



Sustainable New-Wealth Enterprises

Sustainable new-wealth enterprises is a term you have to ponder for a moment, but once you understand it, it makes perfect sense.

The context of *sustainable* as used here, is a long-term land use that is environmentally-sound, profitable, and meets people's needs. *New-wealth* is value that did not previously exist. And *enterprise* is a project undertaken that often requires some boldness or adventurous spirit.

Here, we're talking about a business venture.

When you put it all together, we are referring to new industries based on sustainable land uses that generate new wealth. New-wealth is a key point, because there are many examples where value is converted from one form to another, and there is very little new value added, or value may even be lost. In other cases the cost of materials is very low,

but the value of the product is very high. The purpose of the term sustainable new wealth enterprises is to draw attention to what we really want to accomplish in an enterprise and the community it effects -- sustainably generating new wealth by utilizing renewable natural resources, when nature is debited and does not demand repayment.

Consider a farming operation, where

----- (See *Sustainable* on page 2)

Growing Shiitake Mushrooms is a Spawning Possibility

The shiitake (pronounced she-eh-ta-kay) mushroom is one of the most popular foods in Japan and a major staple in China and other parts of the Pacific Rim that is also growing in popularity in the US. As a protein source, it has the combined attributes of being appetizing, nourishing, dietetic, and healthful. Growing shiitake mushrooms is yet another alternative crop possibility that can be incorporated into an agroforestry system.

Shiitake grow on hardwood logs under forest shade where cold running water is nearby. They prosper in sixty percent or better shade outdoors (not darkness) where ventilation is good. Oak logs are usually used, but many other hardwoods can also produce these mushrooms. Logs are derived from young, living, healthy trees that are selected from stands needing to be thinned. Among commercial growers, a standard log width is 4 inches, cut to 30 to 48 inches long. Care must be taken to avoid damaged bark. Pines and other conifers will not produce shiitake.

Holes are drilled in the logs and shiitake inoculum is inserted. The logs are stacked to allow air movement. It takes 4 to 20 months for a log to become completely colonized by the fungus. Mushrooms are harvested while the caps still have curled edges and are less than 4 inches in diameter. Logs will fruit twice a year, in the spring and fall. Shiitake will

store well fresh for two to three weeks in cloth or paper bags. If dried or frozen, they will keep much longer.

According to the *Mushroompeople* of Summertown, Tennessee, North

America's oldest mail order supply firm for specialty mushroom growers, the most successful shiitake mushroom growers in the United States are still the small family

----- (See *Shiitake* on page 6)



A Summertown, Tennessee mushroom grower examines shiitake-producing logs.

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Message From the Manager

A commentary on the status of agroforestry as reported by Program Manager, Bill Rietveld

Forest Pharming?

In the news you have probably heard about "pharming," where modified genes are injected into livestock to make them produce specialized pharmaceuticals (medicines) that are used to treat human diseases. Well, something similar is happening in agroforestry. There is an expanding interest in growing high-value specialty products in agroforestry systems — forest farming. The strongest interest is focused on medicinal and botanical plants, mushrooms, herbs, and foliage plants.

Forest farming is the intensive culture of specialty crops under a forest cover that has been manipulated to provide the correct growing conditions. Most of these high-value crops are forest-based, for example ginseng, goldenseal, shiitake mushrooms, and beargrass. Products are sold to the health food, floral, landscape, and crafts industries.

Actually, there are opportunities for growing specialty crops in all five types of agroforestry practices. Sensitive crops that require more light, like flowers, herbs, and vegetables, can be grown in alley cropping systems. Nut trees such as hybrid hazelnuts can be planted as windbreaks, and specialty crops such as Christmas trees and nursery stock can be included in the design.

Pine straw and pine cones can be harvested from silvopasture systems. And, riparian zones can be planted to short-rotation woody crops, usually hybrid poplars, to provide a riparian buffer strip and income from woody biomass.

This issue of *Inside Agroforestry* is focused on enterprise development through agroforestry. There's a big story to tell, and the articles in this issue only give an overview. The Center is planning several activities with partners to realize the potential of growing specialty products in agroforestry systems, and you will hear more about them as they develop.

We feel that agroforestry is a win-win situation for the environment and the landowner. But to get people to agree with us, collectively we must provide compelling reasons for adopting agroforestry. Those compelling reasons are there (conservation and income), and are rapidly being developed and documented as this issue of *IA* illustrates. Our job, as natural resource professionals, is to provide the landowner with options and tools to assist sound land stewardship decisions. We will accomplish this by developing improved technologies, information, and tools and demonstrating how they work.

