and rockslides.
- They provide shade and purify the air.
- In some cultures they are valued because of traditions.
- They absorb carbon dioxide which contributes to climate change.
- They are an important part of the urban environment. They have an effect on weather patterns and climate.
- They protect and encourage biodiversity, which is essential for supporting human life and animal life as part of the local ecosystem.

Land clearing

Land clearing is taking place on a massive and devastating scale in various parts of the world. Large, multinational companies are often responsible, but land clearing can have a number of causes.

- Logging companies and other industries such as mining and commercial farming acquire forest land and clear it for profit.
- A growing population increases the demand for wood.
- Large-scale displacement of populations as a consequence of war and/or natural disasters puts a high demand on trees and forests in particular areas.
- Other forms of energy such as solar, wind and electricity are not available or affordable.
- Poverty means there is an immediate need to make money from selling wood.

Almost all of these causes could be addressed by better enforcement of policy in the areas of protection and safeguarding the environment.

The results of uncontrolled land clearing include: a shortage of firewood, soil erosion, landslides and rockslides, which

In this issue

Footsteps

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Footsteps is a paper linking health and development workers worldwide. Tearfund, publisher of *Footsteps*, hopes that it will provide a stimulus for 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 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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Sadiki Byombuka / Tearfund

Seedlings are watered and protected in a nursery in South Kivu, Democratic Republic of Congo.

significantly reduce farming production, the main economic activity of millions of people; and deforestation, which has negative consequences for climate change and which, in the long term, leads to desertification.

In order to address these problems at a local level, it is vital to help communities through action and raising awareness. The responsibility for this lies with all of us – people of goodwill, NGOs, churches, governments.

Here are some ideas and recommendations for action, based on our experience.

How to start and run a community reforestation project

PLANNING

- First identify the problem and the needs and propose ways to respond.

The community and other individuals and groups benefiting from the project should be involved at every stage. Their sense of ownership and active participation in the project activities depends on it. Tearfund's *Environmental assessment* tool can be used to help people understand the local environment and to ensure the project brings benefits and no harm to the local environment.

STARTING THE PROJECT – TRAINING

- Organise a training session for the project leaders.

This should last two or three days. The project leaders should learn the techniques involved in tree production. These include germination, the care of seedlings, setting up and running a nursery, questions of quantity and quality, how to plant and care for trees on different sites and how to maintain written records. The training should take into account the needs of the community and the realities of their environment. An overview of project management can also be provided.

DECIDE WHICH TREES TO PLANT

- When the planning and the training have been done, it is the responsibility of the community to choose wisely which tree species will be planted.

Consider the types of trees regularly planted and those which local people believe will be helpful to their environment. The project leader may, however, propose introducing other agroforestry tree species and/or fruit trees in order to meet the needs identified at the start of the project and encourage species diversity. For example, some trees protect other trees or provide conditions for them to thrive. The project leader should also explain why some trees are unsuitable. Trees that are planted in the wrong place can harm other trees. When planted nearby, conifers kill fruit trees because they turn the soil acidic.

COMMUNITY EDUCATION

- A good way to begin community education is to prepare a flyer or leaflet.

This should mention the benefits of trees, agroforestry, the socio-economic and environmental harm caused by land clearing, and the roles and duties of citizens to protect the environment. Depending on the community, you may wish to add what the Bible says about environmental protection. Present the information in the form of pictures as much as possible and keep the written explanations short. Before printing, test the leaflet by checking that people understand it. Making such

information available will encourage everyone to continue with the project.

Popularising efficient wood stoves
Efficient wood stoves contribute to a reduction in the consumption of firewood, so they are useful for people living in towns and cities as well as for people in rural areas. Tell people about their importance and benefits, and ways of making them using local materials that are easily accessible. People can be shown models of improved stoves, with adaptations if possible. It is also a good idea to hold a few experimental sessions in order to compare the results of traditional stoves with those of improved stoves. Examples of efficient stoves can be found in *Footsteps 82*, *Footsteps 21* and *Footsteps 5*.

Improving the project From the start of the project, a good system of follow-up and evaluation should be put in place in order to ensure that improvements can be made and the project is successful.

Hamisi Mushamuka is the Development Co-ordinator for the Province of the Anglican Church of Congo (Province de l'Église Anglicane du Congo), based in Bukavu, South Kivu province, Democratic Republic of Congo.

EDITORIAL

Helen Gaw
Editor

Trees are a precious resource. They maintain the earth's atmosphere and sustain the environment. It is often said that trees are the lungs of the earth. Trees also provide us with the raw materials for construction, furniture, cooking implements and paper products. They are an important source of food such as fruit, nuts and leaves. Everywhere we look we see the resources provided by trees, whether we live in a large city or a small rural village. All our homes contain wood and paper products and most of us enjoy eating foods that have come from trees.

We need trees, and because we need them, we need to protect them by caring for them and using them sustainably. Much research has been done on this subject and some global initiatives are explained on p10.

Sometimes it is not easy to use trees and forests sustainably. Perhaps there are questions about who owns a forest and who has the right to use it. Or environmental damage such as land clearing leaves an area without enough trees and there are no initiatives for replanting. We consider these problems in the opening article and on p16.

A number of the articles in this issue are about tree-planting in communities, but there is also relevant information for individuals and families who want to benefit from planting trees.

Trees and forests can relieve poverty and contribute to health. We look at the benefits of agroforesty (growing trees and crops together), beekeeping and medicinal plants. The centre spread shares tips for tree planting.

Future issues will be on stigma and non-communicable diseases. As always, readers are invited to submit articles and letters.

Helen

Trees for firewood

Compiled by Helen Gaw

It is well known that the need for firewood can lead to deforestation, which damages the environment and makes it more difficult to find firewood. But people still need firewood.

Women and children often do the hard work of collecting and carrying wood for fuel. They may also face physical and sexual violence when they travel to collect wood.

Geoff Crawford / Tearfund

Collecting firewood in Cambodia near Phnom Penh.

By planting and maintaining good firewood trees close to home, the people who collect wood can stay safe and healthy. Trees planted near the home also provide shade, which helps to keep the environment cool and fresh. Firewood trees may be planted near homes or on communal land in urban areas.

Often trees are grown on farms for timber. Special trees may also be planted on farmland or elsewhere for use as firewood. Women may be particularly interested in planting these trees. They may be planted as wood lots in a corner of a farm or along a particular border. They encourage local wildlife, which may increase the productivity of plant life and trees, for example through pollination.

Many trees used in agroforestry like sesbania, leucaena and calliandra are ideal to plant as firewood. These trees are all members of the pea family and they help put nitrogen into the soil. This improves the fertility of the soil for farming. In Latin America, madreado and guama (common names) have similar qualities and can be used in the same way.

