

EDN

ECHO DEVELOPMENT NOTES

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FIFTH ANNUAL AGRICULTURAL MISSIONS

CONFERENCE REGISTERING NOW. "Trying to meet all the people and attend all the workshops is like trying to take a drink of water out of a fire hydrant." So said Roy Danforth last November when describing the 1997 ECHO Agricultural Missions Conference here in Ft. Myers, Florida. When two hundred of you gather in one place, sharing your successes and talking over your challenges, one can see that Danforth's description is appropriate. Plan now to attend.

Registrations are now being accepted for the Fifth Annual ECHO Agricultural Missions Conference to be held this November 10-12, 1998. A registration form is included with this issue; you may also write to ECHO for a form or download it from our Web site (<http://www.echonet.org>).

We still are finalizing arrangements for a few invited speakers, but as in past conferences, it is primarily a conference by and for delegates. If you are planning to attend and are willing and able to share about successes or challenges you have had, please let us know.

Speakers will be featured every morning and evening in the Amtel hotel on the Ft. Myers riverfront. Afternoon workshops take place at ECHO, and feature practical demonstrations, tours discussing some of the several hundred species of useful plants grown at ECHO, delegate presentations, regional meetings, and small-group sessions.

SOME THOUGHTS ON SAWING TROPICAL TREES.

By Martin Price. In A-Z p. 346 we mentioned the donations program of the Wood-Mizer Sawmill Company that has made it possible for many Christian groups in the tropics to obtain a portable sawmill at half price. Glen Munro is the man who has trained many of the recipients in sawing tropical woods. The following is an interview I had with Glen as we returned from a trip to Costa Rica.

(MP) *What are some of the ways in which wood from one kind of tropical tree might differ from another?*

(GM). I can think of several. Different species can differ dramatically in resistance to termite damage. Some species will give straight boards during sawing, whereas others may curl as they are being cut. Lumber differs in how you can work it. For example, some species become so dry and hard that you cannot drive a nail through the board. That's still OK if you plan to use bolts.

(MP) *What is an example of a wood that doesn't stay straight?*

(GM) Many species of eucalyptus can be a problem. It can be especially difficult if you are sawing a green (not dried) eucalyptus log that is less than 16 inches (41 cm) in diameter.

(MP) *What happens?*

(GM) While you are sawing the board curls and sometimes also twists. Sometimes it looks like ski runners. This happens because there is tension in the wood cells. More wood is cut in the second cut (because it is nearer the center of the log) than was cut in the first cut. So there is more tension released on one side than on the other. The result is that the difference in tension curls the wood.

(MP) *So is eucalyptus useless for sawn wood?*

(GM) Not at all. You can get around this problem if you girdle the tree. This kills the tree. Let it stand for at least 18 months to dry, then cut it down. Now when you cut boards they will be as straight as any. If wood is scarce, you might let local people climb up and cut limbs for use in cooking if they wish. Wood from most species of eucalyptus is very termite resistant (local people can usually tell you which species are resistant).

(MP) *Many farmers like to plant fruit-producing trees as an investment for an emergency "savings account" to be cut in a crisis, with fruit being the interest until the investment is needed. What are some fruit trees that might be especially good for lumber and how are they used?*

(GM) Coconut "wood" is used where strength is not needed, especially as siding of buildings to shed water. You must let the dead tree dry a year before cutting. The fibrous, very wet, wood of recently cut palm trees is difficult to saw and to cut straight. That is true of any soft wet wood, e.g. balsa. In Samoa a missionary had trouble sawing coconut trees that grew near the beach, because wind had blown so much sand into it. He solved it by washing the logs first. Mango grows into a large tree and

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makes excellent wood. Mango logs are also used to make canoes. Tamarind trees make very large logs.

(MP) *You mentioned to me that you have sent missionaries a discussion on making wood shingles. Tell us more about that.*

(GM) Many missionaries have found wood shingles to make the mission buildings much cooler than those made with metal roofs. If you chose local weather-resistant woods, the roofs should last just about as long as metal roofs, which are notoriously hot.

(MP) *Have you encountered any other unique problems?*

(GM) Some wood has so much silica (the same chemical that is in glass and sand) that your blade can become dull after cutting only one board. Many missionaries find at least one species where they actually see sparks when sawing. This is especially true in rainforest areas where there is a lot of species diversity. Ebony, which is exceptionally dense wood, is one tree that contains silica. The amount differs from species to species. After sawing half a dozen eight-foot long boards you may need to sharpen the blade. Ebony is mainly used to make musical instruments.

Interestingly, the persimmon, a popular fruit tree in the temperate and subtropical climates, is a relative of ebony. Its wood is used to make the heads for golf clubs.

