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WSDA Compost Sampling Study Shows Clopyralid Ban is Working

[Scott Nielsen](#), WSDA Pesticide Management Division

The Washington State Department of Agriculture (WSDA) has completed a third year of sampling at compost manufacturing facilities within the state of Washington as part of our [clopyralid residue testing program](#). In the fall 2003, 12 composting facilities were sampled, seven in western Washington and five in eastern Washington. Individual feedstocks and finished composts were sampled at each facility. The average clopyralid residue level of all the facilities was 12.9 ppb in 2003 (Table 1). These results show a nine percent reduction of clopyralid herbicide residues over the previous year, and a 90 % reduction as compared to 2001 (Tables 2 and 3).



In western Washington the average clopyralid residue found in samples collected from seven facilities was only 1.1 ppb in 2003, with four of the facilities having no detections at all. Composting facilities in western Washington showed substantially reduced levels of clopyralid residue in 2002 (93%) and 2003 (98%) as compared to 2001 (Table 4). Of all fifteen samples collected in 2003 in western Washington, including feedstocks, twelve had no detections at all. Additionally, clopyralid residues in all of the finished composts samples were well below levels that would be injurious to vegetables or ornamentals. The continued reduction of

Table 1: Clopyralid analysis*, November 2003

| Facility | Samples (Positives) | Results (ppb) | Aver. (ppb) |
|---------------|----------------------|---------------|-------------|
| #1 east | 2 (2) | 7, 3 | 5 |
| #2 east | 4 (4) | 3, 260, 5, 32 | 75 |
| #3 east | 4 (3) | 9, 7, 7 | 8 |
| #4 east | 3 (3) | 6, 7, 2 | 5 |
| #5 east | 3 (3) | 9, 87, 66 | 54 |
| #6 west | 2 (0) | 0, 0 | 0 |
| #7 west | 3 (1) | 4, 4 | 4 |
| #8 west | 2 (0) | 0, 0 | 0 |
| #9 west | 2 (0) | 0, 0 | 0 |
| #10 west | 2 (1) | 3, 3 | 3 |
| #11 west | 2 (1) | 1, 1 | 1 |
| #12 west | 2 (0) | 0, 0 | 0 |
| Totals | 31 (18 = 59%) | | 12.9 |

ppb = parts per billion

* Finished compost and compost feedstock samples collected by WSDA and analyzed by Anatek Lab.

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Sustaining the Pacific Northwest

Food, Farm, & Natural Resource Systems

This quarterly newsletter provides a discussion forum for people working towards community-based sustainable food, farm, and natural resource systems using interdisciplinary oriented research and practitioner knowledge.

This is a joint newsletter of the WSU [Center for Sustaining Agriculture & Natural Resources](#), the [WSU Small Farms Team](#), the [WSU Small Farms Program](#) and the [Water Quality Management Team](#).



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**Table 2: Clopyralid analysis*,
December, 2002**

| Facility | Samples (Postives) | Results (ppb) | Aver. (ppb) |
|----------|--------------------|---------------------|--------------|
| #1 east | 3 (2) | 20, 11 | 15.5 |
| #2 east | 3 (3) | 6, 5, 6 | 5.7 |
| #3 east | 5 (4) | 23, 29, 22, 18 | 23 |
| #4 east | 3 (3) | 17, 8, 8 | 11 |
| #5 east | 5 (5) | 15, 333, 20, 13, 11 | 78.4 |
| #6 west | 2 (2) | 15, 2 | 8.5 |
| #7 west | 2 (1) | 11 | 11 |
| #8 west | 2 (2) | 12, 7 | 9.5 |
| #9 west | 3 (0) | 0 | 0 |
| #10 west | 2 (2) | 5, 3 | 4 |
| #11 west | 2 (2) | 6, 1 | 3.5 |
| #12 west | 2 (1) | 1 | 1 |
| Totals | 34 (27=79%) | | Aver. = 14.2 |

ppb = parts per billion

* Finished compost and compost feedstock samples collected by WSDA and analyzed by Anatek Lab.

