

**2-1. UNDEREXPLOITED TROPICAL PLANTS** Many of you are familiar with the book Under-exploited Tropical Plants with Promising Economic Value. In the early 1970s, the U.S. National Academy of Sciences surveyed scientists around the world to determine which plants had the greatest potential for introduction to other tropical countries. This book includes 36 plants chosen from among 400 that were nominated. Subsequent books in the same vein are Tropical Legumes : Resources for the Future and Firewood Crops. You may write for free copies to The Commission on International Relations (JH 215), National Academy of Sciences --National Research Council, 2101 Constitution Avenue, Washington D.C. 20418, USA.

A typical reaction upon reading these books is to become very excited and eager to try a few of the plants in one's own part of the world, followed by discouragement with the difficulty in obtaining seed. Some of the sources listed at the end of each chapter (nearly all are scientists or scientific institutions) can still supply seed. Very few have funding for this purpose and many are no longer able to supply seed for these plants or respond to the inquiry. ECHO is convinced that in the long run there is tremendous benefit from putting seeds for these plants into your hands. For that reason, we are growing as many of them as we can get our hands on and have already begun harvesting seed for a few. There are others that we have not yet been able to obtain, and some will not grow in southern Florida.

I hope to feature one of these plants in most issues of EDN. I will also list in each issue some of the other seed that is currently available. Please understand that we supply seed for trial and that the plants must be treated at first as experimental before making recommendations to members of your community. We do not guarantee the seed count in each package, the viability may sometimes be low, and there may only be a few seeds in your packet if our supplies are limited and demand is great. You should watch the planting carefully the first season to make sure it is not likely to become a problem plant in your area. (E.g., we cannot grow seed of water spinach here because Florida is concerned about it becoming a weed in the water canals). We cannot supply quantities of seed for routine production. Rather, we expect you to increase your own seed if the performance of the plant warrants this. Sometimes we may send more than one variety of a requested seed, so that you can determine which of these give superior performance in your region.

In all cases, we look upon those who request seed as collaborators with us in field trials. This does not mean that you must do elaborate experimentation. But we do expect you to take time to write to us after the food has been harvested, letting us know your general impressions on its suitability to the region and the culture. We will use this information to make more refined recommendations to others and to share with interested scientists.

We do not require payment by non-profit organizations working to introduce these plants into their community. [UPDATE: see "Welcome to the ECHO Network" for details on ordering seed.] The next time you are in the capital city of your country, you might inquire about any special procedures for importing seed, then send us any required forms with your order.

**2-2. SEED FOR TEPARY BEAN NOW AVAILABLE** When scientists study how plants resist drought, they sometimes use the tepary bean as a model, according to graduate student Richard Pratt at Purdue University. Tepary beans are cultivated by Indian groups in the Sonoran desert of western North America. They thrive in arid regions which receive heavy but infrequent rains. They need ample moisture to germinate and advance growth to flowering. After flowers form, little additional moisture is needed. Teparies enjoy high temperatures and bright sunshine but are intolerant of frost and waterlogging. They

require night temperatures over 46 degrees F (8 degrees C). In certain types of desert soils, after one of those rare times when the ground is flooded, the beans can reportedly be planted and produce a crop with no further rainfall. Richard showed me results of yield trials where he compared the effect of drought on teparies and on common beans. As he cut back on water, the yield of common beans decreased steadily whereas the yield of tepary beans actually increased up to a point before they also eventually dropped off.

Richard believes that tepary beans have potential for planting near the end of the rainy season, but early enough that the plants can get a good start before the rains stop. It is quite possible that they would then produce a crop during the dry season when few other food sources are available. Dr. Leon a CATIE says that tepary beans can be found in the market on the Pacific coast of Mexico. He has read that they were introduced a cover crop in the Sahel of Africa, and that people on their own initiative began eating the bean. (I would appreciate more information on this from our African readers.)

Dr. Hidalgo at CIAT believes the relatively low yield and a flavor that is inferior to common beans are the main problems with commercialization. Disease is a problem sometimes when introduced into a new area and they are "devastated" in the humid tropics. But he added that, "As a crop for subsistence farming, its potential is excellent. It doesn't stop growing even when it flowers. So if a stress occurs after the first flowers, it has a high capacity to recuperate."