(Sustainable from page 1)

many inputs are required to produce a bushel of grain. Without subsidies, it may be very difficult to produce grain at a profit at today's prices. And many farming practices are not sustainable. Growing organic grain is more sustainable and generates a higher value product. Converting corn to ethanol is converting value from one form to another. It creates new businesses and jobs and expands the market for corn, but it does little to generate more value (profit) on the farm.

In contrast, there are alternative land uses and crops that are more sustainable and can potentially generate more new wealth on the farm. Agroforestry — growing multiple crops on the same piece of land through vertical integration and utilizing the beneficial interactions between trees and crops. Examples include converting a farm woodlot to a forest farming operation to produce ginseng, growing black walnut and grain or forage crops in an alley cropping opera-

tion, and growing high-quality sawlogs and livestock in a silvopasture system. A further example is an agroforestry-based fee hunting enterprise.

There is of course, a relationship between the amount of new wealth potential and the amount of risk involved. Obviously everyone is looking for a low-risk enterprise with minimal costs and high profits. Beyond this are the social aspects, where landowners and communi-

ties are looking for enterprises that are compatible with their culture and values.

Elsewhere in this issue of *IA* are examples of potential sustainable new-wealth enterprises based on agroforestry. The purpose is to present ideas and options, recognizing that they are not tried and proven systems and markets for the products may not exist.

by Bill Holmberg, American Biofuels, Washington, DC and Bill Rietveld, NAC Program Manager



The New "Working Trees for Communities" DISPLAY is now here

The "Working Trees for Communities" display shows how agroforestry technologies can help create more sustainable community environments. It's available on a loan basis and is a wonderful informational aid to use at meetings, workshops, or just in your office. The only cost involved is the cost of sending it to the next user.

Call Clover at 402-437-5178, ext. 14 to reserve.

"Working Trees For Communities" brochures are also available to accompany the display. They're free and we have a large supply ready to be distributed.

Growing Special Forest Products in Agroforestry Systems

by Mary Ellen Dix, National Agroforestry Center, Lincoln, Nebraska

James Freed, USFS, Pacific Northwest Region, Olympia National Forest, Olympia, Washington

Louise Buck, Department of Natural Resources, Cornell University, Ithaca, New York

“Many special forest products have tremendous economic value, particularly when the production is incorporated into tree plantings that serve an additional purpose, such as a windbreak or a riparian buffer strip.”

—Mary Ellen Dix

Earn a profit from a forest before the trees are cut or without cutting them at all? Believe it or not, it's happening in many areas. Special forest products (SFP) are tangible products derived primarily from plants, fungi, microorganisms, invertebrates, and animals found in forested areas, that are being harvested. These products fall into five general categories: food, herbs, medicinals, decoratives (including floral greenery and dyes), and specialty items (including aromatic oils and wood products). See the table on page 7 for more information.

Special forest products have recently gained considerable attention as an alternative income source for contractors who gather them from public forested land in the Pacific Northwest, Southern, and Eastern regions of the United States. Often the gatherers of products in this \$5 billion industry are former lumbermen or lumberwomen, farmers, or urban dwellers. The increasing demand has caused over-harvesting in some forests, which has threatened the very existence of some of the products.

Because of increased restrictions on access to the forests where specialty products can be found, there has been a growing interest in producing SFP in agroforestry systems -- in other words, farm the forest. “Forest farming” is the intentional culture of specialty crops in a managed system. Many SFP's have tremen-



Gathering of swordfern fronds dates from the turn of the century. Today it is harvested year-round from shaded forest areas.

dous economic value, particularly when their production is incorporated into tree plantings that serve an additional purpose, such as a windbreak or riparian buffer strip. Some examples include: ginseng culture in forest farming systems; short-rotation woody crops in riparian buffer strips; saw-palmetto in southern pine plantations; floral decoratives or mushrooms on private forest lands of the Pacific Northwest; shiitake mushroom, nut, or syrups in Midwest agroforestry plantings; and Christmas trees in northern Great Plains windbreaks.

Characteristically, agroforestry systems that produce SFP's are intentionally established on private land through the integration of forestry and agricultural practices. These systems are intensively managed to make a profit from SFP's and at the same time provide multiple conservation and environmental benefits.