**Table 3: Clopyralid analysis*,
November, 2001**

| Facility | Samples (Postives) | Results (ppb) | Aver. (ppb) |
|----------|--------------------|------------------------|-----------------|
| #1 east | 5 (5) | 200, 1550, 11, 56, 477 | 458.8 |
| #2 east | 6 (5) | 18, 600, 23, 29, 16 | 137.2 |
| #3 east | 6 (3) | 11, 20, 66 | 32.3 |
| #4 east | 5 (5) | 35, 26, 103, 43, 40 | 49.4 |
| #5 west | 5 (2) | 62, 46 | 54 |
| #6 west | 6 (5) | 250, 100, 24, 150, 124 | 129.6 |
| #7 west | 3 (3) | 124, 33, 86 | 81 |
| #8 west | 6 (6) | 12, 52, 9, 27, 43, 75 | 36.3 |
| #9 west | 7 (2) | 182, 25 | 103.5 |
| Totals | (36=73%) | | Average = 120.2 |

ppb = parts per billion

* Finished compost and compost feedstock samples collected by WSDA and analyzed by Anatek Lab.

clopyralid residues in compost facilities on the west side indicates that the prohibition of its use on turf has been effective.

In eastern Washington the average clopyralid residue found in samples collected from five facilities in 2003 was 29.4 ppb. The highest level of clopyralid detected in a sample was 260 ppb in timothy grass hay that was used as a compost feedstock. This one sample accounted for almost one third of the average clopyralid found in all samples collected from eastern Washington composting facilities. In eastern Washington levels of clopyralid residue found in samples declined in 2002 (83 %) and in 2003 (82 %) as compared to 2001, but in 2003 there was no decline as compared to 2002 (Table 4). While clopyralid levels of compost from composting facilities are declining throughout the state, levels in eastern Washington are higher than levels on the west side. There was higher historic use of Clopyralid-containing products in eastern Washington as compared to western Washington.

To further test clopyralid residues in compost samples, bioassays were conducted at Washington State University Research Center, Puyallup. In general,

samples of finished compost showed a marked improvement as compared to 2002. In 2003, all samples from western Washington showed no growth regulator type symptoms when susceptible peas were planted into the compost. The five eastern Washington finished composts graded out as follows: 1-none, 3-slight and 1-moderate symptoms. By comparison, in 2002 three of the east side samples were rated as showing severe symptoms.

The WSDA rule prohibiting most uses of clopyralid in turf went into effect in the spring of 2002. The results of our study show that the rule is having the desired effect of reducing clopyralid residues in compost produced at composting facilities. However, results also show that clopyralid-containing feedstocks are continued to be used in eastern Washington composting facilities. WSDA reminds growers that grass hay or straw from fields or pastures treated with a clopyralid-containing product cannot be used as feedstocks at a compost facility.

For more information regarding this program or the history of herbicide-contaminated compost, contact Scott Nielsen at (509) 533-2687.



Anaerobic Digestion

Chad Kruger, Director of Outreach and Communications, Climate Friendly Farming™

Animal manure generated on concentrated animal feeding operations (CAFOs) poses potentially harmful environmental effects on air, water and soil quality from long term manure storage and concentrated land application. Additionally, increasing production costs (partially due to increasing environmental regulations) and decreasing profits result in further consolidation of animal production in order to achieve greater economies of scale. These mounting volumes of waste need to be handled in an environmentally conscientious and economically effective way.

