

with other porridges in the area as well) are reported to be especially smooth and easy to swallow. In addition, the nutritional level is exceptional, with high amounts of protein and of the amino acid lysine (that is almost lacking in maize).

Read more about grain amaranth, its increasing popularity in East Africa, and the use just described, in *EDN* issues [91](#) and [92](#). ECHO also has a [Technical Note about amaranth](#) that incorporates much of the information from the *EDN* articles.

Learn two important lessons from the goat and the deer—diversify food options!

Lesson I. Browsers can pay less attention to exact nutritional analysis of each component of their diet.

Goats and deer are browsers. This means that they eat a modest amount of one kind of plant, then go looking for something else to eat. In contrast, grazers (such as cattle and sheep) find something they enjoy and contentedly eat more and more and more of that one thing.

The diet of the browser contains a sampling of all the edible plants they enjoy. By the end of the day they have likely eaten a modest amount of every vitamin, mineral, oil, carbohydrate or essential amino acid that they need for good health. The grazer has eaten only what was in the one or two kinds of plant they ate that day.

People will be rewarded by intentionally being browsers. By eating a wide variety of foods, we will be more likely to take in a sufficient daily amount of all that we need for good health. In contrast, cultures that, for example, eat mainly rice or tortillas or bread made from one kind of grain (and perhaps some legumes, if they can afford them) are much more likely to experience deficiencies in one or more nutrients. Cultures that enjoy a wide variety of vegetables, including cooked leaves, are blessed for that reason.

A common question when I give tours of the plantings at ECHO is, “What is the nutrient content of that plant?” That is interesting information to know, though in many cases the plant has never been completely analyzed. But I think we tend to make nutrition more complex than it needs to be. An otherwise healthy person with a diverse diet probably has no nutrient deficiency. (An exception would be if plants cannot take up an essential mineral because that mineral is not present in the soil. A good example is goiter caused by iodine deficiency in locations where there is little or no iodine in the soil. In such cases the mineral must be brought in from outside the community.)

It becomes important to know more precise figures about nutrient content when we need to treat a specific deficiency. For example, if illnesses are showing up because of a certain vitamin deficiency (perhaps because there is little diversity in the diet or disease prevents adequate uptake), then it would be helpful to identify edible plants high in that nutrient that are acceptable to individuals who lack it.

This is why one of ECHO’s core ministries is to make people aware of the incredible diversity of food plants that have been

placed here by our Creator, and to make trial seed packets available to increase the local diversity of food options. Ninety-five percent of the food eaten by man comes from only 30 species of plants. Only one of those, the 29th most important, comes from the continental United States where I live! That plant is the sunflower. Almost everything I eat originated in another part of the earth. (You may ask, “What about corn/maize?” Maize was introduced from Mexico and Central America to what is now the United States by American Indians.)

Lesson II. Browsers are less likely to react to toxic substances.

Animal nutritionist Dr. Peter VanSoest, my advisor when doing post-doctoral research one summer at Cornell University, taught me the second lesson from the goat and the deer. He pointed out that the liver is capable of detoxifying modest amounts of almost anything. But its capacity to detoxify a particular toxin can easily be exceeded. Then health problems arise.

A decreased ability to handle a particular toxin can result when people adopt a “fad diet” and eat something in extreme. A good example of that was mentioned in *EDN* [90](#). People in Taiwan went on a diet plan in which a main food was raw juice extracted from leaves of a popular vegetable in SE Asia (and at ECHO) called [katuk](#), *Sauropus androgynous*. Thousands of people have eaten this popular vegetable for centuries with no report of harm. But many people on this diet in Taiwan ([EDN 59](#)) ate far, far more than their liver could detoxify and they ended up with serious, incurable lung disease.

Conclusion

PLWHA face a number of unique challenges. An awareness of some of the issues can be helpful when planning ways to help. We would welcome feedback regarding issues that we have mentioned, as well as ideas and insights not mentioned here.

Advantages of Perennial Vegetables

By Dr. Martin Price

ECHO emphasizes the many benefits of growing perennial vegetables. By this we mean vegetables that are planted once and eaten from for years. The benefits are many and can be especially helpful to the families of PLWHA, who have diminished labor availability and perhaps less land and money to purchase seeds.

Perennial vegetables require far less labor and expense and usually can be counted on for a reliable yield of food.

