

FOOTSTEPS

No.5 DECEMBER 1990

TREES

INVOLVING A COMMUNITY IN FORESTRY PROJECTS

by Dr Julian Evans

ALMOST EVERYONE likes trees. They bring lots of benefits and are pleasant to have around. However, spending time and effort on them often seems less important than growing food, finding clean water or helping to build a new school classroom.

Trees also take a long time to grow. Five years may pass before the extra firewood, fodder or building poles become available from a new planting. There are two keys to this problem. One is to

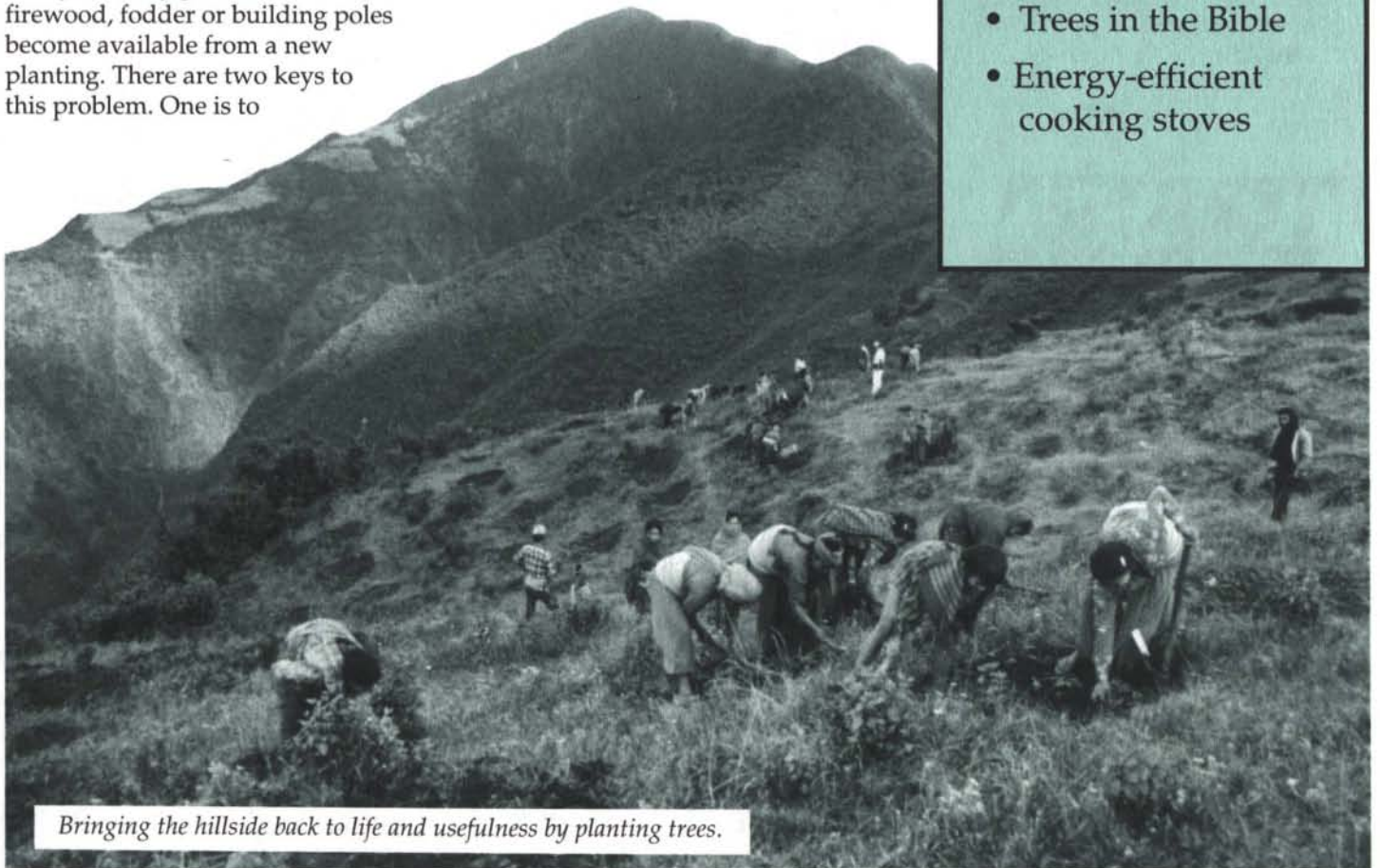
share the burden of waiting by involving the whole community. The second is to combine tree-growing with food-growing, an approach known as "agroforestry". This article looks at the first approach – how to get people interested, and then committed, to a tree project.

Their Need

When asked, villagers will certainly say that trees are needed and will list many of their benefits. But planting

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Bringing the hillside back to life and usefulness by planting trees.

FOOTSTEPS

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

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

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

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more trees is rarely seen as the urgent need for **this** month or **this** wet season. Other things always take priority. This can be helped by showing the link between tree-growing and food-growing...

- Trees help to prevent soil washing, or blowing, away.
- They provide foliage for livestock to eat or to use as a mulch for vegetables.
- They may enrich the soil.
- Fruit trees bring direct benefits.

Make these points in village meetings, using visual aids or even puppet shows (this has been very successful in the Nile province of Sudan) to raise awareness. Keep people's interest by asking this question:

"How would you like your village and its surroundings to be in ten years time?"

This helps the villager to think beyond the immediate, very pressing, day-to-day needs. The question sows the seed of a vision for the future, as it says in Proverbs 29:18: "Where there is no vision, the people perish". This is particularly important in long-term forestry projects.