A natural, biological conversion process, anaerobic digestion (AD) has been proven effective at converting wet organic wastes into biogas (primarily methane) capable of producing relatively clean electricity while also alleviating many of the environmental concerns associated with the waste, such as odor, greenhouse gas emissions, and protection of soil and water quality. About 65% of the methane in the atmosphere originates with agriculture (Duxbury, 1994) and a significant portion of this comes from dairy cows. The Intergovernmental Panel on Climate Change estimates the concentration of methane in the atmosphere increased by over 150% in the last 250 years and that methane is 23 times more potent as a greenhouse gas than CO₂ (IPCC 2001). If half of the 250,000 dairy cows in Washington State were on a farm with AD, up to 100 million pounds of methane could be captured each year (about 3.15 million tons C equivalent).

The US Environmental Protection Agency (Ag Star Handbook) and the USDA Natural Resource Conservation Service (EQIP eligible practices) promote AD as a waste management practice for dairy manure. While proven economically viable for large dairies in some parts of the US, AD has yet to prove economically viable in the Pacific Northwest due to relatively low electrical power rates in the region. EPA

estimates only 100 dairies in the country currently use AD among the 6,000 dairies in the US with at least 500 cows which could benefit from AD (Ag STAR Digest, Winter 2003). A disproportionately small number of these dairies are located in the Pacific Northwest with only one commercial anaerobic digester operating on a dairy in Washington State.

How does AD work?

Most dairies utilize a lagoon system for animal waste storage, a practice leading to large emissions of methane and nitrous oxide. Closed-system AD eliminates most lagoon emissions while conserving nutrients and producing renewable energy. AD converts organic matter in the manure into methane by bacterial action. The collected methane may be used to generate electricity or a liquid fuel. The AD process also creates potentially valuable co-products, such as the digested fiber and a liquid rich in nutrients readily available for plant uptake.



Covered lagoon, complete mixed, and plug-flow digesters are three commercially available AD technologies, each with different advantages and disadvantages. Covered lagoons are a low-cost manure treatment facility that produces biogas from manure if external temperatures are sufficient, with a residency time of approximately 40 days (AgSTAR Handbook). Research is being conducted to reduce the residency time necessary for biogas generation in covered lagoons. This technology is best suited to warm weather climates in southern half of the US. Complete mix digesters use supplemental heat and automated mixing to facilitate the digestion process and treat manure that has

3 - 10% solids with a residency time of as few as 15 days (AgSTAR Handbook). Considerably more expensive, complete mix digesters generally require additional on-site personnel. Lower-technology plug-flow digesters treat dairy manure high in solid content (11-13%) with an average residency time around 25 days (AgSTAR Handbook).

CSANR's Climate Friendly Farming Research Project, in cooperation with the Agri-Environmental and Bioproducts Engineering Research Group (WSU Biological Systems Engineering) and Whatcom County Extension, are conducting research on anaerobic digestion to improve both technical and economic performance of AD systems that would make them a viable waste management practice for dairies in Washington. The Project is comparing AD technologies for their potential to reduce GHG emissions, generate renewable energy, improve dairy nutrient management, and increase economic performance.

The project is also developing a novel AD system which seeks to optimize performance of AD for region-specific applications. In addition, the project is conducting research, market development, and outreach on high-value uses for new co-products other than energy. For example, Whatcom County Extension has been testing the digested fiber as a replacement for peat moss as a growing medium for potted plants in the greenhouse and nursery industry.

While many potential advances in AD technology could improve performance, economic viability remains the key obstacle to the implementation of AD on dairies. Individual dairies must be relatively large (500 cow minimum) to achieve sufficient economies of scale on the physical plant to make the digester cost effective. Cooperation between multiple dairies clustered near one digester can improve economies of scale, but introduces new concerns, such as regulatory requirements, costs associated with transporting manure, and ownership and management arrangements. Improvements to AD technology have been directed at reducing the capital and operational

See *Digester*, page 5



[Chris Feise](#), Director

In this quarterly update, I want to recognize the many achievements of people and programs affiliated with Washington State University's Center for Sustaining Agriculture & Natural Resources. Without their commitment to sustainability, there would be no Center. I offer my congratulations and sincere gratitude to those who make CSANR a world class leader for healthy farms, food, and people.