(MP) *How can you tell that a tree has silica in its wood?*

(GM) You can't tell by looking at it. Local people will know because they will have discovered that they cannot pit-saw it (a method of sawing boards by hand from logs).

(MP) *How is lumber dried in the hot, humid tropics?*

(GM) About the only technique people with minimal resources will have is to stack it. As in the USA, boards are laid across some sticks, another series of sticks is placed on top of the board, another layer of boards is added etc. We call this a "stacked and stickered pile." When stacking lumber to dry where the humidity is quite high, it is important to have a much narrower pile than we might make in the States. In the humid tropics it should be no greater than three feet. Put something on top to shed water, with some stickers between the top boards and the covering. In the US we use sheet metal to keep rain off of the pile, but even banana leaves would help.

(MP) *What makes good furniture wood?*

(GM) The boards must remain straight when they dry. It is also important that they not change shape much as the humidity of the house changes. As a board absorbs moisture, its length changes very little. What does change is that it tends to form arches (change tangentially). For example, on a basketball court you may see boards cup or ark. A good floor will have the same tangential orientation or it will not be able to be sanded because of the mounds and valleys.

(MP) *Wait a minute. What is "tangential orientation?"*

(GM) If you look at the end of a board, the tree rings will make

curved arcs, facing either up or down. This is especially important in flooring. The boards must either have all the arcs facing up or, preferably, all facing down.

The important thing is that wood is laid tight end to end but not side to side. This can be quite pronounced in a large floor, like a gymnasium, where the floor can expand 2 inches in the perpendicular to the boards (i.e. a large floor could become 2 in/5 cm wider in humid weather).

(MP) *Wood can be dried much faster in a kiln. Are there any disadvantages to using kilns?*

(GM) It is important that you not remove more than 3% of the moisture from any lumber in any one day. For example, if a board has 20% moisture there would be 20 grams of water per 100 grams of board. You would want to remove about 0.6 grams (3% x 20 grams) of the water a day. The way you measure this is to daily weigh a small piece (test block) of the wood that is kept in the kiln along with the lumber. If you dry faster than this you will cause the surface to check. A check is like a crack, except it is seldom more than 1/8 of an inch (0.3 cm) deep. The moisture in the center can't get out quickly so the inside can't shrink but the outside wants to shrink because the moisture has left. The result is that exterior fibers pull apart from one another. Do not put wood in the sun to dry or it will cup (the bottom of board doesn't dry as fast). For that reason, solar kilns do not have the wood exposed directly to the sun.

In vacuum kilns we get what is called "honeycombing" if the board is more than four inches (10 cm) thick, unless it is dried much more slowly than the rate used for thinner boards. This is caused by water "boiling" because of the low pressure. If it can't get out fast enough it pops, sometimes leaving large gaps inside. In vacuum kilns water changes to vapor inside wood cells and even comes out from the center of the board. We had some hardwood blocks 6 inches (15 cm) square sent to Haiti for use in making carvings. The wood had been dried quickly in a vacuum kiln. We found that inside the blocks there were 1/4 to 1/2 inch (0.63-1.26 cm) empty spaces (honeycombs).

(MP) *Does the Wood-Mizer donations program cover kilns?*

(GM) Yes, but only solar kilns. What we would send is a kit of the moving parts. The rest would be assembled from local materials.

NOTES TO READERS: The Year-2000 Bug hit ECHO.

We refer to the anticipated chaos after January 1, 2000 when computer programs that enter dates only by the last two digits will no longer work. When you subscribe or renew, our old program entered only 96, 97. We updated it in 1997 to handle renewals through the year 2000, but about 50 of our US addresses got renewed using two digit numbers instead of the new four digit format. We will gladly send missing issues to anyone who was affected. Just tell us which issues you are missing.

We often refer to information published previously by ECHO. If, for example, we cite "A-Z p.8" the reference is to page 8 of our book *Amaranth to Zai Holes: ideas for*

growing food under difficult conditions. See p. 8 of this issue for ordering information. Occasionally a donation is received to send a copy to a non-profit organization that cannot obtain foreign exchange.

Did you know that there is a Spanish version of EDN? Let us know if you would prefer to receive EDN in Spanish. English speakers working in Spanish speaking countries may request subscriptions in both English and Spanish.

TURNING PEANUTS INTO PEANUT BUTTER. *By Daniel Sonke with Mike Fennema.* We recently received a request from a reader in Kazakhstan asking if there was any trick to making peanut butter for a local market. In particular, is there more to making peanut butter than just mashing peanuts (groundnuts)? We sent an e-mail message to former ECHO intern Mike Fennema, serving in Cambodia with the Christian Reformed World Relief Committee. Mike had started a peanut butter project during an earlier term in Cambodia with Food for the Hungry International (FHI). Here is what we learned from Mike:

"You're right about peanut butter being easy to make. Remember the health food store that had a very simple machine that ground the peanuts while we watched? No additives, no preservatives, 100% peanuts.

