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and Dawn Berkelaar

ECHO is a Christian non-profit organization whose vision is to bring glory to God and a blessing to mankind by using science and technology to help the poor.

Issue Highlights

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Vegetable Gardens in Kiffa

By Stan Doerr

[Eds: Stan Doerr wrote to us about a vegetable garden project in Mauritania that quickly took off. We hope you enjoy reading about the project, some of the circumstances that helped make it so successful, and the results.]

The gardens are on the edge of the Sahara Desert, where the sand meets the very beginning of sparse thorn bushes like *Balanites aegyptiaca*, *Leptadenia pyrotechnica* and various *Acacia* species, marking the beginning of the Sahel. The average annual rainfall is 12 inches (300 mm), but we often receive 8 inches (200 mm) or less a year. Temperatures reach into the 120ºs (45–50ºC) in May and June with humidity down to 5%. We live in a place called Kiffa in the Islamic Republic of Mauritania, about 600 kms from the Atlantic coast on the northwest hump of Africa. Surprisingly, it turned out to be the perfect place for a garden.

My wife, Beth, and I came to Mauritania in 2000 to work for World Vision. I came to be the director of a development program and Beth to develop a national agricultural program. Mauritania is a country in transition from a nomadic lifestyle to a sedentary life in small villages and towns. In 1960, when Mauritania became independent from France, around 90% of the population was nomadic.

Repetitive droughts in the mid 60s, 70s, and 80s decimated the herds of livestock and forced the people to settle in small villages where they could find water. The most recent census found that only 4.7% of the population is currently nomadic. However, due to the nomadic history of the people, growing crops and gardens were not traditional skills within the culture. When we arrived in Kiffa, the only vegetable gardens that could be found were in an ancient riverbed (known as a *Wadi)* northwest of the town where the water table was fairly close to the surface. This land was controlled and farmed by just a few family groups. The few oases around the area were mostly used only for date palms.

The Plan

So there we were, in the desert, with Beth expected to develop an agriculture program. When the needs are so great the tendency is to try to address too many issues and end up doing nothing well. Instead, Beth decided to focus on three things: a small farm resource center (called the ARC for Agricultural Resource Center), a vegetable gardening project, and the introduction of the *Moringa* tree. We thought that considering the harsh climate, the ARC would be necessary for trying various crops and techniques before introducing them to the communities. With the high levels of chronic malnutrition, the vegetable gardens and *Moringa* would be the most direct and sustainable solution to this problem facing every family in the area. In this article, I focus on the effort we made to introduce vegetable gardens.

The Beginning

As recently as last year, the concept of a home or kitchen garden was virtually unheard of anywhere in this area except in the Wadis. When Beth and her team first introduced the concept of home gardens, the first obstacle was the demand for fencing. Goats rule the land in Kiffa and nothing is safe from their hungry mouths–not paper, not plastic, and especially not fresh tender vegetables. However, fencing is expensive. From a development point of view, if you start supplying fencing

to every garden project, then soon the attitude is, "If I don't have fencing then I cannot have a garden." In my experience, people who come up with their own solution to a problem usually come up with both a better and a more sustainable solution.

So what to do? Fortunately, Beth has considerable experience in working with various techniques promoted by ECHO in Fort Myers, Florida, and in working in places where rooftop or mobile gardens are needed. Beth introduced to her team the tire garden, which is just what it says it is, a moveable garden made in an old car tire (see Figure 1). [ECHO can be contacted for the design of the tire garden at www.echotech.org]

Figure 1: A woman making a moveable garden from an old tire.

Introduction of the tire garden was successful beyond our wildest dreams. Within a few weeks, you could not find a used tire in Kiffa, they were all being snatched up and turned into gardens. The tire garden immediately solved the problems of goats getting to the vegetables because now the garden could get away from the goats! Gardens were suddenly appearing on top of metal drums, mud chicken coops, even on top of old car bodies.

The Drought

To be clear in painting a picture of this success, there are two other factors that we must consider. The first is the sudden availability of seeds as the result of a gift of a 20-foot container of mostly vegetable seeds from World Vision Canada, and the second factor is the drought that hit Mauritania in 2002.