We have limited quantities of both brown and white tepary beans and will be interested in making them available to you for trial if you believe your region may be suitable. Our recommendation is that they be tried (1) near the end of the rainy season or (2) in regions with low humidity most of the year. Where other beans can be grown all year there is no advantage to growing teparies. Possible drawbacks include: bean is smaller than common bean; taste is different (but has been accepted in some cultures); yields will be lower than from common beans; overcooking results in flatulence (gas); and the beans become hard in storage. But if you can get a bean crop when regular beans would not produce, all these objections can be worked around. There is also considerable variability. If they do well for you, we can help you locate other varieties in the future in hopes of overcoming some of these problems.

When you request seed, let me know if there is a strong color preference for beans in your area. Richard gave me a small amount of seed for five other varieties which we are currently growing. Some of these might be nearer the color that you would need. If any of you have tried teparies already, please write me with a summary of your experience.

**2-3. PROPAGATION OF TROPICAL FRUIT TREES** Judging by the response to comments about tropical fruit trees in the last E D Notes, many of you are including tropical fruit trees in your development efforts. I have used the FAO book [Propagation of Tropical Fruit Trees](#) to answer several of your questions. The first 172 pages of this book are part of a general how-to section covering such topics as: the nursery; propagation by seed; vegetative propagation; cuttings; polyembryony; grafting. Pages 184 to 556 give many practical details about propagation of particular species. For example, the topics covered in the 37 page treatment of cashew include: distribution and ecology; shoot growth; root growth; flowering and fruiting; diseases and pests; seedling variation and selection; seed quality and selection; seed treatment and storage; seed planting and germination; rootstocks; approach grafting; side grafting; veneer grafting; tip grafting; wedge grafting; budding; ground layering; air layering; films for wrapping air layers; propagation by cuttings; handling and transplanting young cashew trees. Other species covered (not all in such detail) include carambola, sugar apple, jackfruit, papaw, star apple, durian, rose apple, surinam cherry, mangosteen, langsat, Barbados cherry mango, sapodilla, jaboticabas, guava and several others.

For those of you with money on deposit with us, I can order the book from the Fairchild Tropical Garden. (The price in 1982 was \$29.00 but changes periodically. Write them first for a price and specify surface or air mail). You may also order it directly from Commonwealth Agricultural Bureaux, Central Sales, Farnham Royal, Slough, SL2 3BN, England.

**2-3. SMALL-SCALE COMMUNITY FOOD CANNERIES** Some years ago the Ball Company designed and manufactured small scale canning equipment that can be tailored to meet a variety of canning needs at an "appropriate technology" level. In some communities this might be an effective way to utilize surplus seasonal crops, as well as to provide employment to members of the community and improved/expanded markets for local farmers. When the Ball Company was no longer interested in continuing this program, the canning equipment was donated to the Church of the Brethren which then established a Food Preservation Systems (FPS) program. Dean Gray, the FPS marketing coordinator, says that his program will assist community groups and/or individuals in planning, purchasing, and installing a canning unit and will provide training in its operation. Although FPS is a non-profit group, it is necessary that the purchasing group meets all cost incurred.

The system seems to be quite flexible. Mr. Gray provided me with four pages listing individual components and their prices. It also includes prices of some ready-to-go systems, ranging from \$6,000 to \$28,000. I asked what the minimum investment would need to be to have a working system. The FPS is in the process of developing a much smaller system that would require much less capital to get started, perhaps under \$3,000. The individual or group could then expand to a larger operation once they gained experience and were earning a profit. If you might be interested in the smaller system, write to Mr. Gray. It would be helpful to them to know the extent of interest and he could send you information as soon as they have finished the development work. Remember that the cost for setting up one of the larger systems is more than what is listed for the equipment. A building must be providing as well as capital to cover wages and produce until income begins to be generated. For price lists, information and answers to questions, write to Mr. Dean Gray, Food Preservation Systems, New Windsor Service Center, New Windsor, MD 21776, USA. You might also wish to request a listing of previous purchasers of canning systems. Mr. Gray suggests that you list one or a few agricultural products that are of special interest. Because equipment needs vary from one product to another, a much greater investment is usually needed if a wide range of produce is to be canned.

I should mention that the food is canned in glass jars unless a vacuum unit selling for about \$3,000 is purchased. So unless you plan on obtaining the vacuum unit, you should probably limit your plans to products which are already sold in glass jars.

[UPDATE: The Food Preservations Systems was subsequently turned over to Mr. Joel Jackson. He handles both the equipment and training. Write him at 1604 Old new Windsor Rd., New windsor, MD 21776. The phone is 301/635-2765.]