"Four years ago I helped a local church to develop a peanut butter business. First I had to know how to make it, so I took a mortar and pestle and pounded and pounded. Eventually, the result was peanut butter. I brought this idea to the local church and together we set about improving the methods for production.

"Here are the major processes we followed:

"1. Quality Selection: Select fresh peanuts. Ensure that there is no mold growth on them and that they have been properly stored away from moisture if they have been in storage. Remove any broken, immature, or over mature peanuts.

"2. Roasting: Our setup was very basic. Roasting was done in a wok over a wood fire. We found that uneven roasting affects the taste. If some peanuts are burnt then the peanut butter will have a burnt taste. If clean sand is available then it can be used to cover the peanuts. This will allow even roasting. If such sand is not available, then take care to stir the peanuts adequately while roasting.

"If an oven is available, you can roast the nuts 425°F (218°C) for 40 - 60 minutes while occasionally turning the nuts by hand. You could also use a rotary coffee roaster.

"3. Skin removal: Remove the red or brown seed coat by rubbing or brushing. Otherwise it can add an unusual and slightly bitter taste to the peanut butter.

"4. Grinding: Next we needed to find a way to grind the

nuts into a fine powder. We made use of an old wine bottle to crush the peanuts by using the bottle as a rolling pin. This is the stage where you would mix in all the additives. The amount of salt should be less than 1.5%, and honey or sugar less than 2%. (Stabilizers and food emulsifiers could also be added, but we never tried them, and they are not available in a lot of developing countries. Besides, it works well to advertise the food as All-Natural.)

"5. Churning: At first we took this powder and pounded it in a pot or mortar until it turned into peanut butter. The pounding causes the oil to be extracted. This oil then mixes with the dry powder to form a sticky peanut butter. (Sorry, I don't know the technical term for the process.) This brand of peanut butter was still quite crunchy.

"We improved the process further by using a grinding stone (used locally to grind rice into a liquid paste). This turned the powder into a super-smooth, creamy and sticky peanut butter. We compared the stickiness and found that the peanut butter we produced was stickier than any other brand.

"We looked into the cost of buying an electric peanut butter maker, which would combine grinding and churning into one automatic process. I am sure that you could even use a blender to make peanut butter, although I have not tried that one yet. Of course using such technology could be considered anti-developmental--more income but for fewer people. Such a dilemma! [Sources of grinders are found at the end of this article].

"At first we sold two brands, crunchy and smooth. Smooth turned out to be the most popular and the easiest to produce, so the crunchy fell by the wayside. In order to make chunky peanut butter, you could add peanuts that have been pounded to 1/8 of the original size.

"You do have the option to add salt or even sugar if you prefer. We only tried adding salt or sugar once. Most people preferred the 100% natural butter. We even had some buyers whose kids refused to eat Skippy after getting addicted to what we called Kampot's All Natural Peanut Butter. How's that for an advertisement?

"The group experimented with making cashew butter. Wow was that good--a real hit, but a little too expensive. If you had the right market, it could do well." (Note: having grown up on an almond farm in California, I know that almond butter has a market there. Perhaps other nuts could also be used in this way. D.S.)

"There is one big difference between commercial peanut butter made in the United States and homemade, all-natural peanut butter. When our product has been sitting around for a while a layer of peanut oil forms at the top of the jar. The peanut butter must be stirred before eating. We noticed this

tends to cause the peanut butter to become a bit dry by the

last quarter of the bottle.

"6. Bottling: Used bottles are readily available. In some countries, new bottles can be purchased along with sealing tape. It is essential to carefully wash recycled bottles. Be sure to wash in detergent and use a good quality bottlebrush, then sterilize with boiling water or over a steaming kettle. Be sure to place the lids in boiling water for 4 or 5 minutes to properly sterilize them as well.

"There are a number of other hygienic measures that can be considered. Keep children away from the production area. This was important when we started our project because the peanut butter was produced under someone's house where children are plentiful and curious. They had creative ways of placing dirty fingers into the peanut butter for taste testing. In addition to wearing facemasks, one's hair should be carefully tied back to prevent loose hairs from falling into the peanut butter. Both hands and spoons should be washed often.

"One of the biggest challenges was in finding a market. I helped to locate the initial market--an expatriate market in Phnom Penh. The group now continues to make the link with this market and keeps them supplied. I have not had contact with the group for over two years and they are still selling peanut butter. So that was the encouraging part.