(We are cautious about disrupting existing market outlets by bringing in free seeds from overseas. However, I guess it is no stretch of the imagination to realize that a place where nobody grows vegetables would not have a ready source of vegetable seeds. In fact, our preliminary studies showed that this was a serious limiting factor in gardening. There are seeds available in Mauritania and in Senegal to the south, but with little demand for vegetable seeds in Kiffa, there has been a very small supply of seeds to the area. For the rules of supply and demand to work it is often necessary to create the demand, which in turn will lead to the supply void being met by local entrepreneurs. In this case, the seeds that were provided to start this project have been a key factor in reducing the risk to the community, allowing experience to demonstrate to people the potential of growing food for themselves.)

As strange as it sounds, the drought was good for the gardens. As a result of the drought that hit this area during what was supposed to be our rainy season, many of the animals died. One traditional coping mechanism during tough times for the people here is to sell some animals and buy imported food. Due to the drought, most of the animals have died and those that have not died are worthless. No rain means no grass, and no grass means no food for the animals, and what is the point of buying a skinny animal when there is no food for it? Cattle prices in the Kiffa area dropped from $425 a head in early 2002 to less than $100 a head by the end of October, 2002. With the drought and the breakdown of one of the most significant traditional coping mechanisms, the concept of being able to grow some of their own food became very attractive to people.

It was the combination of drought, desperation, reduced risk, key elements being provided, and truly appropriate technology that resulted in a radical transformation of Kiffa.

The Gardens

The work of World Vision in Kiffa is managed through what are known as Area Development Projects (ADPs). The Kiffa ADP works with various women's cooperatives, through which the training in tire gardening was done. After the training, each woman was given several small packets of seeds and encouraged to start a garden. We have visual images burned into our minds as we drove away from a training session seeing a woman kneeling down over an old tire with a baby strapped to her back, cutting the top rim out of a tire, starting her first tire garden!

Time passed and we began to get reports of home gardens being seen all over Kiffa. In order to verify this development Beth asked me to make follow-up visits around the town. What a development worker's dream-come-true these follow-up visits have been!

This is my report from the follow-up visits:

"The team from Kiffa ADP took me to a small garden on the eastern edge of the town. All we could see from the vehicle was a small square of tattered cloth hanging on a motley frame of old sticks and metal pieces. As we approached we could see inside and much to my surprise, those rags were protecting a lush garden about 8 meters square. Tomatoes, squash, lettuce, beetroot, cabbage—they had it all. I asked the owner of the garden if she had done gardens before and she proudly told me this was the first time she had ever grown anything. As we admired her garden, another woman came up to us and asked us to come and visit her garden. We asked where it was and she pointed to another line of rags about 100 meters away. As my eyes began to scan the area around me, I began to see numerous little enclosures made of the same combination of

rags, scrap wire, old car parts, and whatever else could protect a green place from the marauding goats. I turned to the Development Agent from Kiffa ADP and asked him, "How many of these are in Kiffa?" His response: "It would take you a month to visit every one, and all of them are first-time gardens!"

Figure 2: One of the many gardens that resulted from the project. A fence and several functioning tire gardens are also visible in the picture.

"After visiting several gardens, we went to another part of Kiffa and it was the same. It is hard for me to give you an actual word picture of what I saw. Kiffa is a very drab town. Everything is brown or sand colored and coated with dust. There are no trees, no grass, nothing but square mud houses and sand with a scattering of rocks. As my eyes got used to looking for these small enclosures of faded scraps of cloth, I began to notice them at almost every house. It was only after I got right up to the enclosure that I could see inside and see that each little refuge protected a beautiful little garden in which every inch was occupied by a vegetable plant.

"As I talked to the women who had produced these gardens, every one of them told me this was the first garden they had ever grown. It was obvious that the children were especially benefiting from these gardens. As we stood talking in the garden, the kids were constantly popping peas and cherry tomatoes in their mouth…they knew exactly what tasted good and had obviously been munching on these since the garden first began to produce.