**2-3. HOME-MADE WATER REPELLENT FOR WOOD** Don Bernd wrote to ask what we would recommend to counter molding of "leather, books, accordion, and wood furniture" in extreme humidity in his part of Colombia. The U.S. Forest Service bulletin, "Wood Finishing: Water Repellents and Water-Repellent Preservatives," describes a method for treating wood that is exposed to weathering (but above ground). It is not clear from the publication what effect it would have on indoor wood exposed to extreme humidity, but it is worth a try. They treated experimental wood window sash and frames with the preservative whose formula is detailed below. The window units are in good condition after 20 years' exposure even though all the original paint has weathered away. Untreated painted window units decayed severely and actually fell off the test fence after only 6 years' exposure.

Extreme caution should be exercised in preparing the water repellent because the organic materials, especially the hot paraffin, are quite flammable. It is best to prepare it outside. Do not use a direct flame or heat near a flame such as the pilot light on a stove. To make one gallon of repellent, melt 1 oz. of paraffin wax in the top unit of a double boiler. Pour this into enough solvent to make a final volume of one gallon, stirring vigorously. The solvent should be at room temperature and can be either turpentine, mineral spirits or paint thinner. After these two are mixed, add 1.5 cups of boiled linseed oil. Exterior-grade varnish can be used in place of boiled linseed oil, but twice the volume (three cups) should be used. The preservative can be applied by brushing or dipping. The wood can be painted after it is dried if desired.

Even more protection can be obtained by including 1.75 cups of pentachlorophenol concentrate 10:1 (40%). The solution is then called a water-repellent preservative. Because this substance is poisonous it should probably be limited to outside use. Remember that it may be toxic to animals and plants. For (a little) additional information, request the free publication FPL-0124 from the Forest Products Laboratory, Forest Service, U.S. Department of Agriculture, Madison, WI 53705.

I don't know what to suggest for the accordion and leather! Any ideas?

**2-4. PRESERVING WOODEN BEE HIVES** It is possible that the water repellent just described would be especially helpful for treating wood that is to be used in constructing bee hives. But be careful if you add toxic chemicals to turn it into a water-repellent preservative. Professor G.F. Townsend at the University of Guelph in Ontario, Canada wrote the following: "In tropical countries it is necessary to either use wood that is resistant to termites and ants, or to treat the wooden parts of the hive. If you wish to stay away from any of the wood preservatives, the equipment may be dipped in a very hot solution of paraffin wax (about 158 degrees C) for a two-minute period. Sometimes up to 50% rosin or some beeswax may be added to this mixture. This procedure is dangerous unless special equipment is devised for the dipping and heating. The only wood preservative which is relatively non-toxic to bees is copper naphthanate. ...if only paint is used, it should be an oil-base paint containing aluminum."

**2-4. RESOURCE CENTER WELCOMES INQUIRIES FROM COMMUNITY HEALTH WORKERS** MAP International has established a "Learning Resource Center" related to community health development in the third world. The center is staffed by a librarian and has a helpful collection of reference materials. Mrs. Jeannie Thiessen, Director for Community Health Resources at MAP, tells me that Christians working in community health in the third world are welcome to write to them when they are in need of information that they are unable to obtain locally (much in the same way that ECHO welcomes inquiries related to your agricultural work). [UPDATE: They have moved from Wheaton, IL to Georgia. The new address is 2200 Glynco Parkway, P. O. Box 50, Brunswick, GA 31521, phone 912/265-6010.

**2-4. HOW TO MAKE BASIC HOSPITAL EQUIPMENT** A book with this title provides simple designs for equipping rural hospitals using local skills, resources and materials. Some of the designs include: Folding hospital bed, ward screen, hospital wheel chair, out of hospital wheelchair, bicycle ambulance, dressing/instrument trolley, patients trolley, blood transfusion drip stand, suction pump, supine exercising machine, caliper, infant weighing scales, low pressure air bed, phototherapy box for neonatal jaundice, thermoplastic aids, baby incubator, walking frame. Most items can be made from locally available materials using simple tools. Welding and soldering expertise is often necessary. The book is published by the Intermediate Technology Group in England. You may order a free copy from AID Resources Report, Room 509, SA-14, Office of Development Information and Utilization, Bureau for Science and Technology, U.S. Agency for International Development, Washington, D.C., 20523, U.S.A.