"But they could have done more on the marketing side. I tried to encourage the group to expand in two ways. (1) Make contacts with more markets in Phnom Penh to increase the number of outlets for their product. (2) Try to develop the local market. This seemed to be a key to me. But the group did not pursue the idea. They tried once, one lady tried to sell peanut butter sandwiches at school--basically this was peanut butter on French bread. But they added expensive sweetened condensed milk, and that ate into the profits. Too bad they did not try it without.

"One regret is that I did not really take enough time to help the group think through marketing possibilities. By the time the project was getting off the ground, my time with FHI was almost up and I had to let go."

Here are a few other useful insights from *Traditional Foods: Processing for Profit*, reviewed in this issue. "The nuts should be dried in the field while in the shell and then, while still on the stalk, turned upside down. Drying peanuts on iron sheets or a roof is not recommended because the nuts become baked in the sun and lose their flavor." "Peanut butter does not easily become contaminated by microorganisms because of its low moisture content, but it can become rancid if it is not protected from air, light or heat. It should not come into contact with metals, especially iron, copper or brass, as these promote rancidity. It should be packaged in an airtight, lightproof container and stored in a cool, dry place."

Mike also writes, "There is one area that I did not look into carefully enough--the danger of aflatoxins." We found the following information in ECHO's library.

Aflatoxins are a class of toxins produced by the fungi *Aspergillus flavus* and *A. parasiticus*. Besides being quite toxic, causing acute aflatoxicoses, they are among the most potent of known carcinogens, often causing liver tumors.

Some toxins, e.g. trypsin inhibitors in soybeans, can be destroyed by heating. This is not the case with aflatoxins. Peanuts have the highest frequency of aflatoxin contamination among worldwide crops. The toxin is most likely to be a problem with peanuts that have been damaged by harvesting or by insects or that have been stored at a high humidity. The toxin can be present with no indication visible to the naked eye, but it emits a green or blue glow when illuminated by an ultraviolet (UV) light source.

Drying the peanuts as soon as possible after harvesting, and keeping them dry during storage, is recommended to prevent the fungal growth that produces aflatoxin. However, other fungi can attack peanuts and grains stored at lower humidity and cause moisture levels to rise, allowing *A. flavus* to grow. Even in dry years the fungi can be a problem if plants are weakened by drought.

Commercial U.S. peanut butter producers test peanut lots carefully in a lab using solvents and UV light. One potentially helpful field test may be this: the mycelia of most molds (including *Aspergillus*) metabolize starch into sugar, which caramelizes when heated, as in roasting. Thus, peanuts which turn dark upon roasting are risky and should be discarded, as should any damaged or obviously moldy nuts.

We heard of a project in Irian Jaya in which the expatriate development workers had no problem with storage of peanut butter that they made, but butter made by villagers own efforts spoiled within two-three weeks. Not knowing more details, it could have been a matter of sanitation, or insufficient protection from air, light and heat.

In our library at ECHO we found that the Lehman's mail-order catalog (A-Z p. 330) sells several hand-powered food mills which can be used to make peanut butter. Prices range from US\$45 to US\$495 (plus shipping to international addresses; free shipping to most US addresses). If you are a Christian missionary, you can request their US\$2 catalog and special missionary "non-electric"



Lehman's grinder which can be powered by hand or by motor

price list at no charge if you write on letterhead of your mission. However, if you want it sent airmail please send US\$3 for postage. To call for quotes or advice on replacement parts, phone 216/857-5757. Write to Lehman's, One Lehman Circle, P.O. Box 41, Kidron, OH 44636-0041, USA.

Mike also put us in contact with the following two sources of commercial peanut grinding equipment. The Grindmaster Corporation (4003 Collins Lane, Louisville KY 40245, USA; phone: 502/425-4776 or 800/695-4500) sells their Grindmaster Model 3000 peanut grinder for a list price of US\$2062. Price does not include shipping. This 115 volt-electric machine can grind 1 pound (0.45kg) of peanuts in 30 seconds and is designed for countertop use in a shop. They have distributors overseas, so write for information if interested.

Alvan Blanch, Ltd. (Chelworth Malmesbury Wiltshire SN16 9SG, England; phone: 01666 577333, fax: 01666 577339) produces more industrial-strength grinders, with mini, hand-powered or electric models and larger models which could likely be harnessed to a small gasoline engine or other power source. They also produce a tractor-mounted peanut harvester and a variety of peanut shellers, from very simple hand-powered models to large machine- or tractor-driven models.

YARDLONG BEANS FOR HOT, HUMID CLIMATES.