"I asked the women what problems they were facing. Water was always the issue. Since we live in the Sahara Desert, I would not have expected anything different. What did surprise me was that nobody said fencing was a problem. When the project started, this was the main constraint. But the women had obviously found their own solution to this problem. Garden pests did not seem to be a big problem other than grasshoppers, lizards and small birds that bother anything green. I also noticed that the ladies were still using the tire gardens but instead of this being the main garden, the tire gardens were used as seedbeds and then the plants were transplanted from the tire garden into the main bed when they were large enough.

"As we began to leave the last garden for the day and were standing by the vehicle I noticed a small little boy in tattered shorts tugging on the leg of my driver. I asked what he wanted, and the driver began to laugh as he told me that the little boy wanted me to visit his mother's garden too. I reached down and took his hand, and he proudly walked me over to his mother's garden to let me admire her vegetables. It is days like this that I thank God for the opportunity to be here."

Conclusion

The introduction of kitchen gardens to Kiffa and the success of this introduction can be attributed to a combination of things. With the drought, the need for a way to meet the nutritional needs of the family was a top priority for everyone in the community, especially the women. The simple introduction of the tire gardens suddenly made it possible to grow a garden at home because it was small, manageable and could easily be protected from the goat population that troubles anyone wanting to grow something in Kiffa. Training provided the skills needed to get started and donated seeds reduced the risk of trying something new.

I specifically asked the Development team if they thought that World Vision would need to provide seeds again next year. The team said they had also wondered about that. Their survey of the community indicated that the women were so impressed with their ability to grow a garden in Kiffa that they said they would find a source of seeds next growing season even if they had to get a relative in Senegal to buy them and bring them to Mauritania.

In our high tech western world, we often think that success depends on bigger, better, and often expensive new things. It is good to be reminded that, for most of the world, simple is usually the best. It is very refreshing to know that something as simple as a packet of seeds and an old car tire has totally transformed an entire community, and especially to know that this has vastly improved nutritional levels for hundreds of children.

Bottle-cap Fertilizer

By Dawn Berkelaar

We read an article in *Appropriate Technology* (Volume 28, No. 3; July/September 2001) about farmers in Niger who used bottle caps to distribute tiny amounts of fertilizer. Despite drought conditions, farmers who used this technique harvested 50 to 100 percent more millet than those who did not.

The caps hold 6 grams of fertilizer, and one capful was used for two or three plants. The amount of fertilizer used was only one-third or even less the amount usually used in Europe and North America.

Niger is in the Sahel in the north of Sub-Saharan Africa. Soils in that area lack phosphorus (P) and are low in nitrogen (N)

and organic matter. Plants respond dramatically to even small amounts of fertilizer.

The "Coca-Cola" technique (so called because coke bottle caps are most often used) was encouraged in the region by researchers working at the Sahelian Centre of the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) in Niger.

We heard about a similar technique from Daniel Kropf, who sent us a paper done in conjunction with the Maradi Integrated Development Project (MIDP) in Maradi, Niger, and ICRISAT in Niger. The author describes the technique as the NPK hill placement method. A 15-15-15 formulation of NPK was mixed with 100 kg of planting seed. Two conditions seem necessary for increased yields: there has to be enough soil humidity (moisture in the ground should be at least 15 cm deep), and the minimum quantity of NPK that is applied should be 50 kg/ha. If the planting density is 10,000 pockets per hectare, each pocket should receive 1 teaspoonful or 5 ml of fertilizer.

In Niger, experiments were done by farmers who were willing to use one hectare of farmland for the experiment. Half of each plot was planted traditionally by two people (a hole was made approximately every meter by one person, and seed was dropped in and covered up by the other). On the other half of each plot, three people were involved. One made a hole, the next dropped fertilizer in, and the third planted the seed and covered it.

At the end of the experiment, 67 plots were analyzed. Overall, control plot yields averaged 234 kg/ha and NPK hill placement plot yields averaged 577 kg/ha—a more than 100% yield increase!