Their Request

The next step is for the villagers to request help with tree-planting projects. Sometimes this can be helped by successful demonstrations. In Ethiopia in 1980, successful tree-planting by the Kale Heywet Church, encouraged local Kabele leaders to enquire about a forestry project on their own ground. Out of this, the Bilate project has grown and now covers many hundreds of hectares.

Nothing succeeds like success, and good demonstration plots can stimulate enquiries and interest. At Bilate, the project's own success has led to neighbouring Kabeles wanting to participate. Today, eight are involved and there is now woodland running some 30km along the Bilate river, where before there was none.

There have been many visitors to Bilate and they have been very impressed. The villagers feel proud of their achievements

and this further encourages others to copy and join in.

Their Land

Trees often appear to compete with land for food growing, but this is not necessarily true. Trees will grow on poor land unfit for farming; they can be planted at field corners, beside roads and in compounds.

At Bilate, there was concern that a forestry project would reduce the amount of land available for rough grazing by livestock. So the villagers themselves decided where the project boundary would be and exactly which land would be set aside. They also agreed where access through the project to the river, would be kept clear, to allow watering of their animals. In fact, they have even provided herdsmen to guard the project's boundary against their own cattle.

Their Work

Involvement with a project needs a long-term commitment in terms of labour. Initially, this commitment can be encouraged by giving different people responsibility for planting and maintaining certain plots of trees. As people see poor and denuded land being brought back to life again, their commitment to the long-term labour needed is likely to increase.

Trees need looking after – as they are cared for, appreciation of them, and their value, increases.

Their Benefits

The final ingredient for successful community-based forestry is for the benefits to come back directly to the people themselves. All doubts about land tenure, whose the produce is, how it is going to be shared out, must be settled early in the project. These are often just the matters a village committee can sort out.

As early as possible in the life of the project, some produce, such as grass for thatching, or prunings from young trees for firewood, should be obtained by the villagers for their use. This will set the pattern for the future and establish clearly that the new woodland belongs to them. Many a project has failed after much initial



enthusiasm, when there has been a hint that the people whose labour has created it are not going to reap the main rewards.

A Hoped-For Result

Isaiah (55:13) plainly describes the turning of poor, rough, ground to productive woodland as a way of honouring God. The Government's inspection of the project at Bilate this year (1990) describes it as "the best model of sound ecological

improvement for the surrounding areas". Such are the results of the local church's willingness to get involved almost ten years ago, and still to be involved today.

Dr Julian Evans works for the UK Forestry Commission and is Tear Fund's Forestry Consultant. He is author of "Plantation Forestry in the Tropics" (reviewed on page 8).

LESSONS FROM NAROK

Have you ever thought how trees can help us with the problem of lack of water?

If you go to the village of Olendeem in Narok District in Kenya and talk to some of the Maasai elders, they will tell you that years ago, a lot of the land that is now under cultivation, used to be forest. They will also tell you that there used to be many fresh-water springs where they could obtain water, but, one by one, these have dried up. Obtaining sufficient water in this area is now a big problem.

Unfortunately, only a few people in this part are able to collect rain-water from their roofs, as the majority of Maasai live in houses with roofs made

of bark, or else flat roofs covered with cow-dung.

Why is there so little water in the springs now? The roots of trees help the soil to act like a sponge so that when it rains, the water soaks into the soil. If there are no trees in the area, most of the rain rushes downhill on the surface, into the valley to fill up streams, often taking the topsoil with it. However, if there are many trees, the rain-water is held by the soil and roots and then released drop by drop, so keeping the springs flowing.

Now the people of Olendeem are aware of this, they have stopped cutting down trees around the remaining springs and have, instead, begun to plant trees.

Sue Hanley



The tree nursery run by the church at Narok, Kenya.



FROM THE EDITOR

In the book of Proverbs we read: "A good man leaves an inheritance for his children's children". In these days of global de-forestation, trees and forests may be a truly precious inheritance to leave for our children and grand-children.

In Sue Hanley's article, we read of how trees can affect the local water supplies. In many countries today, such huge quantities of trees and forests are being cut down, that not only are the local water supplies and climate changing, but the whole world's climate is being affected.

In planting trees ourselves, and in encouraging our communities to plant trees, we are improving our own lives in the future, at the same time as ensuring that there will be a pleasant future for our children. Trees improve the quality of our lives, by providing shade and beauty, fuel, fodder, fruit, timber, paper and many other things, in addition to protecting the soil from erosion and water loss. We hope this issue of *Footsteps* will help you to reflect on the value of trees and encourage you to plant, and care for, more trees.

In our next issue, we will be looking at how communities are responding to the challenge of AIDS. Following this, we will look at Home Gardens. Please write in and share your experiences.

Isabel Carter

AGROFORESTRY

by Mike Carter

The term "agroforestry" has only been widely used for 10 or 15 years. It involves growing trees together with crops and sometimes livestock on the same land.

There is nothing new, you may say, in growing trees and producing food together. You would be right. It's a new name for an old practice. Many people, particularly in warm climates, have practiced this sort of farming for generations. Today scientists have realised that agroforestry systems are very efficient. Generally they are...

- more productive, in food or income
- more dependable with less risk of failure
- more sustainable, continuing to yield in the long-term.

Why is agroforestry efficient?

1 The land is farmed in many layers.

For example, if maize and beans are planted among trees, some products grow near the ground, other grow higher up. Climbers, like passion fruit, may go from one layer to another. Beans and maize have shallow roots, taking their water and nutrients from near the soil surface, while the tree roots draw their water and nutrients from deeper in the soil. All this makes for an efficient use of light, space and other resources.

2 The land receives long-term protection from wind and water

erosion. This is particularly important during the dry season when there may be little soil cover from annual plants.