By Martin Price. I first grew yard long beans (*Vigna sinensis* subspecies *sesquipedalis*, also called 'asparagus beans') as a curiosity when I lived in the temperate climate of Indiana. Three of the long pods were plenty for a meal for my wife and I. That curiosity is a necessity in the hot, humid summers of Florida if we want anything resembling the pole green beans (*Phaseolus vulgaris*) from "up north." It is among my first recommendations when someone asks what vegetables will grow in the hot, humid tropics.

The two things that make it so special are the exceptionally long edible pods (12-30 inches/30-75 cm) and its ability to resist disease in hot, humid weather. It is not a good choice for low rainfall areas without irrigation.

ECHO has purchased seed for two commercial varieties from Taiwan, one US variety (green pods) and a purple-podded variety. Rather than send four packets in the mail, we have bulked these so that a single packet will give plants from each variety. Just save seed from any plants that produce well. It is unlikely that they will cross-pollinate. If you already have yardlong beans, but are interested only in the brilliant purple pods (12 in/30cm), you may request that only that variety be sent.

NEW LETTUCE VARIETIES AVAILABLE FROM ECHO'S SEEDBANK. We recently ordered a selection of heat-tolerant lettuces from Seigers Seed Company. The descriptions here are taken from the Siegers catalog

descriptions rather than from personal experience. Trial packets are available free to those working with small-scale farmers in developing countries; others please send US\$2.50 per packet.

Green Leaf Varieties: 'Oakleaf' (Compact, light green, deeply lobed leaves are tender. Stands up well to heat and resists bolting); 'Slobolt' (Medium size, light green color, long standing with coarsely crumpled leaves, slow bolting); 'Nevada Greenleaf' (Large sized, medium green Batavia type, hardy, early maturing variety. Excels under stress, highly tolerant to tipburn and bolting, tolerates downy mildew & lettuce mosaic virus); 'Greenleaf PS64289' (Medium large with medium dark green color, curled, frilled leaves with good uniformity and color, tolerant of tipburn).

Boston Lettuce Varieties: 'Esmeralda' (Heavy, smooth, firm, medium green heads. Slow to bolt. Good heat tolerance. Tolerant to downy mildew, lettuce mosaic virus. Tipburn tolerant). 'Optima' (Large, shiny, dark green heads. Stands up well to summer conditions. Tolerates some downy mildews, lettuce mosaic virus, tipburn.).

Crisphead Lettuce: 'Ithaca' (Medium large, smooth, flattened head with short core, adapts well to high temperatures, good solidity with crisp leaves, widely used variety).

Bibb Lettuce: 'Summer Bibb' (Deep green with soft, smooth leaves, slow bolting, medium sized).

Red Leaf Varieties: 'Lolla Rosa' (Small with intense crimson coloring and very densely ruffled leaves, tolerant to bolting.), 'New Red Fire' (Deep red, large frilly leaves, widely adaptable, good uniformity and weight, not as brittle as others, slow bolting.), 'Rolina' (Nice-sized heads are well filled with fancy, cabernet red, savoyed leaves. Slow to bolt).



Close-up of Queensland lettuce leaf

NOTE: As mentioned in EDN 41 (A-Z p. 61), ECHO also has a favorite, heat-tolerant leaf lettuce called 'Queensland.' This large-leafed, light green variety from Australia has done well for us every year. This variety is also available from our seedbank. This year we harvested nice leaves in

95°F heat on May 28. It bolted a few days later.

Trial packets of seeds are free to members of our network who are actively working with Third World farmers. Others (or anyone wanting multiple packets) please send US\$2.50 per packet. You can request individual varieties or a "mixed packet" that contains some of all the varieties. Save seed from any plants that do well (none are hybrid varieties, lettuce is 95-100% self-pollinating). Please note that (1) it can be difficult to germinate lettuce seed under high temperatures and (2) lettuce seed loses its ability to germinate faster than many vegetables when stored at high temperatures and/or humidity.

Seigers Seed Company sells bulk quantities of vegetable and melon seed for commercial growers. Their selection includes many Oriental and specialty vegetables. Contact them at 8265 Felch St., Zeeland, MI 49464-9503 USA; phone: 800/962-4999 or 616/772-4999, fax: 616/772-0333.

CORRECTIONS

We incorrectly listed one of the e-mail addresses (CRWRC) for information about the Conference for Christian Workers in East Africa. CRWRC's correct e-mail address is crwrc-k@Africaonline.co.ke.

ECHOES FROM OUR NETWORK

DOES MULCHING MAKE SENSE IN SEMI-ARID AREAS? Thanks to Tony Rinaudo with SIM in Niger and Arnie Schlissel, Administrative Coordinator, IPALAC, in Israel for sharing their recent e-mail correspondence on this interesting topic. Listen in on their conversation.