Economically, farmers could make money if they sold the extra grain, even though they also had to buy a bag of NPK at the beginning of the season. Farmers found that fields with NPK applied had less witch weed (*Striga hermonthica*) because the nitrogen improved the soil fertility.

The author commented that NPK placed in the planting hole gives the young plants a quicker start earlier in the season. "The nitrogen and soluble phosphorus help improve the establishment of a good root system which can better exploit soil resources. The nitrogen is exhausted early in the season but the phosphorus sustains a higher crop yield through harvest." We read in the report that the Hausa name used by villagers to describe the NPK hill placement technique is "Gani Ya Kore Ji", which means "Seeing is Believing."

Pick Those Podborers

By Dawn Berkelaar

Pod borer larvae, in the genus *Helicoverpa*, can decimate a pigeon pea crop. However, an indigenous practice that was abandoned in the past in favor of chemical treatments is once again being used. We read about it in the December 2000 issue of *Spore* and also on ICRISAT's web site (www.icrisat.org). The technique is surprisingly simple. Pigeon pea plants are shaken gently so that the pod borer larvae fall off. As the larvae fall, they are collected on a sheet that is pulled along the ground between the rows of plants. A few hens follow and eat the protein-rich larvae.

The use of chemicals to treat the larvae increased gradually throughout the 1970s and 1980s, but by 1993, 100% chemical control was used in India for pod borers. Three to six sprays were done per season. When the insects began to build up resistance and spraying was no longer very effective, local people started using the traditional method again.

The technique was obviously effective, but researchers at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) decided to find out just how effective and economical it really was. The technique is more laborious than using chemicals; three people work at once, one pulling the sheet between the rows and the others shaking the plants on either side. In India where the trials were done, three people could cover 0.4 ha in a day. Yet even so, the technique was cheaper than chemical control. Shaking the plants (which required seven people) cost Rs 280/ha. Chemical treatment, including labor, cost Rs 500-700/ha.

In ICRISAT's tests, plants were shaken at 160 days after sowing, when there were an average of seven larvae per plant. Shaking resulted in an 85% reduction in insect populations, which was better control than with chemical sprays.

Whether or not a technology is being adopted says much about its value. This particular shaking technique was used at a few locations in 1997. Within two years, more than 100 villages used the technique. Several thousand farmers in three states of southern India were using the method. The report we read stated that all of those farmers continue with the method.

Additional benefits of the technique are the lack of chemical residues and the fact that natural predators (birds, for example) are likely to settle in the area.

ECHOES FROM OUR NETWORK

Alley Cropping Revisited

Ruth Poglitsh wrote to us from Swaziland regarding *EDN* 82. "I wanted to let you know that I have really enjoyed *EDN* while I have been here. The feature on ways to improve your experimentation was excellent. And I was thinking about the Malian peanut sheller as I spent nearly eight hours shelling a backpack full of peanut pods.

"On the alley cropping article, I had a couple of comments. When I was at the University of Florida, I was taught that alley cropping was not intended to be a way to increase yields/acre. The purpose was to shorten or eliminate fallow

periods. It might be an appropriate tool if (1) farmers traditionally had long fallow periods for old fields (often around 7 years) and additionally (2) population pressures now made land a limiting factor and fields could not be fallowed for such long periods of time.

"Alley cropping would then allow the farmer to maintain a lower level of soil fertility over a long period of time. This situation fits very well with Dennis Shannon's data [reported in *EDN* 82]. At first the yields are less with the alleys. But the yields are more stable over time, hence reducing or eliminating the need to fallow the field.

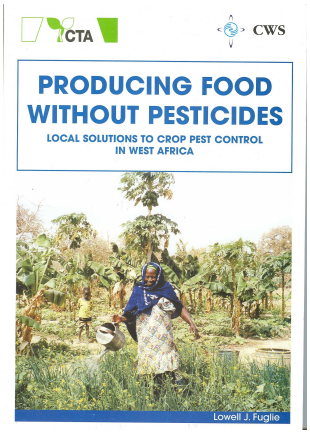
"When I visited CATIE (Tropical Agricultural Research and Higher Education Center) in Costa Rica, I asked about their experience with alley cropping. They said that results were not promising because their soil was too fertile. Not a bad problem to have.