Refer to the Resources page for more information on how to find local trees that can be used in agroforestry and that are suitable for firewood.

Discussion

- Discuss where firewood is collected.
- Discuss the idea of women planting trees, and especially the idea of planting trees for firewood.
- What trees are preferred for firewood? Is it possible to plant any of these near homes?

Discussion questions taken from Agroforestry – A PILLARS Guide, *published by Tearfund.*

Bees and trees working together

by Paul Latham

I remember waking up in the house where my wife and I lived near the village of Manse Nzundu in the Democratic Republic of Congo (DRC). Outside it was only just beginning to get light yet I could hear the sound of bees working some flowers in the surrounding forest. I crept out and followed the sound. I was led to a tree with masses of flowers. Hundreds of bees were working them. Bees and trees depend on one another.

Bees depend on trees

Of all plants visited by honeybees in Africa, trees have been found to be the most important. The bees prefer trees with white or yellow, sweet-scented flowers. Tree species belonging to just six families of tree types (genera) contribute nearly half the total of all those visited. In sub-Saharan Africa these trees normally flower between September and November and the peak brooding and reproductive swarming of a honeybee colony can be accurately predicted following this flowering. Their wide distribution throughout the continent is thought to be because they are largely pollinated by bees. Examples are species of acacia, *Brachystegia* and *Julbernardia*.

There is much anecdotal evidence in DRC that where forests have been cut down, honeybee colonies are fewer and less honey is produced.

Trees depend on honeybees for pollination

In DRC the yields of fruit from mango, avocado, coconuts, coffee, citrus, pawpaw, rambutan and the African pear (*Dacryodes edulis*) are improved when honeybees are present. It is estimated that more than 75% of the crops in warmer countries benefit from pollination by bees. Improving yields through plant breeding takes a long time. However increasing the number of pollinating insects can often improve yields much more rapidly. Though a variety of insects are important for pollinating mangoes, honeybees are probably the most efficient. Their hairy bodies tend to transfer pollen easily. They also work on the flowers of a single plant species consistently. It has been found that the decline in the number of bee colonies in the USA has resulted in a decline in production of those crops which are mainly dependent on insect pollination. Scientists around the world are very concerned that the number of bees is decreasing. There are a number of possible causes, including the loss of water resources and increasing global temperatures.

Paul Latham

Hive made from raffia and beekeeper wearing protective clothing.

Beekeeping that benefits forests

Kibungu Kembelo, the director of Kisantu botanic garden in DRC, told me that the introduction of beekeeping in Bas-Congo province, where beehives are located in small areas of indigenous forest, has been the means of preserving what little forest remains.

Because honeybees in Africa tend to be aggressive, beehives are best kept in areas away from people and livestock. Hives should not be close to the village, or busy footpaths. In hot, moist countries, beehives need plenty of high shade. This is most easily provided by trees, many of which will also provide nectar and pollen.

How to get bees

The best way of getting started in beekeeping is with the assistance of a practising, local beekeeper, who will have advice and experience of local bees and conditions that no textbook can provide.

A good way to get bees is by transferring a colony from the wild into a hive. The wild colony will already have a number of combs and these can be carefully tied on to the top bars of a hive. Another way to get started is to set up a hive, perhaps rubbed inside with some beeswax to give it an attractive scent, and wait for a passing swarm of bees to occupy it. This will only be successful in areas where there are still plenty of honeybee colonies.

From Bees and their role in forest livelihoods, *by Nicola Bradbear. See the Resources page for more information.*

Where honey badgers are a problem, hives can be hung from the branch of a tree rather than put on the ground. As well as providing shade, pollen and nectar, trees provide building materials, local materials for making beehives, habitats for edible caterpillars, vegetables and fruits. Placing hives in forest reserves helps to protect such areas from deforestation and maintains biodiversity.

Paul Latham

Hive suspended to avoid ants and honey badgers.

Key tips for good beekeeping

1 MAKE HIVES LOCALLY

In general, hives should not be imported or purchased, but made out of materials that are available locally. This will ensure they are cheap and accessible to the poorest people. If people can make their own hives from local materials, they do not have to depend on outside organisations, and they can build more hives at a rate that suits them and their surroundings best, for little or no cost.

Some care needs to be taken with materials so that bees do not get too hot or suffer from condensation. If natural materials are used this is unlikely to be a problem.

The top bar hive is widely used in Africa and provided the bars on which the bees construct comb are exactly the correct width (3.2cm) and have a strip of wax inserted along a groove cut along the centre of each, the bees will usually build comb on each bar. The combs can then be inspected easily and removed during harvest.

2 PROVIDE WATER

If bees have to travel long distances to find water, they use time and energy that is better spent on collecting nectar and pollen. Water can be provided in a container but make sure the bees have somewhere to land safely. Sticks floating on the surface or stones placed in the container up to the level of the water can be used to prevent them drowning.

3 INSPECTING AND HARVESTING

Harvest honey in the evening using smoke to calm the bees. Wear protective clothing so that you can work quietly and calmly. After you have closed the hive, the bees are unlikely to cause problems. The bees have the whole night to settle down and people are in their homes, away from the bees.

4 CHECK THE HIVES REGULARLY

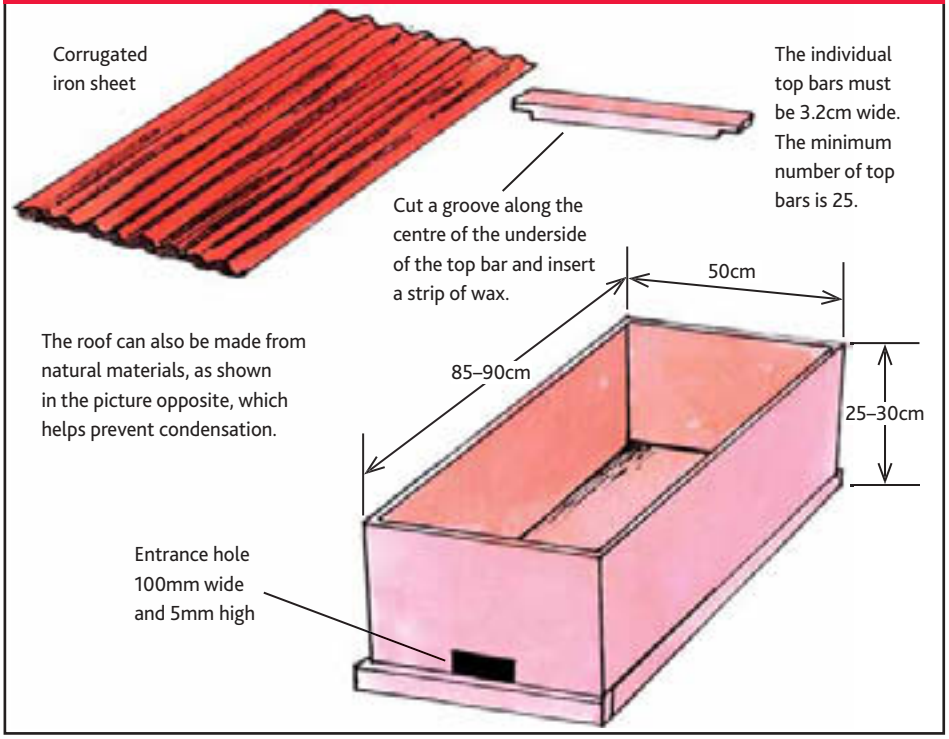
Once a week, make sure ants are not entering the hive. This can be done without opening the hive. Hanging the hives on wires which have grease smeared on them can keep ants away.