The state Legislature created CSANR in 1991 in response to citizen requests, but provided no funding. In response, CSANR developed an alternative management structure based on a Leadership Team, comprised of 15 faculty and staff members from across the College of Agricultural, Human, and Natural Resource Sciences and Extension. This team guides the Center's direction and plan of work. They benefit from opportunities to communicate with each other regularly, and to develop interdisciplinary projects exciting to team members and funders.

During the past five years, Leadership Team members received almost \$10 million in private and federal support to fund projects that advance sustainability. CSANR will grow further in the next decades as the public embraces sustainable solutions that balance concerns for society, the economy, and the environment. As evident in the following highlights,

CSANR creates models relevant wherever communities proactively manage globalization and urbanization, and turn potential threats and challenges into opportunities.

[Climate Friendly Farming \(CFF\) Research & Demonstration Project](#)

Catalyzed by a \$3.75 million grant from the Paul G. Allen Foundation, 30 researchers and technicians study how agriculture can reduce greenhouse gases. The team has already experienced some early successes:

Deployed environmental monitoring equipment at irrigated, dryland, and dairy research sites.

Built conceptual models of greenhouse gases and begun testing and validating them.

Completed construction of an anaerobic digester on a Whatcom County commercial dairy farm to convert animal waste to energy and other value added byproducts.

Secured \$1.2 million in additional funding, with an additional \$1 million pending, and \$3 million in development for spin-off research and outreach projects.

[WSU Organic Research Program](#)

Created by CSANR in 2000, this program received a federal special project grant worth \$712,000 over the last three years to develop certified experimental land, enhance organic seed production, and research new methods of weed control. In 2004, CSANR produced its second national satellite broadcast on raising organic livestock which was viewed at over 90 sites across the country. Leadership Team members have organized seminars, convened a WSU organic working group, and organized two joint organic research symposia with Tilth organizations and Oregon State University.

[Biologically Intensive Agriculture & Organic Farming \(BIOAg\) Program](#)

CSANR is a national leader in promoting biological approaches to farming whose practices work in concert with natural systems to maximize on-farm

resource management and minimize off-farm inputs and unwanted impacts like soil erosion. The BIOAg program also calls for expanded research and outreach on the human health impacts of eating foods grown and processed using biologically based techniques. The program supports value-added production and direct marketing by considering the needs of farmers and consumers together. BIOAg encompasses new research, education and extension projects such as:

Mustard cover crops alternatives to fumigation.

New applications of direct seeding to reduce erosion

Using beneficial nematodes for pest control.

BIOAg promotes strong links between sustainable agriculture, communities, and human nutrition with the goal of keeping family farms viable and promoting access to fresh, healthful Washington-grown food for all of our citizens.

[Small Farms Program](#)

The Cultivating Success course series offers in-depth training for beginning farmers as well as existing producers looking to take their farms in a new direction. The courses bring seasoned growers to classrooms to share their experiences on topics that include whole farm planning, record-keeping, and direct marketing. To date, 400 growers have participated in Cultivating Success and the program has attracted \$1.3 million in federal and private support. A new \$209,000 agreement with the USDA Risk Management Agency allowed WSU to hire two Small Farm Advisers to serve Washington's Latino and Hmong producers. Malaquias Flores and Charlie Chang will spend the next year adapting and testing the Cultivating Success series with these new grower audiences.

In closing, I would also like to recognize team member Don Nelson, a WSU Extension Beef Specialist, who received the College's 2004 Excellence in Extension Award and David Granatstein, Sustainable Agriculture Specialist, who received the WSU World Class Faculty

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Grant Gibbs won't sell his organic produce and meats beyond a 20-mile radius of his farm in the Northern Cascades of Washington. He'd rather feed it to his hogs than take it out on the interstate--and he's doing just fine.

farm." In his pine-encircled valley tucked in the North Cascades, eight organic garden patches are interspersed with pasture, orchard trees, a creek, poultry and pig pens, a small scale mill, and round wood buildings he constructed from timber he selectively harvested from the steep surrounding hills.