This concept is not new. Harvesting and management of SFP's has been a long-standing practice for generating supplemental income in Europe, Asia, and other countries. Ginseng, a high value botanical is a classic example of a specialty product. Asians value the dried roots of this medicinal herb for its stimulant prop-

(See Forest Products on page 4)

There's More Than One Reason to Plant Poplars

Short-rotation woody crops (SRWC) combine both environmental benefits and income generation. Fast growing poplar trees are prized for paper production because their lignin is weaker than in other trees and less costly to break down. For these reasons, poplars have been hybridized and cultivated to produce more biomass annually than any other hardwood or conifer tree in the US. This high biomass production is dependant on fertile, well-drained soil, abundant water, total weed control, and an absence of insects and disease damage.

Riparian buffer strips in the Midwest and Northwest are ideal sites for woody biomass plantings because of their fertile soil and availability of water. Other ways SRWC can be incorporated into agricultural production systems include windbreaks, timberbelts, border plantings, and alley cropping. Poplar trees in these plantings also provide wildlife habitat, erosion control, aesthetic screens, and wind protection. Their roots filter agricultural wastes from surface and subsurface water. The wood can be used as fuel, matches, toothpicks, pulpwood, chipboard, and as a feed supplement. The leaves are nutritious and comparable to alfalfa in protein, carbohydrates, and other nutrients. Futuristically, drug companies could genetically engineer poplar leaves to produce essential pharmaceutical drugs or biodegradable polymers.

Poplar plantings are harvested when trees are 7-8 inches in diameter or every 5-10 years (average 7 years). Generally, plantings need to be 30 acres or larger for the grower to break even on harvesting costs. In the Northwest, approximately 50,000 acres are now in biomass plantings. This is expected to double in the next five years.

Sources: Gary Kuhn, USDA-NRCS and Ned Klopfenstein, NAC. Also adapted from "The poplar from 0 to 60 in 80 days, Poplar Council of the US

erties. In 1993, approximately 230 million pounds of ginseng was produced in the United States with 90 percent being shipped to China, Korea, and Japan. In the United States, ginseng pills and roots are sold in health food stores. The market price varies considerably depending on the method of production that is used. Wild ginseng can sell for as much as \$400 a pound dry weight, while the market price for artificially cultivated ginseng varies from \$32 to \$80 per pound. Prices for woods-cultivated ginseng can range from \$100 to \$300 per pound depending upon how the product appears.

Ginseng is native to the eastern hardwood forests and traditionally was gathered from these forests. However, over-harvesting has severely depleted native stands and in some cases brought it to the brink of destruction. Ginseng can be cultivated from seeds, seedlings, and roots in shaded beds under tall hardwood trees.

The most productive beds are on moist, but well-drained north- or east- facing slopes with a loamy soil and heavy leaf litter layer. Yields are reduced by weed competition and damage from insects, slugs, diseases, and rodents. Roots are harvested from four to seven years after planting, with about one ton of ginseng produced per acre. Currently, ginseng is cultivated throughout most of the United States. In Kentucky, wild and cultivated ginseng production averages close to \$5 million.

Mushrooms, floral decoratives, and short-rotation woody crops are examples of other special forest products that can be readily incorporated into agroforestry systems. However, before starting to produce these SFPs, an entrepreneur needs to locate or develop potential markets and locate available production information and expertise.

Potential markets are often local stores

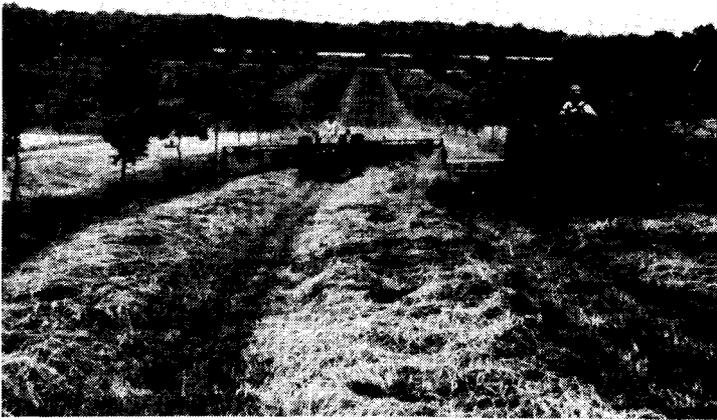
or cooperatives. For example, shiitake, matsutake, truffle, morel, and chanterelle mushrooms are often sold directly to gourmet, French, and Asian restaurants, Asian and natural food stores, or a middleman or cooperative for resale to larger more distant markets. Because markets for salal, beargrass, and other decoratives are in urban areas and overseas, these products are often marketed through cooperatives or local buyers. Nonlocal buyers also can be reached through the Internet.