5 LEARN FROM LOCAL BEEKEEPERS

Find out who the successful local beekeepers are and learn from them. Most are only too willing to help.

Paul Latham was involved in starting a beekeeping project in the Democratic Republic of Congo. He became particularly interested in the trees bees depend on for pollen and nectar, and has prepared manuals on bee forage plants in DRC and the Southern Highlands of Tanzania.

Top bar hive dimensions



Paul Latham

How to make seed balls

A simple method to restore plant life to an eroded area is by using seed balls. Each year, collect wild seeds. Children are especially good at gathering seeds, and they will enjoy learning about plants.

Gather as many different kinds of seeds as possible from plants native to the area. With these seeds and some soil, make little balls.

Mix seeds with compost or planting soil, then add clay. Add just enough water to make the mixture damp. If you add too much water, the seeds will sprout too soon. Make small balls out of this mixture. Let them dry for a few days in the sun. Just before or during the rainy season, go to the area where you want to restore plant life and toss the balls out. Building contour trenches and other barriers there first will reduce and retain surface runoff water which is needed to help the seeds sprout and grow.

The seeds will sprout when it rains. The compost provides nutrients, and the clay prevents the seeds from drying out, being eaten by mice or birds, or blowing away. After a year the new plants will make their own seeds, and before long many new plants will grow. Soil will build up around the plants, preventing erosion. Soon, other kinds of plants will appear. If it is not disturbed, after many years the whole area will be restored.

EDITOR'S NOTE: *This method is good for restoring plant life, but it is not suitable for reforestation. Trees often need more care and time to grow.*

Text adapted from A Community Guide to Environmental Health *with thanks to the publishers, Hesperian, for permission.*

Seed ball mix

1 part mixed seeds

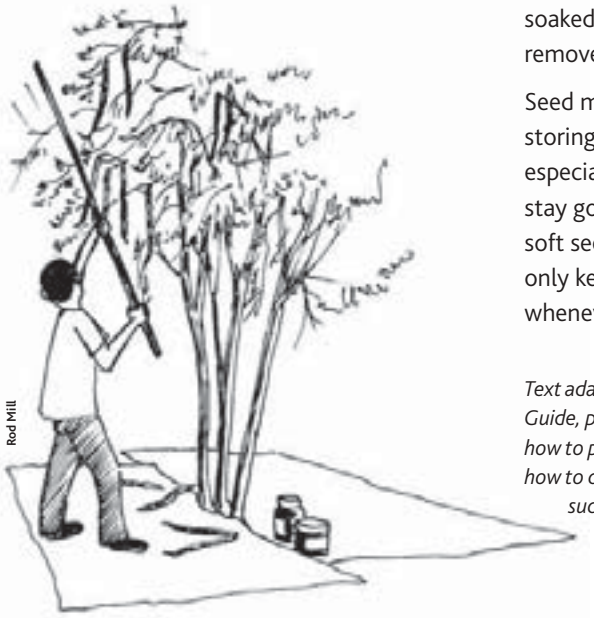
2 parts sifted compost or planting soil

3 parts clay soil sifted to remove stones

a small amount of water

Gathering tree seeds

Make it a habit to carry some bags or old envelopes with you so you are always ready to collect seed from good trees.



Rod Mill

Collect only fully ripened seed from strong healthy trees. Take seeds from the best examples of the tree available. Seeds in pods or fruits need to be removed. Sticky fruits like tamarind need to be soaked in water before the seeds can be removed and dried.

Seed must be very well dried before storing. Use clear labels. Some seeds, especially those that are very hard, may stay good for many years. However some soft seeds such as neem or kei apple only keep for a few weeks. Use fresh seed whenever possible.

Text adapted from Agroforestry–A PILLARS Guide, published by Tearfund. The Guide explains how to prepare a tree nursery, how to sow seeds, how to care for seedlings and how to plant out successfully. See the Resources page for more information.

Group activity

- Discuss what kinds of containers are available which would be useful for storing seed. They need to be clean, dry and able to keep out air and damp. Some ideas include jars, tins, plastic containers, plastic bags or gourds.
- As a group, prepare suitable containers and labels. Then, if possible go out and collect some seeds. The ideal time of year to collect seeds varies depending on the tree species. Allow the seeds to dry well before putting them in the containers.
- What sources of tree seeds do people know about? These may include the Forestry Department, the Ministry of Agriculture or local NGOs.

Please write to: The Editor, Footsteps, 100 Church Road, Teddington, TW11 8QE, UK Email: footsteps@tearfund.org

Local consumption of cowpeas – potential dangers

Cowpeas form a staple in most parts of Nigeria. Consequently, a variety of cowpeas is grown and sold in Nigeria. Cowpeas are notably very nutritious. Cowpeas balance the other starchy staples – yams and cassava. However, as the crop is produced in large quantities, storage has become a problem for local farmers. They use all kinds of chemical insecticides for storage of the crop, endangering the health of the potential consumers. This is probably because of a lack of education or expert advice. Indeed several food poisoning deaths have been reported in the local media over the years.

The situation calls for public education of farmers and consumers. Consequently in my local community, I advise that cowpeas (usually dried) be boiled in ashy water for about 45 minutes. Following that, they should be washed with clean water before cooking. I think the ashy water may help in neutralising the chemicals used in storage. This idea is personal but I wish to publish it for better advice and ideas from *Footsteps* readers.

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Richard Hanson / Tearfund

An agricultural expert teaching villagers in San Luis, Bolivia, about planting tree seedlings for the reforestation of the area.

Two uses of papaya

TREATMENT FOR WORMS

Papaya seeds are an effective treatment for worms in the small intestine, particularly hookworms and amoebiasis (in the form of cysts). It is very inexpensive – if not free – to use this remedy. All you need to do is wait for the papaya to ripen and then remove the seeds and dry them in the sun. Once they have dried out, crush them into a powder and, if possible, pass them through a sieve.