- 3 An agroforestry system tries to copy the natural vegetation. Several different crops and trees are grown, not just one. Crop wastes, animal manures, leaves, green manures and any other organic matter are returned to the soil for recycling.

Many systems of agroforestry occur. Mature trees are left or young ones planted in crop fields. Acacia and Prosopis trees are commonly used for this, e.g. *Acacia albida* and *Prosopis juliflora*. But there are hundreds of others. Local trees are usually best. Look to see which local trees allow crops to grow well nearby.

Alley cropping

Another system of agroforestry that is being tried widely in many countries is known as "alley cropping".

Lines of trees are planted closely in double-rows or hedges, perhaps 5m apart. If the land is sloping, the lines follow the contour. Once the trees are established, they are cut back regularly and the leafy material is placed on the soil of the "alleys" in between the lines of trees. Annual crops can be planted in the alleys. They benefit from the organic matter and plant foods released as the leafy material rots as a "green manure". The green manure protects the soil from heavy rainfall. It acts as a mulch, reducing weed growth and soil



Growing trees and food crops together in Bali, Indonesia.

temperature. It also helps the soil to store water and reduces the need for ploughing or cultivating.

The trees used in alley cropping will generally be legumes which help improve the soil by adding nitrogen. They need to be fast growing, multi-purpose trees with a deep root system that will not compete with the crop roots. Local trees may be useful. Sometimes trees from other countries can be grown. These are called exotic trees. Some useful species for alley cropping are *Gliricidia sepium*, *Calliandra calothyrsus*, *Leucaena leucocephala* and *Sesbania sesban*. As well as being legumes, all these can provide fuel, building material and livestock fodder.

If you are planting annual crops in the alleys then the trees need to be cut back to 0.5m in height, three or four times a year, whenever they grow more than 1.5m tall.

If you want to leave the alleys fallow for a year or two, you can allow the trees to grow tall if you need fodder or fuelwood. Cut them back again when the fallow period has ended.

Larger trees, such as avocados and mangoes, can be grown with alley cropping systems, mixed with shorter trees such as bananas, citrus, pawpaw, *Leucaena* and *Gliricidia*. The rows need to be much further apart.

Mike Carter worked with Tear Fund in Kenya and is now head of T-CORD (Bishop Burton College of Agriculture).



Alley cropping, showing one line of trees cut back and another before cutting. A crop of young maize is growing in the alleys.



Appreciated

I wonder whether all your readers enjoy and gain as much from the esteemed paper as I do. *Footsteps* really gives us all we would like to know about our precious lives, while still battling for the eternal one. Apart from the health advice we get from it, we are also encouraged with bible studies for our spiritual health. I like to hear of how God uses his people in research work to help us with things like vaccines for the dreaded malaria.

After reading from your past papers about local alternative cures for some minor ailments, I have experimented with some and come out with very encouraging results.

Finally I would like to tell you that it is a pity I cannot keep my copies since my friends and workmates who find the paper very helpful, scramble for my copies. In the future we would like to contribute to the magazine if we know the next issues in time.

May the Lord keep you up for this good piece of work, and may many gain from it.

Robert Muga Adongo, Nyilima, Kenya

Rural development project

The Reformed Church of East Africa started the Integrated Rural Development Programme (IRDP) in 1986 to respond to the pressing needs of shortage of food and finance within the rural communities.

I joined the programme as a facilitator in 1988, when the Project began an extension programme. We wanted to reach the whole family, working mostly through the adults. Most were

illiterate, but a few could read at least Swahili. We encouraged people to form groups to share their experiences.

We introduced an agricultural correspondence course, which is offered by INADES. Their courses are simple to read and follow and are very practical. The first courses, in General Agriculture, were available in Swahili, as well as English. Later courses, in Management and Development Studies, will soon also be available in Swahili.

INADES recommend that people study together in groups of eight. We now have 45 of these study groups coordinated by our programme. Both men and women study together and find the courses help them to adopt new techniques in farming, which means they can produce more food for their families and for sale.

Ezekiel Sitienei, Eldoret, Kenya

(Editor: For details of INADES courses write to: PO Box 14022, Nairobi, Kenya. The courses are of great benefit, and I would thoroughly recommend them. All are available in French as well. A small fee is involved for each group.)

Banana Flowers

I was very interested to read Sharon Smith's letter on the consumption of banana flowers in Ethiopia (Footsteps No 3).

I have eaten cooked banana flowers in Bhutan, though they are not a very common food here. They contain some iron, reasonable quantities of Vitamin A precursor, Vitamin C and some B vitamins. So they are not only tasty, but also reasonably nutritious. The buds seem to be of similar nutritional value.

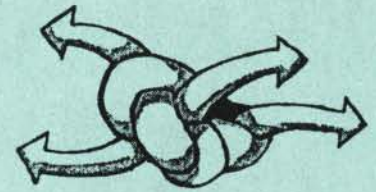
Andrew Schachtel, Thimphu, Bhutan

While living in Sri Lanka, we regularly ate banana flowers, usually cooked in a curry. We also ate the inside of the stem – just the youngest part!

Jerry Adams, Tear Fund, UK

CORRECTION...

The new address for people wanting to order "Where There is No Telephone" is: BMS, PO Box 49, Baptist House, 129 Broadway, Didcot, Oxon, OX11 8RY, UK.