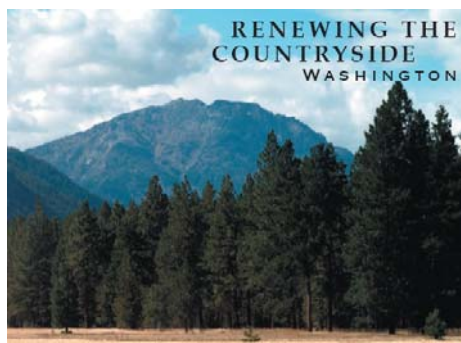
Grant has invested almost 30 years in managing and maximizing this land's productivity, using every natural farming technique ever heard of and then some. "I saw this farm as a spot to do 'permanent cultures' and pass it on generation after generation. When you plant an orchard it is not a one person lifetime thing - it goes on and on and on. The berries, the fruit trees, the forest, the riparian zone - the whole ecosystem is working together as a permanent culture. I am not ever going to take my hayfield out of hay because I need it for the cows, and I need the cows for compost, and I need that manure for the orchard."

Grant's first lesson in farming came in the late 1960s when he decided to head for Canada instead of being drafted for the Vietnam War. "I didn't have enough money to make it to the border. So I went underground, working without a social security number as a migrant, a hobo. I rode the freights and picked orchards." In 1975 he was able to buy this deserted dairy farm. "It was a mess. Nothing was here, no power, no wells, no fields, no road. It was all going back to forest, so I had a huge chore to build all the buildings, start managing all the timber stands, figuring out my field layout."

"I started farming organic after working chemical farms all my younger life. I could see what it was doing to the

ground and the air and the water and the people that worked it. I saw how it was a vicious cycle. I knew I didn't want to go down that road." He was less certain about how he would make a living farming a different way.

"My goal was to make 10,000 bucks off this land," Grant remembers. "I was pretty happy when I first hit that and my dream had come true. Back then, who would have guessed that organic would do what it did? I thought it was going to be a major problem my whole life trying to find a market, somebody who wanted to buy organic hamburger, organic pears, organic lettuce. It was actually a project as much as farming to sell your crop. Now the



demand is such that you can basically stay home and let the phone ring and if you want to answer your phone you'll sell your whole crop." But Grant has chosen to only sell locally, even though the demand for organic produce is far greater west of the Cascade Range, and that means marketing remains a challenge.

"I refuse to haul it to Seattle. It is either going to get sold in this county or fed to my pigs. I'm not going to run the I-90 gamut and burn fuel. I just want to stay simple and sell it within 20 miles of the farm." Even with that self-imposed limitation, demand has grown and Grant now raises produce on about two and half acres. "Originally I had three gardens, now I have eight. I raise six to twelve cattle depending on my hay crop - they are grass fed and people love it. My hogs and fryers are all spoken for. Customers don't have to pay me up front, but it essentially is a subscription agricultural program. People say, 'Raise me 10 chickens. Raise me a hog. I want a quarter of beef from you.' It works out real good."

In addition to selling direct to his neighbors, Grant retails the products of his farm at a number of local farmers' markets and food co-ops. He acknowledges that the hardest work has been selling, rather than farming. "Probably the biggest challenge was accepting the fact that I was going to have to be a marketer and a farmer, and learning how to market. To farm like I do and stay in control of everything you grow - you've got to be a marketer."

Eliminating off-farm inputs

Grant has designed his farming systems to assure that almost everything that comes off his land has a market or is reinvested in the fertility of the ground. He is close to meeting his goal of having no off-farm inputs. "All my fertilization comes from the farm, that's why I keep livestock." Grant designed and built a "pig tractor," a movable pigpen that he rotates over all eight vegetable gardens as part of his four year rotation. "Wherever I had the pigs last summer, I plant sweet corn the next summer; after that comes the leafy greens; then I grow a tuber - carrot or beet - on the third cycle; and the fourth year I do a legume before I go back to the hogs."