Prescription: One spoonful of powder diluted in water (hot or cold) three times a day (morning, midday and evening) for at least five days.

I would be glad to hear from any readers who find this treatment helpful.

Rufen Lukanga Vikungu, Butembo, Democratic Republic of Congo

Email: kisusuthirufen@yahoo.fr

MALARIA PROPHYLAXIS

I am interested in information about using a tea made from papaya leaves boiled in water as a malaria prophylaxis. Can anyone tell me about research on this, or their own experiences of using it?

Judith Sawers, SIL-ACATBA, BP 1990, Bangui, Central African Republic

Email: will-judith_sawers@sil.org

Traditional and modern medicines

Hearty greetings from Rural Development Society!

It is really encouraging to know that there is a space for us – poor village development organisations – to express our ideas and search for like-minded friends who can benefit from the mutual sharing of ideas.

For many years – say, from childhood – we have cared for the sick with natural and healthy medicines in the villages. These medicines included plant and animal products which were readily available in the village and also were easily affordable.

But most of the people nowadays do not know or recognise the diseases or the remedial plants or plant parts for the treatment. As a result we see poor patients die in an untimely way mainly because they do not know how to use the available medicinal plants properly. Also, manufactured medicines are available easily in the village cabins or shops but nobody knows how to use them or how much to use and what the side effects could be.

We want to bring a definite, tangible change and save lives, reducing the pain and side effects of diseases. This is possible provided we have a common effort. For bringing about changes in a positive direction we need to organise training and awareness programmes at different levels, organise village self-help groups, community based organisations, interested NGOs, schools etc towards these problems and ideas, creating a demand for natural treatment at the village level.

Hence we want the co-operation and goodwill of your readership and their suggestions and comments. This will encourage us to go ahead with our mission for the poor State of Orissa.

With all best wishes and hoping to hear from you soon.

George Mathew
President
Rural Development Society
Mahakalpara
Kendrapara District
Orissa
India

EDITOR'S NOTE: *Are there ways in which the village could receive training about understanding and using over-the-counter drugs alongside re-learning traditional methods of caring for the sick? If you have experience of doing this, please write in to* Footsteps *so we can share what you have learned with others.*

Top tips for tree planting

by Steve Collins

It is an unfortunate reality that a significant proportion of the millions of trees planted around the world each year do not survive long enough to meet the purpose for which they were planted. As a result, people's time and resources are wasted, the problems that the tree planting was supposed to tackle continue, and people often become disappointed and disillusioned.

Here are some simple tips that should help communities and local organisations plan and carry out planting work in a way that will result in higher survival rates of trees, better growth and a real sense of pride and achievement for those involved. Most of these tips are also relevant for individuals and families who wish to plant trees.

Shared purpose and ownership

The views and opinions of everyone with an interest in the trees and the land on which they will be planted should be taken into account when establishing the purpose of the planting scheme and designing it. This includes women and children. They should all have an opportunity to express their views freely, which may mean arranging separate or individual meetings. Spending time to find out what people think at the start of the project will reduce the risk of problems developing later.

'Small and achievable' versus 'large-scale and over-ambitious'

Large-scale tree planting might seem the most exciting option, but it is often best to plant a small area, maintain it well and achieve a small-scale success rather than to attempt something over-ambitious that might not work. Failure can result in demoralisation and a lack of interest in planting trees in the future.

Select a site that matches your purpose

Consider things such as the adequacy of the soil (fertility and depth), exposure to strong, dry or salty winds and proximity to the community. If you are trying to reduce erosion, the circumstances might give you little choice of site.

Protect the trees

Think about all the things that could damage the young trees. Cattle? Goats? Wild animals? Children playing? People walking through the area? Flood water? Would a fence help to keep people and animals out? If so, it is best to make a fence before the trees are planted. Putting branches of thorny bushes around the trees will help prevent animals from eating them. If leaf-cutting ants attack the trees, planting jack bean or sesame nearby may help. Fire is often used to control vegetation and stimulate new grass growth for grazing animals, but if it spreads into the area of tree planting it can quickly destroy all your hard work. Inform the community of the consequences of starting uncontrolled fires, and consider clearing and maintaining a firebreak around the planting area so that fire does not spread into it. See Preventing fires, p12, for more information.

Illustrations taken from *A Community Guide to Environmental Health* with thanks to the publishers, Hesperian, for permission.

New planting or natural regeneration?

When the tree species you want to plant exists nearby, and the seeds are spreading into and growing on the chosen site, you might not need to do any planting. Looking after the small, naturally regenerating seedlings might be more effective than planting new seedlings. Or you might choose to have a combination of planting and natural regeneration.

Weeding and maintenance

Grass and other plants growing around the small trees will compete for light, water and nutrients. Ideally, any competing growth should be removed up to a distance of 50cm from the tree's main stem. Laying cut weeds and other organic matter around the base of the tree can help stop more weeds growing and reduce evaporation of water from the soil. This may also help protect the trees from termites, as some types prefer to eat dead plant material.

Weeding and regular checks and repairs will be necessary until the trees are big enough to survive and continue growing on their own. This might be as long as three or four years after planting. Natural regeneration often takes less time as it tends to grow faster.

Ensure someone checks the trees regularly and that damage to fences and other forms of protection is repaired as soon as possible. A goat or cow can eat and seriously damage or kill a lot of trees in a short time!

Plant at the right time of year

Tree seedlings will need time and the right conditions to adapt to their new 'home' after planting. Adequate water and protection are essential during this adaptation period, especially for the first year. Planting at the beginning of the rainy season is usually best, as it will give maximum time for good growth, especially of the roots, before drier weather starts. Seedlings may suffer from weather-related damage, for example, damage caused by strong winds or flood waters, so take care to select a planting season that allows the seedlings to grow for as long as possible before damaging weather is likely.