The typical garden must be dug or plowed, then further worked to make a fine-textured seed bed. Farmers are often unsure whether they will find the seeds they want, whether they will be good seeds, and how far they may need to travel to purchase them. Then there is the work of planting the seeds and cultivating out the weeds. Ants and birds may eat the seeds. Chickens may eat or scratch out the young seedlings. Cutworms may cut the stems of the seedlings and insects may eat the leaves. Larger farm animals can destroy the garden.

In contrast, once a perennial vegetable has reached a considerable size, nearly all of these problems disappear, except those caused by the largest farm animals. This is especially important for the sick and elderly, including AIDS patients and AIDS orphans.

Perennial vegetables provide food year after year. I planted two of my favorite perennial vegetables, katuk and chaya, when my wife and I built a new home 22 years ago. We are still eating from the same plants today.

Soil erosion is reduced. Because there is no need to till the soil, soil erosion is reduced. This can be of enormous importance on sloping land.

Perennial vegetables have special disease and insect resistance. Almost by definition, perennial vegetable plants must have unusual ability to fight off plant diseases and insects, or they would never live enough years to become perennials.

Perennial vegetables have resistance to climatic extremes. Again almost by definition, perennial vegetables must be able to survive long periods without rain if they are grown in a drought-prone region and to resist heat and humidity if they are grown in the hot, humid lowlands.



*Figure 1:
Chaya is a favorite perennial vegetable at ECHO.*

Perennial vegetables often have high nutritional value, high yields and provide food over an extended season. I am always struck by the enormous quantity of edible green leaves on a chaya bush, compared to the much smaller amount that can be harvested from an annual leafy vegetable like spinach or lettuce, which would take up the same space in the garden. I have seen chaya producing edible leaves in Haiti after four months without rain. An added benefit is that leaves of the perennial vegetables regrow soon after harvesting.

Favorite nutritious perennial vegetables at ECHO include [moringa](#), [chaya](#), [katuk](#), and [Haitian basket vine](#) (also known as "hoop vine"). Write or visit our website for more information about these and other perennial vegetables.

Resources to Help with Haiti Disaster Response

ECHO has considered how our resources can be most helpful in light of the recent devastating earthquake near Port Au

Prince, Haiti. Our main strength is in the area of agricultural information relevant to development workers, project volunteers and church leaders working on behalf of those in need. Although ECHO does not specialize in relief, we anticipate that our resources will play a significant role in dealing with long-term recovery efforts. The content below highlights information placed on our website to direct readers' attention to specific articles and links that are especially relevant to those serving in Haiti in light of the recent earthquake. Articles or web links referred to below can be found at:

www.echonet.org/content/Haiti_Earthquake_Resources

Urban and Above-Ground Gardening: It is possible to grow food on flat sections of rubble, cement slabs, tin roofs or other areas where fertile topsoil is scarce. Since 1982, ECHO has experimented with ways to garden under these conditions. Dr. Martin Price has written a [40-page booklet](#) and narrated a [PowerPoint presentation](#) describing principles and techniques for rooftop and urban gardening. Portable container gardens can be constructed from old tires. They can be moved if the gardener relocates and can be placed even on a pile of rubble. If elevated there can be less risk of loss to animals as well.

Water filtration. One of the best methods for water filtration is the [Biosand](#) filter. The ECHO Technical Note on that subject is on the web or can be mailed.

Moringa seeds can be used to clarify muddy water. Crush *Moringa oleifera* seed kernels (left after outer seed coat is removed), mix with dirty water, wait while impurities bind to seed particles and settle to the bottom, and then pour off clarified water. A [pdf publication](#) with more detail is available. This works best in combination with SODIS.

SODIS (solar disinfection) ([EDN 90](#)) is a simple technique for purifying water using clear plastic bottles and sunlight. If water is not quite clear, first clarify it with moringa seed powder.

Food Preparation/Cooking. Loss of infrastructure can make electricity or propane unavailable, leading to more demand for fuel wood in a country already short on trees for this purpose. Certain fast-growing nitrogen-fixing tree species can be grown in small woodlots to supply firewood. *Leucaena leucocephala*, for instance, grows quickly and can be coppiced (it will quickly regrow after being cut back). This species has a reputation for being weedy, but the varieties ECHO carries produce fewer seeds than the "common leucaena." See the following article ("Coppicing Woodlots") for information on small woodlots.

Our Technical Note called "[Agroforestry Principles](#)" explains how to utilize trees in farming systems.