KNOTTY PROBLEMS

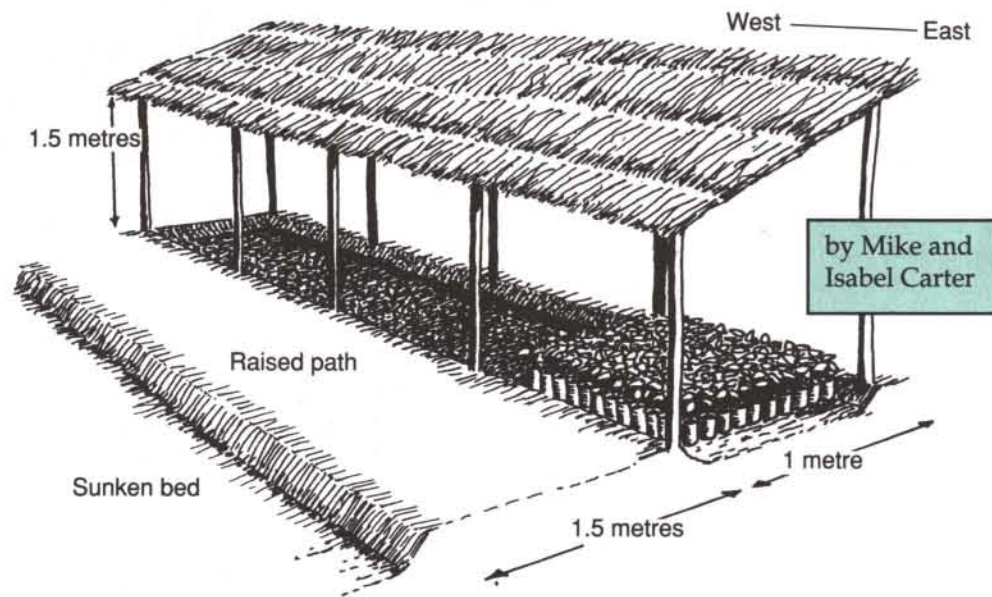
Sue Hanley, a midwife with experience in Sudan and Kenya, provides some helpful answers to Dorothy's problems, concerning traditional practices at birth in the area of Cuzco, Peru (Footsteps No 4).

Dear Dorothy,
You certainly have a problem – four in fact – so I'll take each one in turn:

- 1 Couldn't you get the local midwives, or those helping the delivery, to tie the belt a little higher, i.e. above the uterus and just below the ribs, where it shouldn't interfere with the last stage of labour?
- 2 It does not really matter if the cord is cut with a piece of tile or pottery, as long as it is sharp and it has been sterilised. I think you should concentrate your efforts on these, rather than trying to persuade people to use something else.
- 3 If there are other nutritious foods for the mother to eat, does it really matter if she doesn't eat those you mentioned?
- 4 Staying in bed for 15 days seems to be the biggest problem. Could you use the argument that their body is always "open", as they must realise when they menstruate? Does the uterus become infected at this time too? My only other suggestion is that you choose a lady, as an example, who has not stayed in bed for 15 days after her delivery and is fit and well.

I hope these suggestions are of some help!

TREE NURSERIES



Take care when choosing a site for a tree nursery. It should be close to a permanent supply of water. Remember the nursery will be full of seedlings during the dry season. The site must be on well drained land that does not flood, with a supply of fertile soil nearby. It will need to be protected from animals.

1 PREPARATIONS



TOOLS

You will need a hoe, machete or large knife, shovel and watering can (you could make one from a large tin with holes in the base). A wheel barrow would be very useful.



SOIL MIXTURE

Mix together well with a shovel: 4 parts fine topsoil, 2 parts sand, 1 part old manure.



CONTAINERS

Plastic forestry bags (6cm x 15cm) are ideal. (Larger ones may be needed for fruit trees.) These can be open-ended in wet areas and closed-ended in dry areas. If you cannot get these, try using tins with holes for drainage, or milk containers. Alternatively, use nursery beds and wooden boxes.



SEEDS

Collect ripe seeds from many trees, but only from the best ones. Also ask for seed from other nurseries or Government forestry workers. Store seed in air-tight containers with clear labels.

2 CARE OF YOUNG SEEDLINGS

Many tree seedlings need about four months in a nursery before planting out. Plan your sowing so seedlings will be ready during the rainy season. Very hard seeds, such as Acacia and Leucaena, should be soaked overnight in very hot water (not boiling) to help germination.



SOWING SEED IN BAGS

Fill bags or containers, shaking down the soil. Place in groups of 100. Water very well. With large seeds sow 2 or 3 seeds in each bag.



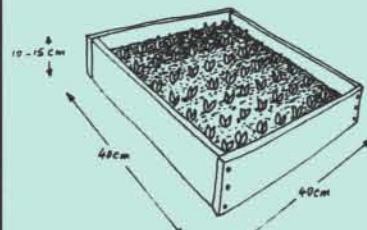
NURSERY BEDS

These are used for very fine seed, or if you have no bags or containers. Soak bed with plenty of water before sowing. Cover with fine soil.



PRICKING OUT

The young seedlings need to be pricked-out. Loosen soil. Lift up seedlings gently and place in container. Plant out into bags, boxes or beds. Make sure the roots have plenty of room. Press soil firmly around seedling.



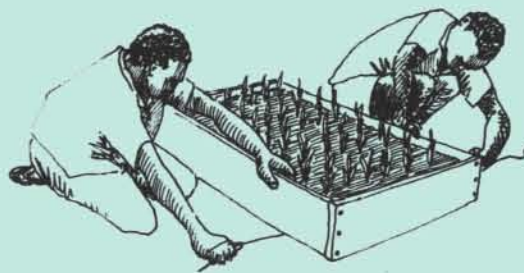
BOXES AND SWAZILAND BEDS

If you have no bags, but plenty of wood is available' make small, movable boxes with bases, for 49 trees. If there is little timber, build Swaziland Beds. These have no base and can be as large as necessary. Paint timber with old engine oil to protect against termites.