"It would be interesting to know if Dr. Sanchez would agree with this assessment or if the data suggests that even in this limited situation the competition with water makes other alternatives more appealing."

BOOKS, WEB SITES & OTHER RESOURCES

Producing Food Without Pesticides: Local Solutions to Crop Pest Control in West Africa

By Lowell Fuglie, Church World Service Senegal
Reviewed by Kristin Davis



In *EDN* 64-5 we reviewed a report from Lowell Fuglie of the Church World Service in Senegal on his successful project with *Moringa oleifera*. He has published another book with CTA (Technical Centre for Agricultural and Rural Cooperation ACP-EU) on natural crop protection in West Africa.

Part one of the crop protection book lists 67 plants and other resources that can be used for crop pest control without having to rely on chemicals. Fuglie tells what pests each solution is effective against and gives specific instructions on how to prepare it. For example, under #19, finger millet, he lists the Latin and local name. He then writes, "Scatter stems and leaves [of finger millet] as mulch around plants to deter caterpillars, cutworms (*Agrotis spp*) and snails (*Phylum mollusca*). Sprays made from stems and leaves soaked in water can be used against fruit flies (*Tephrididae spp*). Plant finger millet around other crops to serve as a 'trap crop' against armyworms (*Spodoptera spp*)."

In part two, methods for protecting stored crops are listed. The author gives a list of over 45 plants that are effective in protecting stored food and describes exactly how to use them. Other methods such as using heat, manure and oils are also explained.

Parts three and four contain lists of the most common West African insect pests and plant diseases, and treatments against them.

Maintaining soil fertility is the subject of part five of the book. Fuglie covers composting, green manuring and the use of termites (zai holes) to increase soil fertility.

In part six, the author explains companion planting and crop rotation. He also lists the 11 most common vegetable crops for West Africa and details the cited pests and diseases for each crop, how to plant the crop and suggestions for pest and disease control.

At the end of the book are lexicons for plant disease, insect pests and plants in English, French and Latin. The plant lexicon also includes four West African languages. References for the book are cited and there is an index at the end, making it easy to look up specific plants, insects or diseases.

The book provides very simple and precise explanations of how to use different methods of crop pest control. Although the book is written for pest control in West Africa, many of the pests, plants and techniques can be found and used throughout the Tropics and the book would be useful for anyone seeking local solutions to pest control.

The book is available from ECHO's bookstore for $14.99 plus shipping. For shipping costs to your country, order from our home page or e-mail us (contact information is on page 1). The book is also available from CTA, Postbus 380, 6700 AJ Wageningen, the Netherlands or Church World Service, West Africa Regional Office, 12 rue Félix Faure, BP 3822, Dakar, Senegal.

Sustainable Food Production: A Manual of Sustainable Methods of Plant Production Helpful in Meeting Food Needs Everywhere

By Don & Lois Sobkoviak
SAND Institutes International
Reviewed by Kristin Davis

In the first half of this manual, the authors cover a history of sustainable agriculture methods, organic food production, methods of composting, bio-intensive gardening and no-till gardening. There is also a brief section on methods of natural insect control.

Somewhat unique are the chapters on the Asian natural farming technique and soil-less gardening. Asian natural farming is patterned after natural conditions, taking a no-till approach.

Soil-less gardening (also called container gardening or even hydroponics) has been well covered in ECHO literature; in fact, much of the information used by the Sobkoviaks comes from ECHO.

The most valuable chapter I found was titled "Crop Selection & Growth Guides." Although many of the charts on plants, climatic zones and growth patterns are available in many other publications, some good advice is found at the beginning of the chapter on gardening in tropical areas and how it is different to many of us who are used to temperate gardening, yet are working in the tropics to improve agriculture.

The last chapter contains sensitive material that may be inappropriate for some closed countries.

The book contains straightforward descriptions and lots of diagrams. It is available in English and Spanish from ECHO's bookstore for $15.00 plus shipping. E-mail us to find out shipping costs to your country.