Every second year Grant does a light



application of compost on his gardens, and that is where the other livestock are useful. He makes a couple tons of chicken manure compost every year. The coarse sawdust from his Volkswagen-powered mill becomes bedding for his cows, and then a key ingredient in the annual batch of 20-25 tons of cow manure compost. "I've been monitoring the plant growth - as long as I see good vigor, good dark

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green color in the leaf then I know my nitrogen level is up - so it's saving me time and money in the long run not over-fertilizing."

Grant designed his orchard to provide an additional hay crop. "I planted the trees far enough apart because I knew I wanted to get a crop out of there in perpetuity. I manage the orchard floor like I would the pasture because I consider it a benefit to have that long tall grass in there that offers a sanctuary for the beneficial insects. I release hundreds of dollars of beneficial insects every year, eight different kinds. Over 20 years I've been doing that, and now I am monitoring the populations to see if they are over-wintering and checking their work out to see if they are keeping the pest insects in check. I have had really good luck with it. It is a long-term fix. Instead of a short-term 'spray the problem with a biological insecticide and call it good,' I am planning, 20 years down the road, on having the whole thing balanced out, the insect population working for me."

"My biggest bill every year is the taxes. The best incentive that could ever happen to me would be if the county tax assessor realized that this awesome farm provides clean water, healthy forests, organic agriculture, organic Christmas trees, organic meats, organic hay. If they valued that enough they could cut my taxes a bit or even eliminate them. That would be a huge help to me. I'm doing the same thing I've been doing for 30 years and everything is changing around me. All these mountain tops are getting second or third family dwellings built on them, and guess what, up goes my taxes."

"As the farm changes and new neighbors move in, there are a lot of things going through my mind: maybe it's about time to bite the bullet and spend \$10,000 and build a new stainless steel, county-approved kitchen so I can do value-added food products. Maybe that's the way the farm can keep up with the increasing taxes and the surge of people coming into town with the big money."

In the meantime, Grant has his hands pretty full as it is. Over the past 12 years he has hosted one to five interns in a seasonal farm apprenticeship program.

Now other members of his family are taking on more of the farm work. Grant's oldest son has built his home on the property and lives there with his wife, assuring continuity among the human inhabitants.

As he surveys the tall pines that loom around his fertile green pastures and leafy green gardens, Grant reflects on how his lifestyle is a continuous learning process. "I feel like life and farming are an ongoing experiment with no certainties to the outcome. A lot of my experiments have failed and a lot haven't; whether they fail or not, it's still a learning experience. As long as things keep changing, I'll stay on the beginning end of the learning curve."

Ingrid Dankmeyer writes and raises vegetables, fruit, chickens, ducks, goats and two daughters on a small farm in Battle Ground, Washington. She can be reached at ingrid@pacifier.com.



Communal Farming with the Women of Iscayachi: Rock Phosphate and Manure Use in Small Farming Systems in Bolivia

Renee Lorion, MS candidate, Washington State University Department of Crops and Soils.

Iscayachi means 'two roads' in Quechua, the descendant language of the Incas. It is also the name of a small town in southern Bolivia where two major roads, neither of which is paved, come together. Iscayachi sits in a high valley at about 11,500 feet, bordered on two sides by dramatic rounded mountains, and was my home for two years while I served in the Peace Corps in Bolivia.

Through a program called Masters International, I completed my coursework for a Masters in Soil Science at Washington State University in 2001, and implemented my research project in Bolivia during my 2002-2004 Peace Corps service. Living in a small, rural community in a developing country was a unique and meaningful experience. In addition, it was a remarkable opportunity to do a non-traditional agricultural research

project with people on a grassroots level.