PRUNING

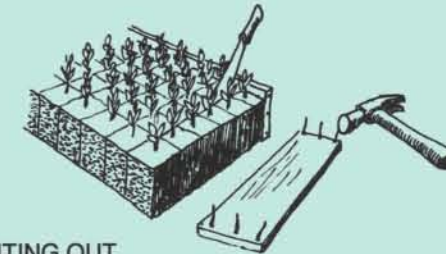
Keep seedlings shaded and water regularly. Prune roots to encourage strong root growth. To do this simply move the bags each month. With boxes cut the soil into squares. Use strong wire (e.g. a fine guitar string!) to prune the roots under Swaziland Beds.



3 PLANTING OUT

HARDENING OFF

This means teaching the seedlings how to survive outside the nursery. 4 - 6 weeks before planting out, gradually remove the shading in the nursery. Begin to reduce watering.



PLANTING OUT

Water boxes well. Remove sides, cut squares again and carefully place the seedlings into trays or boxes to carry to the planting site.



Prepare large planting holes. If possible, break up the hard rocky subsoil in the bottom of the hole and add a little manure. Place seedling in hole at the right level. Now remove bag or container. Replace soil and press down firmly.



If rainfall may be low, make a small hollow around the tree to catch water.



If trees are planted on a slope, make V shaped ridges to catch rainwater.



Protect well with thorns from livestock. Water, if possible, during very dry periods until established.



For tree seedlings near the house during dry periods, fill a bottle with water. Quickly turn upside-down and press into soil near roots. The water will slowly seep into the soil. Or use a clay jar that allows water to seep through.

Agroforestry Today

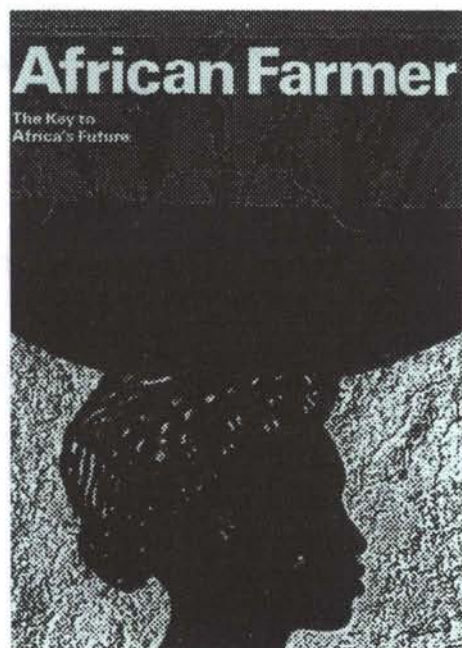
This is a free, fairly technical, newsletter which would be helpful for people working in Agroforestry. It is available in English and French.

Write, with a brief description of your work, to:

The Editor, International Council for Research in Agroforestry, PO Box 30677, Nairobi, Kenya.

A Practical Guide to The Correction of Iodine Deficiency

This is a detailed manual describing the problems caused by a lack of Iodine in the diet, and ways in which to prevent Iodine deficiency. It is available, free of charge, from offices of UNICEF or WHO worldwide. It would be helpful to anyone involved in health work, the training of health workers or working to improve nutrition.



African Farmer

This is a quarterly publication of the Hunger Project. Its aim is to help in the fight against world hunger. It contains articles from all over Africa on improvements in agriculture and new ideas. It is available, free of charge, in both English and French from:

Carol Coonrad, The Hunger Project, Global Office, One Madison Avenue, New York, NY 10010, USA.

Boiling Point

This is a journal of the Intermediate Technology Development Group's (ITDG) Fuel for Food Programme. The journal provides mainly technical information about new developments of fuel-saving stoves in different countries. Technical enquiries can be answered by the stove team at:

ITDG Fuel for Food Programme, Myson House, Railway Terrace, Rugby, CV21 3HT, UK.

FAO Publications on Forestry

There are two booklets available which may be helpful as general reading on Forestry.

Tree Growing by Rural People (64 pages)

Forestry Extension Organization (66 pages)

Readers working in tropical countries may be able to obtain copies free. Write, giving a brief description of your work, to:

FAO, Publications Dept, Via Terme di Caracalla, 00100 Rome, ITALY.

Plantation Forestry in the Tropics

by Dr Julian Evans
Oxford University Press (472 pages)

Price £6.00 in a cheap ELBS edition. A detailed study of large scale forestry practices. Available in large bookshops in most countries.

Improved Wood, Waste and Charcoal Burning Stoves: A Practitioner's Manual

by W Stewart et al
Intermediate Technology (240 pages)
ISBN 0 946688 65 6

A detailed, practical and clearly laid out book, describing 28 different types of stove, with details of their construction and use. Excellent for anyone involved in working with any kind of stove-building programme.

Price £9.95. Available in large bookshops in many countries, or order from: IT Publications Ltd, Unit 25, Longmead, Shaftesbury, Dorset, SP7 8PL, UK. (Postage: £2.50)

Tree Seeds for Africa

The Henry Doubleday Research Association has a three year project to encourage the introduction of useful tree and shrub varieties in Africa. Seeds are available, free of charge, to development groups in Africa. If you would like to request seeds, write, including the following details: type of soil, rainfall and climatic details, height above sea level and future use of the trees (ie firewood, fodder, building, etc.). Helpful practical instructions will be included with the seeds. Write to:

Dr Phil Harris, HDRA, Ryton-on-Dunsmore, Coventry, CV8 3LG, UK.

NEWS

Pas à Pas

This is our first edition to be published in French. We welcome all our new readers. We hope that you will find *Pas à Pas* a real help in your work with health, agriculture and development.