FROM ECHO'S SEEDBANK

A Lesson in Agroforestry

By Cheryl Beckett
ECHO Staff

"The word "steward" derives from the old Norse word sti-vadr, meaning "keeper of the house." Within the field of conservation, stewardship generally means people taking care of the land. When a rural family takes good care of its farmland so that the soil will be healthy for generations to come, that's stewardship." (Marsh-Billings-Rockefeller National Historical Park)

Working at the Marsh-Billings-Rockefeller National Historical Site in Vermont as an intern a few years ago afforded me a valuable learning experience in the area of land stewardship. It is the only National Park in the United States that focuses on the evolving nature of land stewardship within America. I saw for the first time here in the United States an example of a piece of land which had been totally degraded through heavy logging, fires, overgrazing and erosion, now rejuvenated to a state of healthy, abundant production. I also saw an integration of farming and forestry in a sustainable and profitable way through creative, practical, and flexible techniques.

Mr. Billings bought the land in the 1860s and selected appropriate species to reforest the hillsides, combining them with pasturelands for an eventually thriving dairy farm while practicing sound forestry methods. He set a successful and sustainable standard of land stewardship now mimicked and studied by farmers throughout Vermont and across the United States.

So, what does this example have to do with ECHO and the seed bank? My time at this national park was my first exposure to agroforestry in action. The word "agroforestry" seems to have become a part of every agricultural development worker's daily vocabulary. Sometimes words can be misconstrued or confusing to individuals new to the field. Here is a quick review of the agroforestry concept before jumping into seed bank details:

Definitions:

Agroforestry: In its simplest definition (as quoted by ECHO's Technical Note "Agroforestry Principles"), "agroforestry is the production of trees and of non-tree crops or animals on the same piece of land." It should be viewed more as a creative process than as a set technique because it is ongoing, dynamic, flexible, and practical.

Agroforestry involves *deliberately* using woody perennials (trees, shrubs, palms or bamboos) with crops and/or animals on the same piece of land. These can be cultivated on a piece of land at the same time, and/or in consecutive cropping seasons. Trees are not just *allowed* or *tolerated* but planted, arranged, managed and utilized in conjunction with one or more other elements to allow a farm to function at a fuller capacity, making it more productive for a longer period of time.

Types of Agroforestry Systems:

Technically, agroforestry is a generic name for different types of agricultural systems. Here are a few of those:

- **Agrosilviculture**: Agricultural crops combined with forest crops.
- **Silvopastoral:** Trees and shrubs combined with pastures and animals.
- **Agrosilvipastoral:** Trees or shrubs combined with food crops, pastures and animals.
- **Alley cropping:** Trees and shrubs planted closely in a row with wide spaces (alleys) for food crops between the rows of trees.

Why Use a System of Agroforestry?

Use of Inputs:

The Nitrogen Tree Fixing Association (NTFA) highlights a few of the benefits of agroforestry which allow for a more efficient use of the limited resources that most small farmers face:

- **SUN:** Multi-storied crops allow for the absorption of sunlight at all levels.
- **SOIL NUTRIENTS:** Deep-rooted trees and shrubs may absorb nutrients that leach from the more shallow parts of the soil, where the roots of food crops are usually concentrated.
- **WATER:** Tree cover discourages water loss because trees shade crops, keeping them cooler, which results in less evaporation. Trees also cover more soil surface, discouraging loss of water from the soil to the air. Tree leaf mulch can help retain moisture near the surface of the soil. On the other hand, shallow-rooted trees may compete with crops for water.
- **LAND:** Erosion is reduced as trees hold the soil in place and feed the soil with organic matter. If trees are nitrogen fixing, the root microorganisms and the leaf litter will enrich the soil with much needed nitrogen.