After three months of language and cultural training, I was assigned to the town of Iscayachi. The volunteer I replaced had worked on a communal farming project with the Mother's Club, a women's group common in rural Bolivia whereby women get together, organize community events, and socialize. Local government and non-governmental organizations use Mother's Clubs to disseminate information and educate women and their families. Women in the Bolivian campo generally help their husbands in the fields and know a great deal about agriculture, although they are not the decision makers in terms of what to grow or how to grow it. While women work primarily in the home preparing food, rearing children, and cleaning, they sometimes run a small store or sell empanadas to supplement household income. Women in Iscayachi also participated in politics at the local level. Women had a strong and respected role in the family, as well as in the greater community.

The communal farming project was originally designed as a seed bank and organic agriculture demonstration. Using a small grant, women purchased high quality seed with the idea these women would produce the crops together. Harvests could be sold for



Women selecting seed at the community center in Iscayachi, Dec. 2002.

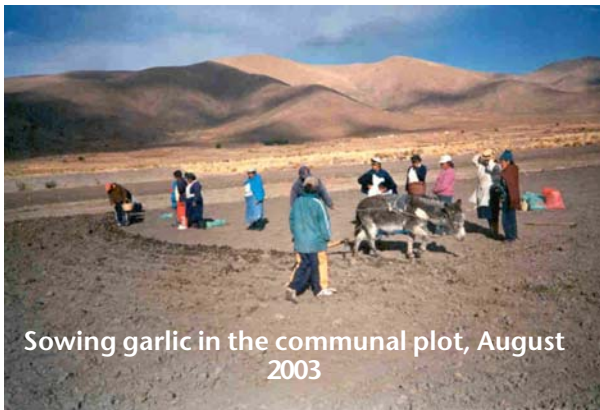
profit or divide the seed among the women to plant in family plots. The women grew potatoes, garlic, chamomile, and a broad green bean called haba in a one-acre plot donated by the local municipality. I participated

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in the project in its second and third years.

In talking to local agronomists and my neighbors, they identified high fertilizer costs as a constraint to crop production in the area. With no commercial production facilities, Bolivia must import chemical fertilizers from neighboring countries. Rising costs of fertilizers in Bolivia affect the poorest people, a common situation in many developing nations. Finding inexpensive alternative sources of nitrogen and phosphorus for small farm operations could benefit Bolivia's rural populations.

Rock phosphate occurs naturally in Bolivia and can serve as an alternative source of phosphorus under certain circumstances. The suitability of rock phosphate as a directly applied amendment depends on the solubility of the rock, soil acidity, soil P-fixation capacity, soil organic matter content, and crop P requirements. Composting rock phosphate with organic materials, such as farmyard manure or crop residues, can increase the dissolution of the rock, while adding nitrogen and improving overall soil quality.



Sowing garlic in the communal plot, August 2003

To determine the suitability of using rock phosphate as an alternative phosphorus source, I compared the application of cow manure by itself, rock phosphate by itself, and rock phosphate composted for five weeks with cow manure. Experimental plots were planted with potatoes the first year, and garlic the second.

The elected president of the Mother's Club oversaw the communal farming

project and I worked with her to plan, organize workdays, and troubleshoot. Sometimes I would decide on a workday, only to discover it conflicted with a school dance performance or other community event. Working with the group and getting used to their way of getting things taught me much about their culture. When we gathered together for a workday, I found it remarkable how the community worked together. The plow, or yunta, a traditional wooden wedge pulled by two yoked bulls, makes a long trench down the field in which women place seed potatoes. The plow's second pass covers the seeds and places the next furrow. It takes three hours to plant a quarter acre field. When finished, wine and coca leaves are sprinkled on the field as an offering to Mother Earth, or Pachamama, before passing the wine around and breaking for lunch.