Choose the right tree species

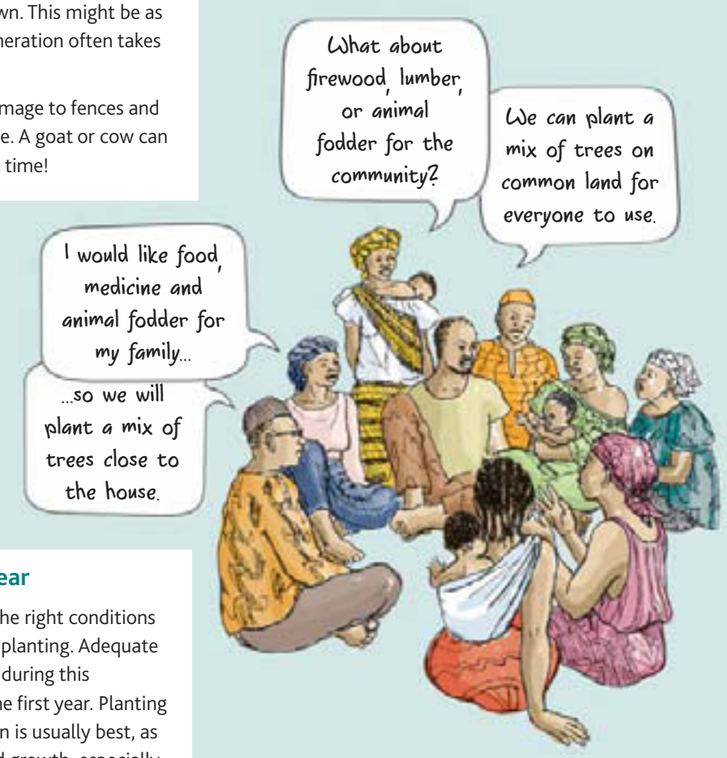
Select types of tree that you know will grow well and achieve your purpose. You will often find that local native species are suitable. If you are trying to reduce erosion, choose trees that grow quickly and will have strong root systems.

Good seedlings

Use healthy seedlings from a local nursery. These will have a better chance of survival. Larger plants will suffer more during the 'transplanting' process. The best size for seedlings is usually between 30 and 90cm tall.

Reflect on and learn from what happens

During the first two to three years after planting, take time as a community occasionally to reflect on what went well, what didn't, and why. Identify the lessons you can learn from this and apply these lessons next time you plant trees.



Careful planting

Do not drop, throw or stack the seedlings on top of each other when moving them from the nursery to the planting site. This can damage the plants in a way that you cannot see. Cover them and prevent them getting too hot while moving them. Avoid exposing the tender roots to the air. They must not be allowed to dry out. After planting, press the soil around the seedling firmly with your foot to make sure there are no air pockets around the tiny roots. If possible, water each tree after planting, but do not flood it. Several cups should be enough.

Steve Collins is currently Tearfund's Country Representative for Nepal. Previously he worked as a Forestry Consultant in Scotland and an Environmental Advisor in Honduras.

Issues in forestry

by Julian Evans

As the international conference on climate change in late 2010 in Cancún, Mexico, reached a disappointing outcome, we will have to resort to doing our own bit to protect our environment. This includes taking care of trees and forests, because forest clearance and degradation accounts for close to 20% of the annual emissions of greenhouse gases. Quite apart from all the other losses caused by the destruction of forest – indigenous people's homes and livelihoods, biodiversity, soil protection, and countless more – this link to our atmosphere is increasingly seen as crucial. So what is being done about it?

REDD

No, I have not misspelt the colour 'red'! This acronym stands for 'Reduced Emissions from Deforestation and Degradation' and is a UN-backed initiative to tackle the continuing problem of the loss of forest, particularly in the tropics. It is not cheap but does represent a concerted attempt, region by region, to try to get to grips with an incredibly complex problem. One difficulty, as always, is definition: what is a 'degraded' forest, and hence eligible to receive money to support reforestation? There is some debate about how REDD should be funded – with options ranging from carbon trading, a special fund or a mixture between the two, and debate on this subject is fierce. (Carbon trading allows countries and companies that are producing below their quota of carbon dioxide to sell their remaining allowance as credit to other countries and companies that have not kept to their own quotas.)

In recent times the initiative has been enlarged to REDD-plus which aims to reduce emissions from deforestation and forest degradation and to support the role of conservation, sustainable management of forests and improvement in the amount of carbon held in forests in developing countries. There are some concerns that despite sounding like a positive development, REDD-plus could impact on the rights of indigenous peoples in forests, and potentially lead to the conversion of some forests to industrial tree plantations with implications for biodiversity.

Geoff Crawford / Tearfund

Forest view in Honduras.

Planted forests

The concept of planted forests (see box) is an important one because the UN's Food and Agriculture Organization (FAO) has assembled some surprising data. In 2005, when the FAO collected data about planted forests using this wider definition, planted forests were found to account for about 280 million hectares or some 7% in area of the world's forests. The surprise was that this small proportion in area was supplying a large percentage of the world's wood products: in a few years' time some 70% of the world's forest products will be coming from just 7% of its forests.

Planted forests

A category of forests called 'planted forests' includes:

- tree plantations
- native forests which have been regenerated by tree planting
- forms of agroforestry (growing trees with livestock or arable crops)
- planting in and around homes and villages for fuel wood, building poles, fencing materials etc.

This conclusion has far-reaching implications. It means that at last wood production is following the path of agriculture and is focused on intensive management of relatively few forests. More importantly, it means that the world's great natural forests do not need to be logged by companies to make wood products, though they may be destroyed for other reasons.

Back to climate change

Deforestation contributes to greenhouse gas emissions, so what about tree planting to soak up carbon? This attractive idea is less straightforward than it seems. Certainly over their lifetime trees store or capture carbon, but we need to look very carefully at whether other aspects of management undo the good. For example, if the cultivation of the soil before planting releases lots of carbon dioxide (as organic matter decays) or if expensive protection is needed, the carbon balance – as it is called – may not be so positive. However, if wood and timber from planted forests can be used more widely, and even in place of energy-rich materials such as steel, aluminium and cement where appropriate, then reductions can be achieved.

The world's forests are a precious gift from God. Let's care for them wisely and remember even God himself delights in beholding trees (Genesis 2:9)!

Julian Evans has authored 12 books, including Plantation Forestry in the Tropics. *He edited and partly authored a book for the Food and Agriculture Organization of the United Nations,* Planted Forests – uses, impacts and sustainability, *published in 2009. He is vice-president of the Commonwealth Forestry Association and was on Tearfund's Board for 19 years.*

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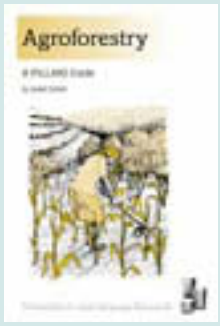
Agroforestry – A PILLARS Guide



Agroforestry is the practice of allowing trees and crops to grow together, on farmland or in the forest. PILLARS Guides are designed for use in small group situations where one or more people are literate and confident enough to lead others in a group discussion. No training is needed for the leader. This Guide raises awareness of the benefits of agroforestry for sustainable agriculture, for the soil and for nutrition. It increases understanding of the different benefits of different trees.

This PILLARS Guide can be downloaded free at: www.tearfund.org/tilz in English, French, Spanish and Portuguese.

Printed copies are available from:
International Publications, Tearfund,
100 Church Road, Teddington, TW11 8QE, UK.
Email: pillars@tearfund.org

A Community Guide to Environmental Health

by Jeff Conant and Pam Fadem

This practical, well-illustrated guide contains relevant sections on forests, restoring land and planting trees.