Our next edition (looking at AIDS) will also be available in Spanish – *Paso a Paso*.

Fast growing tree with many benefits!

Tagasaste (*Chamaecytisus albensis*) is a small, fast growing, nitrogen fixing tree. It is similar to *Leucaena*, producing fodder for livestock, and also useful as a hedge or for alley cropping. It is able to grow on very poor soil and copes with long dry seasons.

The following groups are distributing Tagasaste seeds free of charge in small quantities:

NFTA, PO Box 680, Waimanalo, HI 96795, USA

ECHO, 17430 Durrance Road, North Meyers, FL 33917, USA.

Keith J-Fisher

MOTIVATING INDIVIDUALS TO CARE FOR TREES

IF YOU ASK FARMERS in the hills of Nepal what benefits are received from trees and the forest, they will answer without hesitation. Starting with tree leaf-fodder for their livestock (their only source of manure), they will continue with firewood, timber, fruit, animal bedding and shade. They may also mention the rather less obvious benefits of improving water resources and preventing soil erosion. However, if you then ask whether they have planted any trees recently, or whether they have enough trees on their land to meet all their needs, they will usually say "no".

What causes this problem?

At a recent meeting of forestry field workers in Okhaldhunga district, the reasons why so few trees are planted were discussed:

- The Government controls most of the forest and farmers felt they had little security for their trees, even when they were planted on their own land.
- There were few forestry extension workers to explain the benefits of tree planting.
- Government Forestry staff showed a lack of respect towards villagers and tended to order them around.



- Poor people find it very difficult to take part in any activity which does not bring quick benefits.
- Food production and other essential tasks already take up all the available time.

Solutions

The discussion continued by trying to discover solutions to some of these problems.

People's fears about the state control over trees were often based largely on rumours and were untrue. The local Forestry Officer could be invited to speak to village groups about the legal right to use the products from trees planted on village land. This might help to remove people's fears, leading to increased trust in the Government.

Good extension work involves listening to the villagers and helping to solve their problems with the resources they have available. This

attitude is often lacking in official extension workers, who may have been educated in the city and may be reluctant to go back to the rural areas. For this reason, a local leader (facilitator) can often do extension work more effectively.

Training programmes can also be very effective in motivating people. Most farmers already have a good knowledge about trees and the benefits they bring. Groups of farmers can come together for about a week during the dry season, when there is little agricultural work. With the help of an extension worker or local facilitator, they can learn together and discuss how trees can be used to improve the situation in their own community. Ideas and plans can be developed within the group, both for individual and community action.

For example, a group of villagers from Devasthan in Western Nepal, felt that the lack of seedlings was a problem.



Encourage farmers to try out different species on their own land.

COMMUNITY INVOLVEMENT

Some of the farmers attending the course, decided to set up small private nurseries, raising seedlings for sale to their neighbours. A plentiful supply of seedlings helped the whole community.

Project demonstrations of new tree species, or methods of cultivation, are rarely very effective. But if you can interest local, enthusiastic farmers to try out new species and ideas on their own land, then surrounding farmers will be more likely to copy successful results.

One such demonstration farmer said: "Everything we need comes from the forest. The forest satisfies our own needs and can also help us to make money. Five years ago I had one buffalo. I had to go up the hill and walk for four to five hours to collect enough fodder. Now I have six buffaloes. I only cut fodder for one hour in the morning and one hour in the evening on my own land to get enough. If I had not planted trees, I would have to send my children to collect fodder, but now all four of them are studying at school."

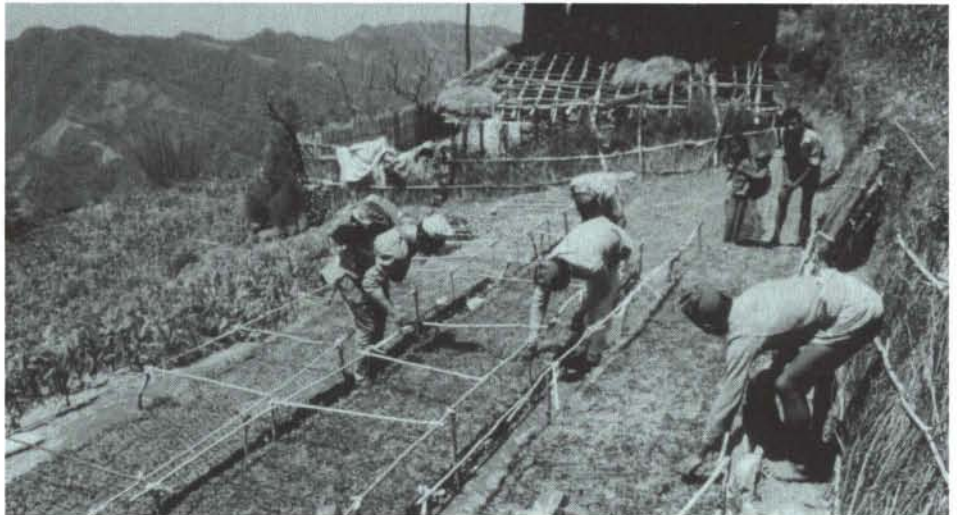
Tree species which grow quickly and bring the farmer rapid benefits are very useful for encouraging interest. Once an interest in tree-planting has been established, then people may be more willing to plant slower-growing but more valuable trees.

Conclusions

There are problems to overcome in encouraging people to care for trees. But if this is done effectively, most communities will respond well. Probably the most important factor that we have identified is the need for a facilitator, either from the local community itself, or from outside. They will need to have not only technical knowledge, but a respectful and caring attitude to the community, and a real concern for their work.