University Extension Services, the US Forest Service, US Natural Resources Conservation Service, and local growers are possible information sources on production and marketing for well-known products. However, there is a lack of information on less common products (e.g. mushrooms, salal, saw-palmetto), especially their production in agroforestry

(See Forest Products on page 5)

Spotlight On Success Missouri

Alley Cropping to Help Feed Buffalo Herd



To help feed his herd of buffalo, Dan Shepherd harvests hay between rows of his maturing pecan trees.

Editor's Note: Landowners like Dan Shepherd, who use innovative approaches to manage their land resources must be commended. Shepherd Farms is another unique agroforestry example to learn from.

Some pioneers have learned how to use their land to the fullest, and Dan Shepherd is one of those innovative pioneers. Shepherd Farms has implemented a unique agricultural system which literally lets one operation "feed" from the others. In fact, Shepherd's buffalo feed on hay grown in alley cropping practices.

Shepherd's 2,800 acres of land near Clifton Hill, Missouri is divided between diverse agricultural operations which all work together. They include alley cropping between pecan trees, a cow/calf buffalo operation, and growing eastern gamma grass for grazing and seed.

The Shepherds purchased their land in 1970 where they grew traditional crops such as corn and soybeans and raised buffalo. They started with a 12-acre test plot of pecan trees, experimenting to find the best method to start their orchard. In 1981, the Shepherds planted 5,000 pecan trees, knowing that they would have to wait 20 years before the trees would reach full nut production. In the meantime, they have been using the spare land in the

alleys between the rows of pecan trees to grow corn and hay, which helps feed the herd of 700 buffalo.

When Dan and his father began farming, they knew that they needed unique operations to diversify their program and bring in a stable income. "We chose the pecans and the buffalo because we have more control of the prices," Shepherd said, "instead of letting the markets decide for us."

The pecan trees, now in their 15th season, have begun producing nuts. Shepherd will continue to alley crop corn and hay in between the tree rows until the trees become too large and shade out the crops. He is pleased, though, that he could use the land in the most productive manner for such a long period of time.

"You have to look long-term," Shepherd said. "The benefits outweigh the costs of both time and labor."

Dan Shepherd has taken traditional and not-so-traditional agricultural practices and implemented them into a system where each enhances the others. This is a good example of a successful sustainable new-wealth enterprise.

Don't Miss the March Agroforestry Satellite Broadcast

To address the growing interest in agroforestry, the USDA-NRCS will be producing a satellite broadcast that will address the purpose, concepts, opportunities, and benefits of agroforestry. The broadcast is planned for March 20, 1997 and will be broadcast from studios in Washington, DC.

The program is targeted to field level resource professionals and practitioners

*Begin preparations for the
satellite broadcast on
March 20, 1997.
Call the information line
for further details
as they become available.*

and will provide information on: 1) what agroforestry is, 2) how agroforestry links to sustainable agriculture, sustainable forestry, and sustainable communities, 3) the different types of agroforestry practices, (alley cropping, forest farming, riparian forest buffers, silvopasture, and windbreaks), and 4) regional opportunities for agroforestry.

The broadcast will be a combination of speaker's presentations in the studio, live discussions, video segments of actual agroforestry applications in different situations, and phone-in question and answer sessions with the viewers.

Of special interest is the development of a much-needed agroforestry video to be produced from this broadcast. There have been many requests for a video dealing with agroforestry and this shortened and edited version of the broadcast will be useful for creating awareness of agroforestry. It will be useful to inform viewers about how agroforestry relates to sustainable natural resource programs, promote the concept of agroforestry, and to train natural resource professionals and practitioners how to apply agroforestry practices in their area. As information about the video becomes available, it will be printed in future issues of *IA*.

Local groups who wish to participate in the broadcast are encouraged to make

(Forest Products from page 4)

systems. A few innovative producers have experimented and developed their own agroforestry production systems for a number of these products. Locating these individuals involves numerous phone calls and a bit of luck.

To address these needs the National Agroforestry Center in cooperation with several partners, is planning a symposium in 1998 to assess the potential and synthesize the state-of-the-art of growing SFP's in agroforestry systems. The symposium will summarize sources of available production and marketing expertise for SFPs grown in the United States, summarize information on economics, species and production systems.