Arnie wrote, "I read your message about mulching again, and I am in a state of shock because there must be a hidden factor I am not taking into account. Almost every response I get from the scientific community says: a) there is not sufficient biomass in semi-arid Sahel for mulching; b) farmers have higher priority uses for crop residue--primarily animal feed; c) even if farmers see benefits of mulching, they stick to their priorities as above.

"Along comes Tony and says he uses crop residues, sometimes with dramatic results. How can this be? Aren't you in a low rainfall zone? Don't your farmers maintain livestock? Are the practices you describe limited to an experimental site? And if not, what was the secret to acceptance by farmers? Where is the catch?"

Tony replied, "It's important to look at recent history and also look at the context in which the Maradi Integrated Development Program (MIDP) is introducing mulching. The Maradi area (and much of Niger) is experiencing hunger with increasing frequency. Soils are worn out, erosion is very high and people are not only worried about the present, they

cannot comprehend where this is all leading. Our program has worked alongside farmers since 1973. We have a good relationship of trust, having been involved in famine relief work on several occasions. There is an assumption that MIDP is there for the people's good.

"Please note also that despite benefits the majority of farmers do not use mulch. But it is a method that is gaining popularity. It is difficult, if not impossible near the city of Maradi (population approx. 70,000) or near other centers, where millet stalks can be sold, where poor townspeople scavenge even twigs 15cm long and less than 2.5 mm in diameter and where grazing pressure is extreme.

"However, in village situations it is happening, first with non-usable parts such as millet husks and heads which have had the grain removed. In the past the husks were usually burnt on-site and the heads used for cooking fuel. But today farmers are even using the millet stalks. We found that some already knew the benefits of mulching--both on hardpan sites and on sandy sites (water retention, stop soil loss, trap wind blown sand etc.) They did not practice it however because village women would come looking for fuel and take the stalks they had left. Culturally, it was easier to ignore them than to fight them. Practically, it was better for them to collect the stalks themselves than to have them stolen.

"Over the last 15 years, Farmer Managed Natural Regeneration (FMNR) has been gaining momentum. There are well over 2 million trees out there that weren't there 15 years ago. [Ed: see Tony's article in EDN 58]. One of the spinoffs of FMNR is that many African tree species bear pods which make very good animal fodder. When this work was started much of the area consisted of desert-like, barren plains. There was a severe shortage of organic matter and, yes, food for livestock was very scarce. The trees not only provide fodder; they naturally shed leaves that blow onto the fields. In addition, when branches are harvested, farmers have started putting them on hardpan sites to dry out. This attracts termites that break up hard crusts. They convert the leaves and smaller twigs to rich soil/humus and the branches, which cause turbulence in wind currents, force winds to drop their silt load on the site as well. Many sites, which have been unproductive for 20+ years, have been restored in one year, and give bountiful crops.

"In regions where hardpan formation is common we started to promote the digging of zai holes [Ed: see A-Z p. 133]. This is very effective but extremely hard work. In these regions, using mulches has proven much more popular. The farmers were getting into a tight corner, with some having lost 20-50% of their land to hardpan formation. They believed that it was irreversible. All the time food production was declining. To them I guess, the need for grain outweighed the needs of their livestock. In good and bad years, grain yields on mulch-treated fields were far superior to yields on non-treated fields.

"These farmers now spend hundreds of hours each dry season mulching their fields. They even carry stalks on their heads from distant fields to restore degraded land.

"It should be noted that not all fields are mulched each year. There just isn't enough to go round. But the benefits of mulching last several years. Thus, we encourage farmers to work on their worst sites first and move onto other sites sequentially.

"We do have trial plots of our own, but we have always encouraged farmers to do their own experimenting. I think this is another factor in them accepting change. It is their experiment, not ours! They own the results and spontaneously share them with their neighbors."

Arnie asked, "What about some *Acacia* species that might be grown as mulch crops?"

Tony replies that "planting trees is good, but in our situation it is an uphill battle. Low survival rates (<30%) are common. It is very, very hard work planting and ensuring survival of trees. Only the truly committed farmer will succeed. They are in a minority here. If there are native species that will regrow if just protected from slashing, this is a much easier way of getting mulch material. I am not talking about tree-planting projects that both fund and enforce planting of trees. These will work, but only for as long as funding is available. I am talking about a popular, voluntary farmers' movement. After 15 years this has not happened here. (Though there is growing interest in acacias for human food--it is hardly a people movement yet.) In any case, it is increasingly difficult to find funds for big tree schemes--they have a poor track record and donors are wary."