To order in English, contact: TALC, PO Box 49, St Albans, Hertfordshire, AL1 5TX, UK

Email: info@talcuk.org
Website: www.talcuk.org

The book costs £20 plus delivery. It can be downloaded free of charge from www.hesperian.org. It is currently available in English and Spanish. Translations into French and Portuguese are in progress.

Bees and their role in forest livelihoods: A guide to the services provided by bees and the sustainable harvesting, processing and marketing of their products

by Nicola Bradbear

Available in English and French.

This book is available from the Food and Agriculture Organization of the United Nations (FAO). Readers in developing countries can request up to five publications free of charge from the FAO. Requests from institutions (eg libraries, companies, organisations, universities) rather than individuals are preferred to make the publications accessible to more readers. Requests should be directed to:
Forestry Information Centre, Forestry Department, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy
Email: FO-publications@fao.org

World Agroforestry Centre – regional offices

These offices are a good source of regional information on agroforestry, including how to get seeds.

EASTERN AFRICA OFFICE
World Agroforestry Centre, United Nations Avenue, Gigiri, PO Box 30677, Nairobi, 00100, Kenya
Tel: +254 20 722 4298
Email: j.mowo@cgiar.org

LATIN AMERICA OFFICE
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SOUTHERN AFRICA OFFICE
World Agroforestry Centre (SADCICRAF), Chitedze Research Station, ICRISAT buildings, PO Box 30798, Lilongwe 3, Malawi
Tel: +265 1 707 332
Email: f.akinnifesi@cgiar.org

WEST AND CENTRAL AFRICA OFFICE
Regional Office & Humid Tropics Node, PO Box 16317 Yaounde, Cameroon
Tel: +237 22 21 50 84
Email: icraf-aht@cgiar.org

Useful websites

Agroforestree database
www.worldagroforestry.org/resources/databases/agroforestree

The database provides detailed information on 670 agroforestry tree species in order to help field workers and researchers in selecting appropriate species for agroforestry systems and technologies. For each species, the database includes information on identity, ecology and distribution, propagation and management, functional uses, pests and diseases and a bibliography.

You can search by country, by the uses of the tree and by species.

CIFOR – Center for International Forestry Research
www.cifor.cgiar.org

CIFOR focuses research on tropical forest management and people who depend on forests for livelihoods.

International Year of Forests
www.un.org/forests

The United Nations declared 2011 as the International Year of Forests. Information about events can be found on this website.

Agroforestry case study: Indonesia

by Richard Roden

In 2002, local NGO Ayo Indonesia started to promote sustainable agriculture to the farmers' group 'Suka Maju' in Meni in Golo Ngawan village in the East Manggarai district on the island of Flores, Indonesia. They were introduced to new ideas for land conservation and agroforestry to increase land productivity.

Ayo Indonesia Foundation

Rofinus Nafir at the edge of his forest land.

People started planting trees from the pea family and cash crops and some nurseries for trees were also developed. In the beginning only 16 farmers joined the programme as most farmers in Manggarai do not like to follow an activity without seeing good results first. The 16 group members were challenged to prove that a real change could be made.

The agroforestry programme aims to:

- increase land productivity
- protect the local environment
- guarantee food security
- produce extra income.

It consists of planting various kinds of cash crops (cocoa, bananas, mahogany, cloves and *Gmelina arborea*), trees from the pea family and food crops on the terraced land using a particular planting pattern for every kind of crop. On the inner side of the land cash crops and food crops are planted. Calliandra, mahogany and *Gmelina arborea* are planted on the outer side of the land with 3 x 4 metres planting space between each tree. Calliandra is important since it can improve land fertility and can be used by families for firewood (see p3). Calliandra must be pruned regularly. When the cut parts are buried they become an extra fertiliser.

After eight years of hard work the farmers can now harvest the fruits of success. All the trees that were planted are very productive. Every member has an average extra income of 1.66 million Indonesian rupiah (US$ 185) each year from agroforestry.

The most successful farmer is Rofinus Nafir, who is 42 years old and father of four children. He tells how agroforestry can improve a family's life: 'Before joining the agroforestry programme, I earned a living by working as a day labourer in government infrastructure projects or clearing other people's lands. I had a very small income which was never enough to pay the household bills. But now I can earn 9.7 million Indonesian rupiah (US$ 1,066) in a year. My previous income has tripled. I'm very glad about the success and have decided to use my front garden as a nursery for cash crops and various tree seedlings like cocoa, *Gmelina arborea* and mahogany, to increase my income even more. I am using the money to pay for my children's education and to build a convenient house for my family.'

Now, after seeing the improvement in Rofinus's and his family's life, many farmers have been motivated to imitate Rofinus's hard work. They use the agroforestry techniques which he shares during the training or motivation sessions for new farmer groups.

What we have learned

- Agroforestry increases the productivity of the land without requiring money and materials from outside the local area.
- Agroforestry prevents landslides and erosion, and increases the amount of water absorbed by the soil in the rainy season.
- Agroforestry guarantees food security and income for farmers.
- To motivate new farmers to participate in the programme they have to experience the success stories of other farmers.
- Agroforestry reduces poverty.

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Yayasan Ayo Indonesia
Kotak Pos 149
Ruteng, Flores, Indonesia

Email: ayo2indonesia@gmail.com

Look at the Resources page to find sources of information on agroforestry, including the Agroforestree database.

Preventing fires

A firebreak is an area of land that has been stripped of any possible fuel for the fire. This includes dry roots beneath the surface, as fires may burn along them overnight. A firebreak should prevent fire transferring from one side of the firebreak to the other. Firebreaks should be at least one metre wide, depending on the size of the area and the trees being protected, and as straight as possible. A local forestry worker can give advice on preventing uncontrolled fires.

Geoff Crawford / Tearfund

Forest fire started in Honduras by a local farmer who failed to ensure there was a wide enough gap between his land and the hillside forest when using slash and burn techniques.

Medicinal trees

Trees with healing properties

Traditional medicines often include one or more tree parts or products. These may be the fruit, leaves, flowers, bark, roots, seeds or oil. Here we share some information about a few medicinal trees in the humid and arid tropics. We strongly recommend that you consult a local herbalist first about the correct quantities and use. In the case of serious symptoms, you should consult a doctor.

KAMALA – *Mallotus philippensis*

Found in humid tropical forests in Papua New Guinea, the Philippines, southern China, India and Australia.

- All parts of the tree can be used as external applications for parasitic infections of the skin.
- The fruit is used to treat intestinal worms.

TOLU BALSAM, PERU BALSAM, QUINOQUINO – *Myroxylon balsamum*

Found in the tropical forests of South America.