Other innovations related to cooking include [sawdust cookstoves](#); rocket stoves (with external links to information: [Build a Stove](#) and [CCAT Rocket Stove](#)); and [biogas digesters](#).

What crops grow well in Haiti? Staple crops in Haiti include maize, "pitimi" (Creole for sorghum) and "pwa kongo" (Creole for pigeon pea). A variety of local cowpea and

dry bean varieties also exist. Seeds can often be found in local markets, especially in rural areas. As rural communities cope with large influxes of relatives and refugees from Port Au Prince, there could well be pressure to use seed stocks for food. In efforts to provide grain, consider growing out the best local varieties for the purpose of seed multiplication and preservation. In some situations, it may even make sense to contract with local farmers to grow seeds, thus utilizing local knowledge and labor while providing farmers a guaranteed financial benefit for their efforts.

Vegetatively propagated crops commonly seen in Haiti include banana, sweet potato Haitian basket vine (liane panye) and cassava. Again, farmers in rural areas are often willing to sell starts/cuttings of these. Look for local varieties, but realize that farmers in one area may not have the same varieties as those even five or ten miles away. [Agristarts](#) in Florida is a good source of tissue cultured bananas.

Perennial vegetables well-suited to Haiti include [moringa](#) ("Doliv" or "Benzoliv" in Creole), [chaya](#) and [Haitian basket vine](#) (also known as "hoop vine").

Other vegetables that grow well include eggplant, okra, Roma tomatoes (beefsteak types often fail, because high temperatures inhibit pollination; even Roma varieties should be planted in cooler times of the year such as early October), kale, amaranth, and pok-choi. A number of multi-purpose agroforestry species are also present in Haiti. As mentioned in [EDN 106](#), the entire 418-page book of *Bwa Yo: Important Trees of Haiti* is available from the USAID Development Experience Clearinghouse (DEC) and can be accessed by following this link: http://pdf.usaid.gov/pdf_docs/PNACA072.pdf.

Farming practices, techniques and systems: The [100th issue of ECHO Development Notes \(EDN\)](#) included brief summaries of a number of the most successful innovations covered in the first 99 issues.

[ECHO Material Available in Creole](#) includes:

- A pdf document by Road to Life Yard (project led by Mark Hare) on [making moringa leaf powder](#).
- A web page showing [plant names in Creole](#).
- Material by Wayne Niles on [Rabbit Production](#); [Chicken Production](#); and [Making a PVC Pump](#)

If you are working in Haiti and have found ECHO's services/resources helpful, please let us know as you are able. This is a work in progress, so please send us suggestions.

Coppicing Woodlots

Jean Remy Azor, interviewed by Danny Blank

Jean Remy Azor works with the Mennonite Central Committee (MCC) in Haiti. He participated in a group keynote presentation at ECHO's conference in 2007, about MCC's reforestation and "ti fore" (little forest) program. He also helped lead a post-conference workshop. Jean Remy owns and manages his own "ti fore" in Haiti. Farm Manager Danny Blank shared, "I have seen different examples of wood

production on small pieces of land in various countries such as El Salvador, Ethiopia, Malawi, and Haiti. Jean Remy has the oldest coppicing and reseeded woodlot started by a farmer that I know of. He started it in 1984 and has not had to replant it since. It is very impressive." Danny visited Jean Remy and his woodlot in 2007. Below we share the interview between Danny and Jean Remy. Questions in boldface and italics are Danny's; the text following is Jean Remy's response.



Figure 2: Jean Remy's ti fore (little forest), a mixture of Senna siamea, Leucaena diversifolia, and neem (Azadirachta indica), planted in 1984.

How did you first get the idea, training, or interest in planting a small forest?

I saw a few other forests in other areas of Haiti and that is where the idea came from. Then I came to understand how and why they are important. The impetus for starting my own was because I wanted to put into action a demonstration garden to help people discover how they can make a ti fore, to create an available source of seeds for the nurseries and to increase my personal income to sell charcoal, firewood and wood for construction to the community.

Was this your own field?

Yes, because I had bought a piece of land and my mother gave me another adjoining piece of land which resulted in a ¾ hectare piece of land that was mine.

Did you need permission to plant this field?

I didn't need direct permission but I had to talk with my mother and explain my plan to her because she was the actual landowner.

What was on that field before you planted?

Before the small forest my parents planted corn, sorghum or sweet potatoes and congo beans [pigeon peas].