Outputs:

The World Forestry Centre in Kenya highlights other production benefits:

- **SHADE:** Tall trees provide shade for food and cash crops, and for livestock.
- **ANIMAL FODDER**: Leaves or pods can be used as food for animals.
- **INCOME GENERATING**: Fruits and nuts can give added nutrition and extra income.
- **LIVING FENCES**: Closely planted trees form living fences around livestock enclosures, and around vegetable gardens to prevent incursions by livestock.
- **FUELWOOD/ENERGY**: Fast-growing trees provide fuelwood for family cooking and for increased income.
- **BUILDING MATERIALS:** Trees for these purposes (many of them slower-growing) produce timber for building and for furniture, as an investment for the future.
- **SOIL IMPROVEMENT**: Trees and shrubs are intercropped with other plants to improve soil quality and to control weeds and pests.
- **MEDICINAL:** Certain trees provide medicinal products from their bark, leaves, roots and fruit that can keep the family healthy and provide added income.
- **EROSION CONTROL**: Trees, shrubs and plants such as banana can be planted along the contour lines of sloping fields to prevent soil run-off in heavy rains, while at the same time supplying additional food and other products for improved nutrition and income. Cut branches left from animal feed can be used to make erosion control barriers.

Agroforestry systems allow for the production of both short-term and long-term products. For instance, in Nepal, cabbage and other *Brassica* species are grown in the shade of apple tree orchards. Cardamom is grown among Himalayan alder trees. Both native and exotic species have been used. For instance, *Faidherbia albida* (apple ring acacia; previously known as *Acacia albida*) is suited to and often indigenous to the hot dry tropics such as regions in Malawi, whereas *Calliandra calothyrsus* is more suited for the wet tropics such as parts of Nicaragua. For higher elevation tropics, *Sesbania sesban var. nubica* is more often recommended than other forms of Sesbania.

The overall creativity that these systems allow for is one of the most appealing attributes of agroforestry. Each farmer can develop a dynamic, adaptable, realistic and sustainable system suited to his or her particular circumstances. Agroforestry can be practiced by almost anyone, from the small-scale Zimbabwean farmer with under an acre to the large-scale commercial farmer as seen in the national park mentioned earlier. The main challenge in agroforestry is finding a strategy that fits your area, needs and resources.

If you are interested in further information regarding agroforestry, ECHO has a Technical Note available called "Agroforestry Principles." The following websites are also excellent resources for information on this subject:
www.winrock.org
www.agroforestry.net
www.worldagroforestrycentre.org

We carry many different species of tree and shrub seeds in our seed bank. All are available in trial packets, and some can be purchased in small bulk quantities. A list of available seeds can be found on our web site (www.echotech.org). Below we highlight just a few of the species that we recently obtained from Agroforester (available in trial packets).

Acrocarpus fraxinifolius

Common names for this tree include acrocarpo, khang chang, cedro rojo, fresno hindú, Kenya shade tree, lazcar, mundani, pink cedar, and shingle tree.

Acrocarpus is native to the tropical regions of Asia. It is a fast-growing deciduous tree, which can grow 1.3 to 3 m annually and can attain heights of 30 to 60 m (see Figure 3). The species grows in acid and calcareous soils, at elevations between sea level and 2000 m with annual precipitation between 500 and 3000 mm and temperatures between 15 and 26°C. It is very sensitive to frost. *A. fraxinifolius* is a pioneer and grows best with plenty of light, but tolerates slight shade when young. The wood of *A. fraxinifolius* is hard and strong. Because it physically resembles ash and walnut woods, it is used as a substitute for these two species. Although a legume, it apparently does not fix nitrogen. *A. fraxinifolius* is deep rooting, with roots up to 4.5 m into the soil.

Figure 3: Acrocarpus fraxinifolius. Photo by Herbert Menendez, in Agroforestree Database (www.worldagroforestrycentre.org)

Major uses for this tree include fodder, apiculture, fuel, and timber. Other benefits include:

Erosion control: Due to its deep root system, it is recommended for holding soil in place on hillsides and along rivers.
Shade or shelter: It functions as a shade tree on tea and coffee plantations in countries such as Kenya and Uganda.
Land Reclamation: It is a good species for reforestation of open areas.
Soil improvement: Leaves are suitable for mulching.