- The extracted resin from the bark, known as balsam, is an antiseptic and is used to treat skin complaints, bedsores and haemorrhoids. It should not be used on open wounds.
- The balsam is also used in cough syrups to help loosen and bring up mucus from the lungs.

JATROPHA – *Jatropha curcas*

Found in all parts of the arid tropics.

- In Myanmar, the seeds are used as a laxative. Oil from the seeds can have a laxative effect or induce vomiting. Extreme care must be taken as the purging effect is caused by poisons.
- The leaves are anti-parasitic and water in which leaves have been boiled can be used to promote healing of wounds.

ACACIA – *Acacia nilotica, Acacia arabica*

Found in Africa and Asia.

- Acacia gum is edible and can be used for the relief of some symptoms of throat and chest complaints.

Honey also has medicinal properties. Dabbing honey on a wound or burn promotes healing. Some honeys are anti-bacterial, and this explains why honey can be effective in soothing sore throats. Evidence for the effectiveness of honey remedies has not been established.

The material in this article has been drawn from Medicine trees of the tropics *by Robin Levingston and Rogelio Zamora, published by the Forestry Department of the Food and Agriculture Organization of the United Nations.*

Richard Hanson / Tearfund

Woman preparing home-made medicine for her sick daughter.

BIBLE STUDY The purpose and meaning of trees

by Chris Hawksbee

Read Genesis 1:11-12.

Very early on in the Bible, in the book of Genesis, we find that trees are mentioned.

Not just one variety of tree, but various kinds. They are not mentioned just for their beauty, but because each gave fruit with seeds in it. They were given for us to use. This shows God's generosity to us in abundance and variety. Some seeds produced oil that could be used for cooking and lighting, medicinal purposes, and for beauty treatments. Fruit and seeds provided food. We can add to this list: shade, wind breaks, habitats for animals, building and construction materials, sweet perfumed trees and incense. And God saw that it was good!

Read Genesis 1:29-30.

God gave seed-bearing plants and trees to us for our use, and for food for animals.

God made the trees with seed-bearing fruit. He gave us the possibility to increase their number by planting the seeds. We needed to learn to do this to continue receiving their benefits.

In Genesis 2:8-9, we see that God planted a garden, and in Genesis 2:15, he gave Adam the responsibility to tend it – which means to manage it properly. Adam was 'to care for it'. Trees need caring for so that they bear fruit and benefit mankind, contributing to our overall welfare. With our care, trees could greatly help to reduce global poverty.

In Genesis 2:16-17, God gave both man and woman his first command, and it referred to the fruit of the tree, but they disobeyed.

We see in the gospels that Christ died on a tree for the forgiveness of our sins. We can start again.

In the Book of Revelation, at the other end of the Bible, we find more references to trees. We will have the right to eat of the tree of life (Revelation 2:7), if we overcome as the Spirit of God shows us. Trees are in the paradise of God.

In Revelation 22, we learn that the tree of life bears fruit crops 12 times a year, and its leaves are for the healing of the nations. There are many trees with healing powers at our disposal now, which is a sign of God's provision for us.

- *What part do trees play in God's plan for people, for animals and for the world?*
- *What different meanings do trees have in the Bible?*

Chris Hawksbee works as a development consultant. He specialises in a number of subjects including forestry. He lives in Paraguay.

Soil care

by John Crossley

Deforestation often leads to erosion. This article shares a method for improving soil fertility for agriculture.

If you walk in the hills of Nkhata Bay district, Malawi, you will see steep hillsides with the trees chopped down and burnt. Further on you will see cultivation using small mounds in which cassava cuttings are planted. The ash from the burnt trees will give an initial boost of fertility, but very soon erosion will take over. No method of cultivation could cause the soil to be washed away more quickly than this. When heavy rain falls, water swirls between the mounds, carrying away the fertile top soil and leaving only coarse sand and stones.

John Crossley

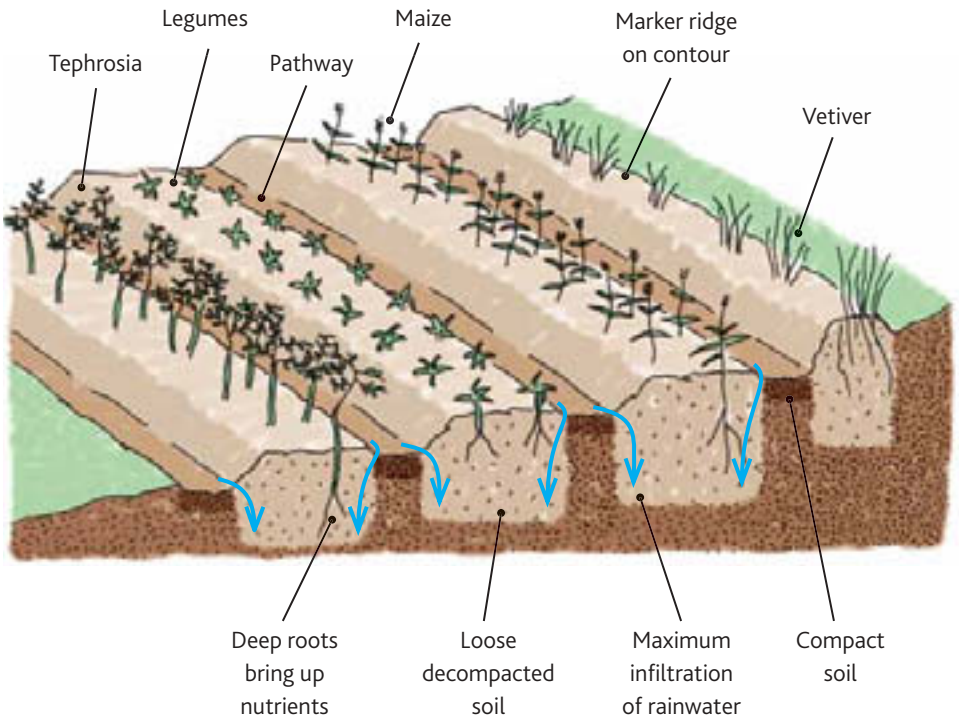
Members of the 'Msongwe Gate Home Based Care' group at work in the soil care garden. The marker ridges can be seen to the left and the right of the photo, planted with vetiver.

A step in the right direction

This method has been replaced throughout most of Malawi by cultivation on ridges. But the effect on the soil is almost as bad. This is because the ridges do not follow the contours as they should and are usually left open at the ends. As the ridges are constantly walked on by the people that are hoeing them, the soil is packed down hard. This stops water entering the soil after heavy rainfall, so the roots are not watered, the water is wasted and soil fertility is progressively lost.

Is there a way of cultivating the soil that requires less labour but improves the soil and helps it to grow more and healthier crops?