What were the original species planted?

I started with many varieties, mostly Kasya (*Senna siamea*), Lesena (*Leucaena diversifolia*) and Neem (*Azadirachta indica*), but there were several that didn't develop well.

Did you plant seedlings from sacks or direct seed?

I planted a lot of seeds in the semi-direct method and I planted seedlings which came from nurseries.

Please explain about the actual planting of the field-- land preparation, burning or hoeing, number of people, labor involved in planting.

To start I cut everything on the land which was mostly grasses. After that I planted trees together with crops, (e.g. trees with corn and congo beans.)

Did you purchase your plants?

At that time there was a central MCC nursery in Deschappelle and we had yet to start selling trees, so I was able to get those trees for free.

Was this part of a program?

No, this was done on my own initiative, it is 100% private but it does serve as a reference for a lot of local landowners who visit the reforestation project.

Did other farmers in the area plant woodlots?

There wasn't anyone who did the same thing that year, but after two or three years several peasants started small forests in the area.

What was the size of your original planting?

I started the forest in all the land I had because the crops I was growing were taking too much money to grow and the soil was too poor. I never have measured the land officially but I consider it to be about ¾ of a hectare (1.85 acres). The forest is the same size today as the original.

What has/have been the most significant species in terms of production?

Kasya (*Senna siamea*) and Lesena Divesfolya (*Leucaena diversifolia*).

Do you coppice (cut low to the ground and allow for resprouts)?

Yes, I coppice the trees, and they sprout several others.

Do you ever replant species or is it a self-sustaining forest?

A lot of the trees have been giving off seeds for a long time. [Some new trees come from seeds that fall and sprout.] Also when I cut a young tree it resprouts. Because of this I have never had the need to plant other trees in this small forest.

Can you estimate the amount of labor it takes on a yearly basis to manage the size of your plot? Please explain activities and time involved.

I don't really do a lot of work to manage the small forest. In the first year I worked more, but after the first year there was too much shade from the trees for the grass to grow. To talk about the work in the forest currently, it is mostly trimming branches and repairing holes in the fence. On the average I work 10 to 15 days each year in the forest.

Can you estimate the income from this plot on a yearly basis? Is your family better off because of this woodlot?

I decided to let a few years go without harvesting trees so they can get larger. I have tried different methods of using the trees and selling wood. All combined, I can get between \$500 and \$750 US per year. I can say yes, the forest has made some differences in my family's life because the money I make in the forest is added to buy food, pay for school, etc.

Can you estimate how much wood comes off this plot in a year?

The way I use the wood most often is to cut it in 30 to 40 inch (75 to 100 cm) sections that I then sell for people to use to cook, for dry cleaning, bakeries, etc. In a year I can get about 19.6 to 23.5 cubic yards (15 to 18 cubic meters).

Does it meet your own family's need for wood? Do you use wood, charcoal, gas, or electricity for cooking? What about in the past?

Yes, I have plenty for myself and the rest I sell. For the past 10 years I have used two kinds of energy. To cook in the house, I use kerosene. To make food for a lot of workers in the field, I use firewood directly. I use some charcoal to iron clothing and also to dry corn. Before this I used more charcoal and firewood.

Do you have other woodlots?

Yes, I've started another small forest which is growing well for now.

Explain your neighbors' reaction to your woodlot. Are other people interested?

Yes, the neighbors had a lot of reactions when they saw how beautiful it was and all the opportunities it provided both economically and environmentally. A lot of neighbors had an interest in starting their own forest and many have started forests in the past three to five years.

Is theft a problem?

From time to time four or five trees will disappear from the forest, usually when someone local is building a new house.

How would you rate your overall experience with woodlots?

It has been an amazing experience. I do have some problems that I need to address so the problems don't persist, like animals (goats) put into my forest to graze, or Voodooists that consider a forest a space for evil spirits.

What advice do you have for others?

The advice I have is for everyone to choose to make a small forest as an economic resource which you can use both when you are young and strong and when you get old and can't depend upon your physical strength anymore to make money.

BOOKS, WEBSITES AND OTHER RESOURCES

Book Review: Paul Polak. 2008. *Out of Poverty. What Works When Traditional Approaches Fail*

By Harold J. Harder, Ph.D.

Professor Emeritus, Trinity Western University, Langley, BC, Canada

What can the poor do to move out of poverty? In his book *Out of Poverty*, Paul Polak challenges the reader to take

a fresh perspective on the poor—to see them for their potential to work their way out of poverty.