Obviously, growing SFPs in managed systems is a niche enterprise whose markets are temperamental. Obtaining information on the production and marketing contacts for SFP's can be difficult and frequently is unavailable. Because the interest and need for information will continue to grow, answers will gradually emerge over the next few years. We at the National Agroforestry Center, USFS Pacific Northwest Region, and Cornell University perceive that growing SFP's in agroforestry systems is a win-win situation for the landowner and the environment.

Source: Adapted from USDA Agricultural Information Bulletin 666 (1993); Arny, Hill and Worms 'Alternative Forest Products' (1994); Beyfuss, American Ginseng Production in New York State' (1994) Cornell Cooperative Extension Service Bulletin; USDA Farmers Bulletin 2201; Mater Engineering Report for Missouri.

advance arrangements for a local downlink and contact cooperators and partners in your area to invite them to attend and participate.

At the time of this printing we do not have coordinates for the downlink. **However, a special information line has been set up. Call 402-437-5178 ext. 41 after February 21, 1997 for more information about the downlink coordinates, starting time, and length of the broadcast. If you have other questions, stay on the line until after the recorded message is completed and leave your name, number, and a message and someone will get back to you as soon as possible.**

Greenery for Crafts is Big Business

In the northwest, floral *decoratives* such as swordfern fronds, beargrass, and salal are gathered from public and private forests and sold to European and urban markets. Markets for floral decoratives have been increasing or steady with total sales in 1989 over \$49.6 million.

Gathering of swordfern fronds dates from the turn of the century. Today swordfern is harvested year-round from shaded forest areas. Beargrass is found in open areas in alpine and subalpine western forests. The long stem leaves of this lily are used by native Americans to make baskets and by florists for decorative arrangements. Beargrass is reported to be the highest volume SFP exported to Europe. Until recently, salal, a shrubby understory evergreen, was considered a weed species. Now salal is harvested year-round for floral arrangements. Only undamaged decoratives are marketable. Thus, the leaves of all decoratives, must be examined for deformities, spots, and insect damage.

Sources: Adapted from USDA Agricultural Information Bulletin 666 (1993), and USDA Pacific Northwest Region Olympic National Forest Bulletin 'The forest beyond the trees' (1993).

Proceedings of the Fourth North American Agroforestry Conference held in Boise, ID in July, 1995 are available.

To order a copy of *Building a Sustainable Future* send US\$35 (plus \$5 for US or \$10 for non-US shipping and handling) to Conference Proceedings, Attn. John H. Ehrenreich, Editor, College of Forestry, Wildlife, and Range Sciences, University of Idaho, Moscow, ID 83844-1135 Phone 208-885-7600

Gathering Pine Needles for Profit

Editor's Note: North Carolina Pine Needle Producers have found a profitable product that is benefiting the environment. Pine straw is just one of many special forest products landowners have learned to market.

Landowners in North Carolina are taking what used to be a forest by-product and harvesting it for a profitable gain. The collection and distribution of pine needles for mulch and landscaping uses has become a hot special forest product operation, especially in the South. It would also be an easy way to profit from an existing agroforestry silvopasture operation.

Gathering pine needles, often called "pine straw," for landscaping use began decades ago. When the sand hills of North Carolina were devastated by a series of forest fires in the early 1960's, firefighters noticed that in places where needles had been gathered from the forest floor, the trees didn't burn as fast or as hot. Landowners soon realized that this profitable practice of collecting needles was actually helping the trees protect themselves.

Terry Bryant, a leading pine needle producer from Carthage, NC, has made this alternative product his way of life. "Originally, pine needles were used for mulch to control erosion on hill sides," Bryant said, "but because they were so beautiful and long-lasting, they're now being used for other purposes like landscaping around trees and shrubs." Long leaf (*Pinus Palustris*) conserve moisture and buffer against extreme temperatures.

Bryant and other pine needle producers follow a strategic method for growing and harvesting the best possible product. He says that planting trees at proper distances apart, removing undergrowth, and raking the needles into rows is essential for a clean product that bales easily. He uses a foreign-made hay-baler because it makes easier-to-handle bundles with its smaller chamber to save costs. Bryant doesn't use excess packaging or labels for his product, although some producers do.

"We sell retail and wholesale to landscapers and homeowners," Bryant said. "Of course, we like to sell in quantity, but we do sell a few bundles at a time to landowners." He receives anywhere from \$3.50 to \$4.00 per bundle with about 70 to 120 bales per acre.