WHY INTERCROPPING REDUCES YIELD OF SWEET POTATOES. Marsha Hanzi in Brazil sent the following about the sweet potato. "Our mentor / teacher / friend Ernst Gotsch says that sweet potato produces tubers when it is STRESSED. That is why in intercropping it produces more leaves and fewer tubers [Ed: because it is less stressed under the canopy.] The same is true in agroforestry systems where it can produce abundant leaves and be very vigorous, producing very few tubers indeed.

"To get more tubers in this situation, Ernst 'stresses' the plant, winding a long shoot around on itself (he calls it 'making a wig'), whereby it produces one large tuber instead of several tiny ones."

Dr. Frank Martin told us of a custom in Paraguay where farmers would pull thorn trees over sweet potato patches to damage the leaves, with the goal of stressing the plant and thus increasing the yield of tubers.

CAN YOU HELP US?

The fires in Indonesia have been on the news a lot. On a

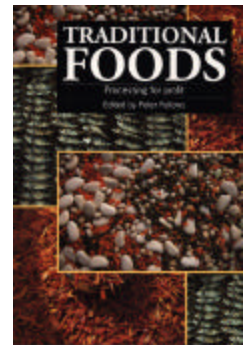
recent visit to Nicaragua I (MLP) saw fires out of control everywhere. A particularly sad site was a grove of cacao and coffee that had beautiful plants and thick leaf litter--until the point where the fire went through. The jet waited 2 1/2 hours for smoke to clear before departing Managua. Visitors to other Central American countries report similar stories.

I came home wondering if there were any special techniques that even small farmers could take to give them a better chance to protect their land. Perhaps some fire-resistant plant for the borders? Andres Recalde with World Vision Canada just called to see if ECHO had any materials on organizing rural communities to combat forest fires.

Do you have experience in successfully combating the spread of fires using only the kind of resources available to limited-resource farmers? If so, or if you know of written materials specifically addressing this issue, we would very much like to hear from you. Address your letter to Martin Price.

BOOKS AND OTHER RESOURCES

TRADITIONAL FOODS: PROCESSING FOR PROFIT, Peter Fellows, 210 pages, Intermediate Technology, 1997. This practical book gives the basics of processing, including flow diagrams and equipment needs, for all kinds of traditional foods. Most discussions are limited to information-packed 1-2 pages.



The first 25 pages cover basic processing. The remaining chapters cover cereal and legume products; fruit products; vegetable and root crop products; honey, syrup and sugar confectionery; nut and oilseed products; meat, fish and dairy products; and herbs, spices, flavorings and essential oils.

A few randomly selected topics follow: pineapple peel vinegar, chili sauce, papain, popcorn, popped sorghum, injera, split cereals, tomato sauce or ketchup, tomato paste, pickles and chutneys, crystallized vegetables and snack foods, cassava fritters, cashews, macadamia nuts, peanut oil, dried fish, smoked meat and fish, pasteurized milk.

ECHO recently ordered its copy for £22.50 (approximately US\$38) plus shipping from Plymbridge Distributors, Estover, Plymouth, PL6 7PZ, United Kingdom. Fax +44 (0) 1752 202331.

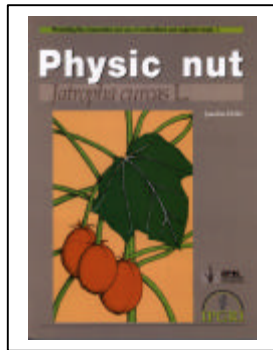
NEW IPGRI SERIES PROMOTES UNDERUTILIZED CROPS. The International Plant Genetic Resources Institute (IPGRI) has published a series of books titled "Promoting the conservation and use of underutilized and neglected crops." Each title covers a different crop species. The purpose is "to

draw attention to species which have been neglected in a varying degree by researchers and/or underutilized economically." As ECHO is very interested in underexploited crops, we wrote to IPGRI and obtained copies of each title in the series.

IPGRI is a research center dedicated to identifying and collecting plant germplasm, conserving it, and disseminating it to researchers developing or promoting new crops. Each book focuses on taxonomy, origins of species, related species, and reproduction biology. Ecology, propagation methods, cultivation, and germplasm conservation are also covered. Because of the heavy focus on germplasm topics, the series will not be of interest to everyone in our network. Those trying to identify local minor crops and possibly useful wild relatives or who have worked to introduce a specific crop will find this series helpful.

For example, Nancy Harper in Belize wrote to ECHO regarding the physic nut, *Jatropha curcas*. The physic nut is a shrub widely found in the tropics. (It is used as a living fence and as a medicinal, grows in arid regions, and produces a nut which when pressed yields an oil that can be used in making soap and has been used as a diesel substitute in small engines with some success in trials. Young leaves of the plant may be cooked and eaten. All parts of the plant have been used medicinally.) Most *Jatropha curcas* plants produce toxic nuts. In Mexico and Central America there are types of physic nut that are safe to eat when roasted. Nancy wanted to know if these edible types were a different species of *Jatropha* and if they should therefore propagate them by cuttings or by seed.