Faidherbia albida

Common names include anaboom, haraz, apple ring acacia, white-thorn, and arbre blanc.

This nitrogen-fixing acacia is best suited for arid and semi-arid regions. Best growth and production can be found in areas with a high water table, and loamy, sandy clay soils that drain well. The

apple ring acacia can grow with mean annual rainfalls between 300 and 1800 mm and is able to survive extended dry periods. It grows at altitudes ranging from 600 to 1800 m. It is very thorny.

The apple ring acacia is unique because it provides shade for animals during the sunny dry season, and then loses its leaves at the beginning of the rainy season, just as farmers want full sun for their crops. Leaves can be used for mulch. The leaves and pods can also be used as fodder and are an important source of protein late in the dry season. While most other species flower before or during the rains, the apple ring acacia flowers and leafs out at the end of the rainy season. It is a main source of pollen and nectar for bees during this time. Since seeds are set later, usually towards the end of the dry season, the edible seeds may provide food during times of famine. In West Africa, it is intercropped with sorghum and millet. It is deep rooted, thus not competing with shallow rooted crops. A spacing of 50-100 trees per hectare generally provides substantial nutrients for the season. Some other uses for *Faidherbia* include production of fuelwood or construction wood; windbreaks; and soil conservation.

UPCOMING EVENTS

ECHO's Eleventh Annual Agricultural Missions Conference

ECHO, Fort Myers, FL, USA
November 9-11, 2004
By Martin Price, Executive Director

When ECHO began, 23 years ago, nearly all agricultural development workers were in underdeveloped countries. Most of them worked in tropical or subtropical climates. We have been carefully watching as opportunities continue to open up for development workers to work in former or current communist countries. We are now in contact with a modest but increasing number in the "stan" countries, e.g. Afghanistan and Kazakhstan, Eastern Europe, and even Mongolia and mainland China. Another trend is that more are now working in the Middle Eastern countries, often in agricultural business development.

These people mostly work in temperate to subtropical climates. A new window of opportunity for ECHO is to minister to those working in "northern agricultural development." We are exploring how to enfold our smaller but growing "northern network" into the existing core ministries oriented to our "southern" tropical/subtropical network. How do the needs for training and technical backup for northern development workers differ from those for southern development workers and how are they the same?

We have decided to make the needs and issues facing northern agricultural development workers one of the featured themes at this year's conference in Fort Myers (November 9-11) where such things could be explored. We already have the first speaker lined up: Dr. Jim Goering, formerly with the World Bank and now frequent consultant to World Vision. He will talk about his visit to see NGO work in North Korea.

Hopefully some of you working in China, the Middle East, Eastern Europe and Central Asia will be part of the conference. If you work in these areas, please consider submitting a topic for presentation at our conference. It might center on your work, on problems/issues encountered, or on your ideas about how ECHO might best serve development workers in these areas.

Workshop on Health, Agriculture, Culture and Community

ECHO, Fort Myers, FL
November 15-17, 2004

In conjunction with King College and MAP International, ECHO will be conducting a workshop in Fort Myers on Health, Agriculture, Culture and Community from November 15-17, 2004 (the week following our annual conference). The lead teacher is author and speaker Dr. Dan Fountain, a medical and public health missionary in Zaire for 30 years. The goal of the workshop is to empower health and community workers to help people improve their own health through understanding and applying scientific and Biblical principles of health. The workshop will focus on:

- basic Biblical and cultural foundations of community health
- principles of community health
- how church leaders and health professionals can work together with people to improve the health of the community
- how to motivate people to participate in health-related activities and to take ownership of community health programs and activities
- principles and practice of cross-cultural communication and non-formal adult education
- methods of Primary Health Care (PHC) and how to organize PHC service in a community
- planning of community health programs and study of working models
- study of a few impact options for a nutrition program, such as the use of Moringa; urban gardening under difficult conditions; tropical fruits; perennial vegetables; and mushrooms and their possible nutritional and economic benefits in the community.

Write to David Balsbaugh at ECHO for more details (dbalsbaugh@echonet.org).