A village leader from the Lalitpur district in Nepal said: "For forestry development we need unity." The role of a facilitator should be to encourage that unity.

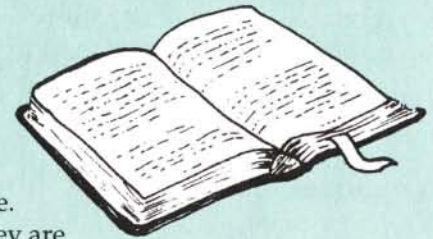
Keith J Fisher has worked as a forester in Nepal for many years supported by Tear Fund.



A small, privately run nursery.

BIBLE STUDY

by Dr Julian Evans



Trees are often mentioned in the bible. They remind us of God's creation; they are used as a picture of the mature Christian, and we read about how the Jews used them with care.

1. Read Genesis 2:9. How does God regard trees?

At the other end of the bible, we find it is a tree which is used to picture eternal life and to restore God's people. **Read Revelation 22:2.** Why do you think God chose a tree to illustrate eternal life?

This tree symbolises the completion of God's saving grace in Jesus Christ. How grateful we are that it was on another tree, the Cross, that our sin – begun with Adam and Eve disobeying and picking the fruit from the one forbidden tree – was atoned for. (**Read I Peter 2:24.**)

2. Read Psalm 1:1-4 and Jeremiah 17:7-8.

How can Christians be compared to trees? What do these verses teach about the Christian's faith and what happens to it in times of difficulty?

3. Our stewardship includes caring for trees and using them for good. In the bible we find the perfect balance. For example, Noah built an enormous ark of wood to save life (Genesis 6 and 7); Solomon traded with King Hiram of Tyre to buy cedar of Lebanon to build the holy temple (I Kings 5).

Read Deuteronomy 20:19-20. What commands are given here about the use of trees during war? Here is plain teaching that we have no right to destroy trees and forests without a real need. Indeed we find the bible goes further. The reclamation of waste-land, to clothe it with useful trees, is prophesied by Isaiah (55:13) for the Lord's glory. The joy of God's people, whom he has redeemed, described in the previous verse (55:12), is shared by creation itself – even the trees of the field "clap their hands". God likes trees!

4. Read Isaiah 53:2. What picture of our Lord Jesus Christ does this verse give you? How unexpected, and how marvellous in our sight, is the blooming of the desert; how much more astonishing is the coming of Jesus and the unfolding of God's plan of salvation!

GRAFTING CITRUS TREES

by Mike and Isabel Carter

Many of the fruits we eat come from trees. Fruits are an important human food, rich in vitamins. Some fruits, such as papaya and passion fruit, grow easily from seed. But if you have tried growing citrus fruit from seeds, you may have been disappointed with the results.

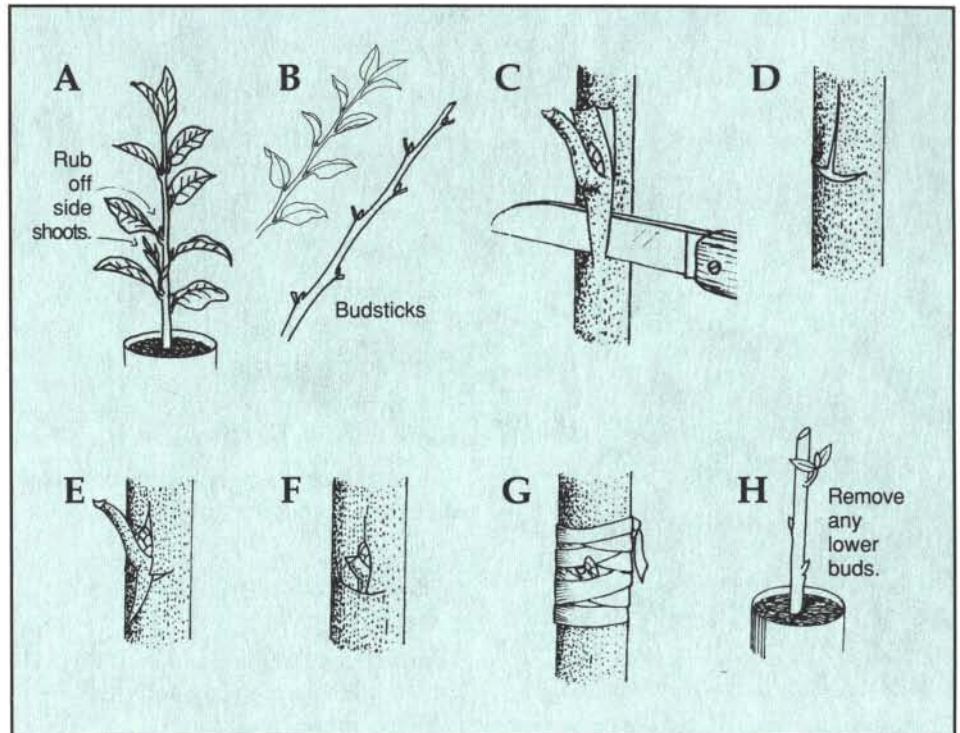
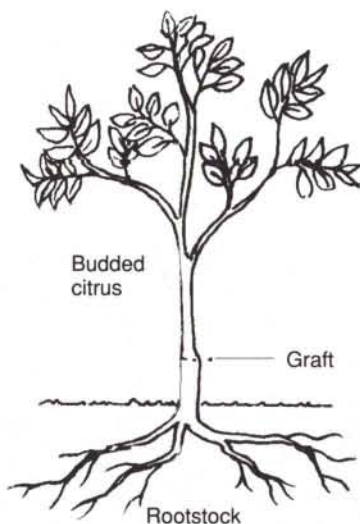
These trees will take many years to produce fruit, and the fruit is often not very good. These problems can usually be avoided by raising grafted fruit trees. Many people think that bud grafting is too difficult for them and needs to be left to experts. In fact, with practice, it is very simple.