Using the IPGRI book on *Jatropha curcas*, we learned that the edible type is probably the same species as the toxic type, and that because it is pollinated by insects, the edible and toxic types may be able to cross pollinate if grown in the same area. We encouraged her to talk with local farmers, as the book seemed to indicate that in her region the predominant *Jatropha* may be the non-toxic type, making propagation by seed safe.



The series book on black nightshades, *Solanum nigrum* and related species, is useful for identifying local *Solanum* species used as potherbs and "huckleberries," as ten species or subspecies are described in detail with diagrams, local names, and an identification key. Some botanical education would be helpful in using the key. (The genus *Solanum* includes tomato, pepper, potato and eggplant. It also contains many wild relatives, some of which have food potential and some are poisonous.)

These are the titles in print as of this time: Physic nut *Jatropha curcas* L., Yam bean *Pachyrhizus* DC., Coriander *Coriandrum sativum* L., Hulled wheats: Proceedings of the First International Workshop on Hulled Wheats *Guizotia abyssinica* (L.f.) Cass., Pili nut *Canarium ovatum* Engl., Safflower *Carthamus*

tinctorius L., Chayote *Sechium edule* (Jacq.) SW., Bambara groundnut *Vigna subterranea* (L.) Verdc., Breadfruit *Artocarpus altilis* (Parkinson) Fosberg., Cat's whiskers *Cleome gynandra* L., Tef *Eragrostis tef* (Zucc.) Trotter., Sago Palm *Metroxylon sagu* Rottb., Oregano S., Black nightshades *Solanum nigrum* L. and related species., Carob tree *Ceratonia siliqua* L.

IPGRI advertises that their publications are free of charge to "institutions and libraries." We corresponded with their publications department for clarification. Paul Stapleton, Head of the Editorial and Publications Unit, replied "IPGRI publications are distributed free of charge, so we aim to place them in libraries and institutions so that their potential readership is maximized. We do not want them to be read by one person, then filed on a bookshelf and forgotten." However, "if the organization is going to use the information to benefit workers in the area, they can have as many copies of our material as needed. IPGRI is eager to disseminate its information where it can do the most good, and that is why we maintain our free distribution policy. Some workers can easily show that they have a need for a personal copy, such as laboratory researchers, university professors, extension agents, etc., and we gladly supply those."

If your organization is able to make use of one of the titles listed above or would like to know of IPGRI's many other titles related to germplasm conservation and breeding, write to: Paul Stapleton; Head Editorial and Publications Unit; Documentation, Information and Training Group; International Plant Genetic Resources Institute; Via delle Sette Chiese 142, 00145 Rome, Italy; phone 33-6-51892233, e-mail P.STAPLETON@CGNET.COM, fax 33-6-5750309; home page <http://www.cgiar.org/ipgri>.

UPCOMING EVENTS

III LATIN AMERICAN MEETING ON NO-TILLAGE SYSTEMS FOR SMALL FARMS (III ENCONTRO LATINOAMERICANO DE PLANTIO DIRETO PARA PEQUENAS PROPRIEDADES). October 19-22, 1998, Pato Branco Municipality, Parana State, Brazil. Organized by: IAPAR, Est. Exp. Pato Branco, Fax: 55-46225-3183. For more information see <http://cefet.whiteduck.com.br/elapdp.html> on the Internet or e-mail Fátima Ribeiro at fatima@whiteduck.com.br.

IN MEMORIAM. A gift to cover the cost of writing, printing and mailing this issue was made in honor and in memory of Eldon Kirkham by Dick and Jo Dugger. Eldon was for many years a valued volunteer at ECHO. He is greatly missed by all who knew him here.

THIS ISSUE is copyrighted 1998. Subscriptions are \$10 per year (\$5 for students). Persons working with small-scale farmers or urban gardeners in the third world should request an application for a free subscription. Issues #1-51 (revised) are available in book form as *Amaranth to Zai Holes: Ideas for Growing Food under Difficult Conditions*. Cost is US\$29.95 plus postage in North America. There is a discount for missionaries and development workers in developing countries (in the Americas, US\$25 includes airmail; in Europe,

Africa, and Asia, \$25 includes surface mail and \$35 includes air mail.) Issues 52-59 can be purchased for US\$8, including air postage. ECHO is a non-profit, Christian organization that helps you help the poor in the third world to grow food.