Many poor people are entrepreneurial in their thinking and have assets such as

dormant at the beginning of the rains and deposits abundant quantities of organic fertilizer [falling leaves and pods] onto the food crops to provide nutrients and increase yields, totally free of charge. These trees are fertilizer factories in the food crop fields.” Some of the nutrients attributed to this tree may actually come from manure deposited while livestock are resting in the shade of the tree.

Dr. Garrity also remarked “If scientists were to invent from scratch a tree species that encapsulates the ideal characteristics of an agroforestry tree, compatible and valuable in food crop systems, they would probably come up with something pretty close to *Faidherbia*. Thus, the tree is an icon of what agroforestry can contribute to food production systems on this continent and elsewhere in the tropics.”

Although the use of *Faidherbia* as a dispersed tree in cropland was noted first in West Africa, it has been promoted widely in Malawi and surrounding countries. Estimates are that *Faidherbia* is intercropped with maize on half a million farms in Malawi. Promoters in Zambia hope to see 240,000 ha with *F. albida* on small

farms by 2011. In Ethiopia *F. albida* is not managed but known and regulated; cutting of these trees is not allowed.

F. albida is also recommended as a good species to combine with conservation tillage (a.k.a. ‘Foundations for Farming,’ previously called ‘Farming God’s Way’). The World Agroforestry Center calls this “Conservation Agriculture with Trees (CAWT)”. The recommended density for *F. albida* dispersed in cropland is 100 trees per hectare (5 m x 20 m or 10 m x 10 m spacing). These can then be gradually thinned to achieve a rate of 20 mature trees per hectare. For groundnuts, soy and cotton, density of mature trees can be 40 trees per hectare.

Trees should be started from seed in a nursery. Nick the seed for good germination and air prune the seedlings (prevent roots from growing longer by letting them contact air, growing them in open tube on a raised platform). Transplant within six weeks of sowing.

In the field the roots tend to grow shallow and horizontally until they reach the edge of the canopy and then grow downwards. *F. albida* seems to be most effective with grains – maize, sorghum, millets.

ECHO has a limited supply of *F. albida* seeds and will supply a free sample packet (approximately 30 seeds) upon request to network members.



Figure 3: *Faidherbia albida* at edge of a field in Kenya. Photo: Bob Hargrave.

Web Links:

- World Agroforestry Centre: www.worldagroforestry.org
- 2nd World Congress of Agroforestry: www.worldagroforestry.org/WCA2009/
- African Conservation Tillage Network: www.act-africa.org/
- Foundations for Farming (formerly called Farming God’s Way): www.foundationsforfarming.org/

UPCOMING EVENTS

ECHO Networking Forum

*Ouagadougou, Burkina Faso
September 21-23, 2010*

If you are working in West Africa, please consider joining us for this upcoming networking forum. Presentations will be in French and English (there will be translation). The cost is \$200 or 100,000 CFA (not including breakfast, supper and housing). Registration will be mostly through ECHO in Fort Myers, but can

also be done in CFA through a local NGO in Burkina Faso.

Check the “[ECHO Events](#)” portion of our website for more details about the content, costs and location of the forum. Contact Tim Albright at talbright@echonet.org with suggestions for topics and/or potential speakers for the forum.

17th Annual ECHO Agricultural Conference

*Fort Myers, Florida
December 7-9, 2010*

Online registration is coming soon. Please let us know if you are planning to attend, and consider giving a presentation. We have speaking slots for 45-minute morning sessions, 60-minute afternoon workshops on the ECHO farm, and 25-minute evening PowerPoint talks. Contact Tim Motis (tmotis@echonet.org) if you have topic/speaker suggestions.

PLEASE NOTE: At ECHO we are always striving to be more effective. Do you have ideas that could help others, or have you experimented with an idea you read about in EDN? What did or did not work for you? Please let us know the results!

THIS ISSUE is copyrighted 2010. 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. The book and all subsequent issues of *EDN* are available on CD-ROM for \$19.95 (includes airmail postage). Issues 52-107 can be purchased for US\$12, plus \$3 for postage in the USA and Canada, or \$10 for airmail postage overseas. *EDN* is also available in Spanish (Issue 47 and following) and French (Issue 91 and following). ECHO is a non-profit, Christian organization that helps you help the poor in the third world to grow food.