What does bud grafting mean?

Bud grafting means taking a small bud from an excellent mother tree and joining it under the bark of a young seedling (called the rootstock) which will provide the roots for the new budded tree. The budded tree will have the stem, leaves and fruits of one type, and the roots of another type.

How does budding help?

- Budded trees combine the good points of both the mother tree and the rootstock.



- They start bearing fruit after only three or four years.
- Some types of citrus do not have seeds, so they can only be produced from buds.
- They do not grow so tall, so they are easier to pick.

How do you raise budded citrus trees?

You must first raise rootstock seedlings. The seeds from large, rough-skinned lemons, or sour orange, are grown in nurseries to provide the rootstock. All types of citrus – orange, tangerine, grapefruit, lime and lemon – can be budded onto these rootstocks.

- 1 Choose only the best seed from fully ripe fruit. Cut them carefully and plant the seed straight from the fruit. Do not store this seed.
- 2 Plant the seed in large, strong, plastic forestry bags (20cm x 30cm) or in large tins with holes in the base. Grow in a tree nursery for about a year. Allow only one strong stem to grow; rub off any small side shoots (A).
- 3 When the stems of the rootstocks are as thick as a pencil, collect budsticks from healthy, high-yielding citrus trees of the kind you want. Cut off the leaves carefully (B). Use immediately or

wrap in a damp cloth to store for up to two days.

- 4 With a very sharp knife or razor, remove each swollen bud, starting just above the bud to 2cm below, to make a "tail" (C). Don't touch the cut face of the bud – hold it by the tail.
- 5 Cut an upside down T shape into the bark of the rootstock about 30cm above the soil (D).
- 6 Open the bark gently with your knife. Push the bud gently upwards into the cut, under the two flaps of bark (E). Cut off the tail (F).
- 7 Wrap a thin strip of clear plastic (cut up bags) firmly around the bud (G). Remove the plastic after three weeks. If the bud is still green, you have succeeded in citrus budding! Congratulations! If it is brown, try again a little lower down the stem.
- 8 Cut off the top of the rootstock just above the bud. Remove any lower buds that start to grow (H). When the new bud is one metre tall, remove the top and allow four strong branches to grow.

Before you start, practise grafting buds from an older citrus back onto itself.



Traditional methods of cooking on open fires waste a lot of fuel.



Fuelwood becomes more expensive to buy as trees are cut down.

ENERGY-EFFICIENT COOKING STOVES

by Magdalena Blum

A VAST MAJORITY of women, especially in densely populated areas, are experiencing an ever increasing shortage of firewood. They find they have to spend more and more time gathering enough firewood, or agricultural wastes such as coffee or tea branches, maize cobs and stalks etc.

Meeting the daily needs for fuel to cook the meals for the family is often a struggle for women. As more and more land is cleared for agriculture, the problem increases. Few trees remain. Planting more trees is vital, but conserving firewood or fuel is also essential.

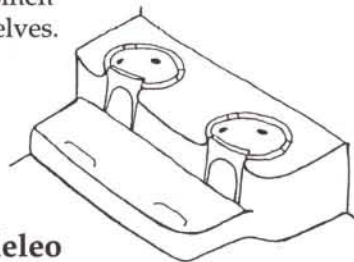
The "Women and Energy Project" and its aims

In Kenya the "Women and Energy Project" (WEP) began in 1983 with the help of the German Agency for Technical Cooperation (GTZ) and the Kenyan Government. It aims to improve the living and working conditions of the rural population and especially women by:

- reducing fuelwood requirements through the introduction of energy saving cooking stoves, called

Maendeleo Stoves. (*Maendeleo* means *progress*.)

- improving fuelwood availability through tree planting activities by the women themselves.



The Maendeleo Stoves

These stoves save 30-50% of the firewood which is needed for the traditional method of cooking on three stones. The Maendeleo stove is the cheapest available on the Kenyan market. The stove insert, made out of fired clay, is bought for KSh33 (just under £1 or \$1.50). The rest of the stove is built by the women themselves, using local material (sticky soil and stones, mainly) which they are already familiar with from house construction.

Yet the stoves have many more advantages. They...

- reduce smoke in the kitchen
- keep the kitchen clean from ashes
- work well with all sorts of agricultural waste
- save children from getting burnt
- last for at least three years
- can have different shapes according to the wishes of those cooking.

The energy efficiency of the stoves is the result of the clay insert, which holds the heat and does not allow it to

escape from the sides. The clay inserts are produced in pottery workshops or by women's groups. This creates new jobs and uses local materials and skills.

Training in Stove-Building

The WEP began working in four districts of Kenya. Now it is working in four new districts with plans to extend into others. Government fieldworkers, members from women's organisations and development groups are trained in stove construction so they can teach others.

During training courses, women learn how to build the stoves. They are also taught how to save firewood by practices such as using a lid on the pot, using dry firewood and keeping embers overnight which can be warming water for washing in the morning.

By the end of 1989, WEP had encouraged the building of 30,000 Maendeleo Stoves in the first four districts.

Further details: Women and Energy Project, GTZ/SEP, Project Manager, PO Box 41607, Nairobi, Kenya.

Magdalena Blum worked with the WEP Project in Meru District, Kenya from 1986 to 1989. Other kinds of fuel efficient stoves are being developed in different countries. Can any readers share news about the kind of stoves they are using?

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