A group of six volunteers in Msongwe village, Malawi, is responsible for giving home-based care to the sick people in the village. They got a piece of land on which to grow crops to improve the diet of their patients. They were anxious to avoid the loss of soil, which they know is damaging so much of the land. So, to conserve the soil and build up its fertility, they put into practice a system based on the advice of an expert in agricultural production.



Permanent deep bed method

The first requirement of soil care is that, even after heavy rainfall, the maximum amount of water should sink into the ground and none should run over the surface.

First, a line level was used to mark the contours on the fairly steep piece of land, and large marker ridges were constructed (see illustration and photograph). Next, permanent deep beds were prepared. These beds run parallel with the marker ridges, following the contour, and the soil is loosened to a depth of 60cm (about twice the distance from elbow to wrist) using a pickaxe. This breaks up the layer of compacted soil which usually forms as a result of the traditional method of field work mentioned earlier. By contrast, the

deep beds are never trodden and the loose soil encourages all rainfall to soak into the soil and reach the roots.

Making deep beds requires a lot of labour, but once constructed, they do not need the year-by-year preparation of the traditional ridge system. Digging and turning the soil (tillage) is not necessary. The deep beds only need light surface weeding. If possible, cover them with a mulch of crop residues, leaves and grass. This will provide crops with nutrients, keep moisture in the soil and protect the soil from weeds.

The Msongwe home-based care group now has a garden where the rainfall sinks into the soil where it is needed. There will be:

- no flooding
- no erosion
- no silting
- no loss of soil.

The Msongwe group does not use chemical fertiliser. They maintain soil fertility by making and applying compost, rotating the crops and growing agroforestry species such as tephrosia, which bring nutrients to the surface from deep in the soil.

John Crossley is the Conservation Officer for the Wildlife and Environmental Society, Mzuzu, Malawi.

Footsteps 15 *on Soil erosion and* Footsteps 70 *on Agriculture and climate change both share further information on this topic. The instructions on how to measure contours using an A-frame are particularly relevant.*

Mangroves

compiled by Helen Gaw

Mangroves are a group of trees that can grow in salt water. Mangroves have large root systems which prevent erosion and provide an essential habitat for valuable fish species. They can also grow in fresh water. Mangrove forests are important for protecting coastlines, riverbanks and estuaries from floods and storms.

'Trees are very important for building houses and fires. If we cut one down we must plant another.'

Abdul Kalam, aged 35

'The forests protect us from the storms and high tides. The forests have really been good to us, and the trees help us.'

Shahanara Begum, aged 16

Abdul and Shahanara live in the Sundarbans in Bangladesh.

Peter Caton / Tearfund

The Sundarbans in Bangladesh is the home of the largest salt water mangrove forest in the world.

In a number of places in the world, mangrove forests are in danger. Sometimes they are cleared for shrimp farming, fish farming or building hotels.

Restoring mangrove forest

- Select healthy, mature seedlings from the existing forest. In many mangrove species, seedlings develop on the parent tree rather than in soil, making them easy to collect.
- Conditions for storing depend on the type of mangrove, but it is best to store most mangrove seedlings with the pointed end in the type of water they will be planted in.
- Plant the seedlings directly into an area of soft clay or mud between low and high tide, where the tide will cover the ground every day.
- To increase the strength of the seedlings and their chance of survival, grow them in a nursery using a polyethylene bag supported by a stick (bamboo is suitable). If the nursery is in a low-lying intertidal area, make small holes in the base of each bag so the seedlings can be watered by the tides.
- During the wet season, strong winds may cause waves which sweep away the seedlings. If this is a risk in your area, to avoid losing the seedlings, plant out after the wet season. Although the wet season is often the best time to plant, it is more important that the seedlings remain strong and that they are protected from damage by people and animals.
- There is no need to use pesticides or fertilisers.

Speaking up for forests and livelihoods

Andrew Philip / Tearfund

Forest in South-East Asia.

Speaking out against a dam construction project

In South-East Asia, as part of a larger dam-building project, a government and foreign companies are planning to build a dam at the meeting point of two rivers. This place is rich in biodiversity and has great cultural significance for the people that live there. The project involves flooding a large area of forest and relocating 60 villages, affecting around 15,000 people. These families will no longer be able to provide for themselves and raise income through farming, fishing and gathering non-timber forest products (useful things the forest provides that do not require the cutting down of trees). One such village has 2,000 acres of rubber plantations, 300 acres of mixed fruit orchards and 200 acres of orange orchards. These have been established for 20 years.

Many people are speaking out against the construction of the dam. The purpose of the dam is to create energy for electricity, which is needed in the area. Although compensation has been offered, villagers do not believe it represents the value of what will be lost. There are no proper resettlement plans. Villagers are appealing to the government, saying that the productivity of their farms, which has taken many years to develop, will be lost.

This situation has not yet been resolved and plans for the dam continue.

With thanks to the Kachin Development Networking Group for permission to use their research.

Working together to protect the Amazon rainforest

The people of Amazanga, Ecuador, did not always live where they do now. An oil spill forced the members of the Quichua tribe to move from their traditional land in the Amazon. When their new homes were threatened by deforestation and industrial farming, the villagers decided that managing their lands according to the traditions of their people – hunting, fishing, and gathering plants for food and medicine – was the best way to protect their lands.

But this required more land than they had. Amazanga demanded that the government grant them territory to live as their ancestors had lived. 'We cannot live from a piece of land like a piece of bread,' they said. 'We are talking about territory, and the right to live well from the forest.' When the government ignored their demand, they asked international environmental groups for help in buying back their ancestral lands.

The villagers invited their international partners to take photographs and videotapes showing traditional ways of using the forest, and to share these with people in their home countries. After several years, Amazanga raised enough money to buy almost 2,000 hectares of forest.

However, buying this much land created suspicion among members of the Shuar tribe who lived nearby. When the Shuar claimed ownership of the same land, the people of Amazanga understood they had made a mistake. They had built partnerships with international organisations, but had failed to make agreements with their neighbours! The Shuar were so angry they threatened violence. After many meetings, the people of Amazanga and the Shuar agreed to share the forest according to shared rules. Because the Quichua and the Shuar have similar understandings of how best to use the forest, they were able to form an alliance.

They made the land a forest preserve and agreed to a forest management plan preventing the felling of trees and building of roads. The land was declared 'patrimony of all the indigenous tribes of the Amazon' and protected for future generations. By reaching out to visitors from near and far, the people of Amazanga will protect the forest, preserve their culture, and help others to protect their own forest homes.

This case study has been taken from A Community Guide to Environmental Health*, with thanks to the publishers, Hesperian, for permission.*

Discussion

- Do you know of any similar situations in your region? If so, what can be done?

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