(Shiitake from page 1)

owned farms using hardwood logs. Hardwood-grown mushrooms are the highest quality product and successfully compete against large commercial growers using artificial substrate.

As you can tell, it is relatively easy to grow shiitake. However, making money is another matter. Mushroom growing as a commercial enterprise is closely dependent on good marketing. While the market in North America and Europe is steadily expanding, at times supply still exceeds demand, which causes prices to fall below cost, something no farmer can sustain for very long.

Here is a possible scenario of a one-

person farm. A small farm (less than 5,000 logs) can produce 45-65 pounds per day (at 0.25 to 0.33 lb/flush/log). Labor is needed for soaking the logs, harvesting the mushrooms, packaging them, and then selling them. A small farm with perhaps a father and his son or daughter and hired help in season, inoculating 4,000 logs per year will generate \$20,000 to \$30,000 pre-tax annual income or about \$10 per hour of labor, assuming an average sale price of \$4 per pound. If a steady buyer at \$8 per pound can be found, returns go up dramatically. For this reason, many shiitake farmers devote as much time to marketing as to produc-

Pine needle producers have learned that the production of pine needles can actually improve the environment. Many landowners who wish to cash in on pine needle production have planted their trees as windbreaks or on hills to control erosion under the Conservation Reserve Program. Although environmentalists are speaking out, concerned about effects of pine needle production on endangered species such as woodpeckers, producers have proven that their production helps control the woodpeckers' most dangerous predators, the squirrels. Raking also cultivates many plants in the longleaf wiregrass ecosystem.

Pine needle production has a fairly quick return and is long-lasting. After eight years, Bryant's 100 acres of 17-20 feet tall long-leaf pine are already producing needles. "I'll probably be 90 before my trees start to decrease in production," Bryant said.

Terry Bryant and other North Carolina pine needle producers have found an environmentally-conscious operation that yields great financial rewards.



Forming a windrow for baling requires shaping, fluffing, and removal of sticks, cones, and foreign matter.

tion, driving long distances to service gourmet restaurants and health food stores.

Shiitake has adequate nutritional qualities to serve as a main dish. Its oriental mystique makes for an easy entree into the vegetarian/health food/gourmet circles. As the baby boomers begin to age (the leading edge is now 50 and the back edge is 30), they will demand foods that are filling without being fattening. Endowed with blood-pressure lowering qualities and a demonstrated antiviral property, shiitake sales could take off quickly as this flavorful mushroom becomes for America what it has already become in Japan: a popular all-around food.

*Adapted from 1996 MushroomPeople Catalog
1-800-692-6329.*

Special Forest Products

Specialty Products	Examples	Use	Region of the United States							
			Northeast	South	Midwest	N. Plains	S. Plains	Intermountain	Pacific N-west	Pacific S-west
Food	Shiitake and matsuki mushrooms	food, medicinals	X	X	X	X	X	X	X	X
	Black locust and plum honey	food, candy	X	X	X	X	X			
	Walnuts, acorns, pecans, and Pinon pine nuts	food, dyes	X	X	X	X	X	X	X	X
	Blueberries, huckleberries, and other berries	food, dyes	X	X	X	X	X	X	X	X
	Maple, birch, and boxelder sap	syrops, candy	X	X	X	X		X	X	
Specialty Items	Cedar and pine oils	aromatics, crafts	X	X	X	X	X	X	X	X
	Poplar, willow, and switchgrass biomass plantings	fuel, paper	X	X	X	X	X	X	X	X
	Cedar, poplar, and willow residues	mulches, animal bedding, litter products	X	X	X	X	X		X	
	walnut crotches, wormy chestnut, diamond willow, and cedar veneer	wood, decorations and, carvings	X		X	X	X	X	X	
Decoratives	Salal, bear grass, sword fern, and other greenery	decoration, crafts projects				X	X	X	X	X
	Club fern, spanish moss, and other mosses	decorations, crafts projects	X	X	X				X	X
	Wild grape, kudzu, vine maple, and other vines	crafts		X					X	X
Medicinals	Ginseng	longevity, general strengthening, teas, herbs	X	X	X	X	X	X	X	X
	Goldenseal	eyewash, laxative, tonic hemorrhagic	X	X	X					
	Saw-Palmetto	food, prostate health		X						
Herbs	Slippery elm bark	food flavoring, laxative	X	X						
	Elder flowers	food flavoring, eye and skin health	X	X	X	X	X	X	X	X
	Eucalyptus leaves	flavoring agent, expectorant							X	X