**2-5. WHAT SEED WOULD YOU TAKE TO AN UNINHABITED TROPICAL ISLAND?** Dr. Frank is known to many of you as author of several books and articles on tropical subsistence farming. He works at the Mayaguez Institute of Tropical Agriculture (USDA) in Puerto Rico. Currently his research centers around sweet potato improvement for the tropics. We recently received from him the following interesting note:

"If I were to go to an uninhabited island in the hot, humid tropics, taking with me the seeds with which I think I could best provide myself food, I think I would take the following. **Roots and Tubers** (1) sweet potatoes -- the variety Gem (orange fleshed) and some white-fleshed types, (2) yams -- *Dioscorea alata* and *D. esculenta*, selected varieties, (3) cassava -- some true seed to start my own, (4) Queensland arrowroot (*Canna edulis*), very easy to grow and productive. **Grains** (1) corn, (2) okra, for edible seed and well as green fruit, (3) wax gourd\* (*Benincasa hispida*) for edible seed as well as squash-like fruit. **Legumes** (1) Catjang cowpeas (climbing, disease resistant forms), (2) winged bean\* (3) *Dolichos lablab* beans\*, (4) asparagus beans. **Leavy Vegetables** (1) chaya, (2) sunset hibiscus, (3) Tahitian taro (*Xanthosoma brasiliensis*), (4) Indian lettuce\* (*Lactuca indica*). **Fruit Vegetables.** (1) tropical pumpkin, (2) okra, (3) small-fruited, indeterminate tomatoes, (4) hot pepper, (5) ensalada pepper\*,-- variety selected for its edible leaves. **Trees** (1) bananas, (2) breadfruit, (3) limes (West Indian, from seed), (4) tamarind, (5) papaya, (6) mangoes (from seed, turpentine type but selected)."

ECHO can provide small quantities of seed for those items with an asterisk. If you visit us, I can give you cuttings of chaya and sunset hibiscus, but these are not propagated by seed as far as I am aware.

I asked Dr. Martin where people could get his 56 page USDA publication Techniques and Plants for the Tropical Subsistence Farm and his book Edible Leaves of the Tropics. [UPDATE: Dr. Martin long since ran out of both books. You can order either microfiche or photocopies (specify which) of "Edible Leaves ..." for \$11.50 and "Techniques ..." for 7.50 from Agricultural Research Service, P. O. Box 53326, New Orleans, LA 70153.]

**2-5. ARE YOU THINKING OF USING A COMPUTER IN YOUR WORK?** Taylor University has an on-going Computing Assistance Program (CAP) to help mission groups integrate the computer as an effective tool in their work. CAP will act as a consultant on data processing and/or systems problems, assist in developing needed computer programs for a wide range of applications, assist in obtaining equipment for data processing applications, and help fill personnel needs on a long or short term basis. In project Wycliffe, CAP is developing a computer program for use in Bible translation work. In Project DOULOS, a computerized inventory control system is being placed on board the ship/book store DOULOS, operated by Operation Mobilization. In the Mission Software Project, a complete home office management system is being developed.

I asked the director, John Kastelein, about financial arrangements. "To the extent possible, the organization being served pays some portion of the cost. This would vary depending on the nature of the support. The cost for consulting would be basically the travel expense and lodging. Our resources are limited so we cannot respond to all request for assistance. However, we welcome inquiries and desire to assist as many missions as possible. For more information, write to Mr. Kastelein at Taylor University, Upland, In. 46989, USA.

**2-5. WHEN YOU NEED HELP MAKING PURCHASES IN THE U.S. RELATED TO YOUR WORK** It is often difficult to locate and order items from the USA when you are in another country. A few of you have sent money for ECHO to keep on deposit to cover purchases that you ask us to make from time to time. We are happy to help you in this way and deduct the costs involved (including any necessary long distance phone calls and postage) from your deposit. ECHO is NOT able to make purchases on your behalf and bill you. Be sure to indicate whether it is a rush order that should be handled by phone and **ALWAYS SPECIFY** whether you wish us to ship air or surface mail. We will assume you wish air mail unless you tell us otherwise. Please be sure the amount you send us is at least enough to cover estimated expenses so that we can avoid delays while waiting on a second check. This is only for technical items.

This is the most convenient way for us to arrange for a purchase for you. For example when I called Fairchild Tropical Gardens to see what they would charge for the book on fruit tree propagation, they said there was no way they could set a price because postage would vary so much from country to another and their next shipment of books might be more expensive. They suggested it would be much faster if I ordered and paid for the books. You could do the same thing from your country, but with considerable delay while waiting for the mail. Most of the purchases you have asked for have been books, larger quantities of seeds, and subtropical fruit trees. We do not charge for this service but, of course, neither can we assume the risks of lost merchandise. **YOU MUST ASSUME ALL RISKS** of loss in the mail or of problems in customs.