It was impossible to maintain total control over the field plots and I quickly gave up the idea of a tightly managed field experiment. I weighed bags of potatoes using a scale (borrowed from a neighbor who used it to sell meat) held on a broomstick by two helpers. It was difficult to convey the idea that I needed to weigh and measure plot yields for comparison. For example, when harvesting potatoes, some of the women would take potatoes from inside treatment plots to prepare lunch. I had to ask them to take potatoes from outside the treatment area. They laughed when I explained we couldn't eat the potatoes until I weighed them.

After my Peace Corps service, I brought soil samples back to WSU for analysis. My results showed that none of the treatments significantly improved crop yields or available phosphorus over the control. I found that the field



Women sorting seed

had sufficient levels of background phosphorus, and that the soils were slightly alkaline, which likely inhibited the dissolution of the rock phosphate.

While this was not a typical field trial since I had only limited control over the variables, it was a true 'field test'. All of the outcomes were unknowns. I had a plot of land, seed, and a group of people. I wanted to demonstrate the idea of a side-by-side field trial and give the women a sense of accomplishment by including them as active participants in the research.

Involving forty-five rural Bolivian women proved an important aspect of this research for me. In two years of working with this group of women, I learned more than could ever be conveyed in a classroom. Their sense of community and ways of working together to accomplish goals are remarkable. I watched them develop leadership and organizational skills as they solved problems and worked out compromises. While we got a lot of work done, there was also a lot of socializing and laughter. I feel immensely privileged to have worked with these incredible women. This experience far outweighs any data I collected.

In May 2004 Renee returned to Washington State University and completed her thesis, titled *Rock Phosphate, Manure And Compost Use In Garlic And Potato Systems In A High Intermontane Valley In Bolivia*. She can be reached at reneelorian@yahoo.com.



Making the Bugs Work for You: Biological Control in Organic Agriculture

[Carol Miles](#), WSU R&E Vancouver

Washington State University Center for Sustaining Agriculture and Natural Resources (CSANR), Oregon State University Integrated Plant Protection Center, Washington Tilth, and Oregon Tilth recently co-sponsored the symposium, Making the Bugs Work for You: Biological Control in Organic Agriculture on November 12 as part of the Tilth 30th Anniversary Conference in Portland, Oregon.

Over 180 farmers, researchers, extension agents, state agency and industry representatives learned new and innovative strategies regarding habitat management for ecologically based biological control. Presentations highlighted new organic agriculture research at Washington and Oregon State Universities, innovative organic farm practices in the region, and recent breakthroughs in biological pest management by local industry.

Paul Stamets, of *Fungi Perfecti*, presented his findings on mycoattractants and mycopesticides and discussed this new direction for biological control of insects. Paul Jepson, Oregon State University Integrated Plant Protection Center, discussed conserving biological diversity on the farm through habitat management, while Elanor O'Brien, of *Persephone Farm*, presented her successful farmscaping experiences on her organic farm in the Willamette Valley. Bill Snyder, Washington State University, discussed ecological challenges for conservation biological control, while Frank Morton, *Shoulder to Shoulder Farm*, presented a holistic picture of keeping bloom on the farm West of the Cascades by introducing practical species and strategies. Helen Atthowe, Montana State University, introduced her work on designing pest resistant systems with living mulches. In addition, David Granastein, Washington State University, presented an overview of current organic research, education, and production in Washington and Oregon.

The Symposium concluded with a poster session featuring 30 posters that

highlighted organic pest management research projects, extension programs, college or high school classes, farming techniques, and other organic agricultural activities. The 64 page proceeding can be purchased at \$5 each and includes papers from the symposium speakers as well as summary papers of all poster presentations. To order, contact Cindy Murray, WSU CSANR Puyallup, at (253) 445-4626 or csanr@wsu.edu.

Liability & Public Use of Your Land

[A. McGuire](#), WSU Agricultural Systems Educator

Should you allow recreational users of land on your property when there seems to be a personal injury lawyer behind every tree? What is your liability when you choose to let people on your land? Well, it depends. The state of Washington has a law (RCW 4.24.210) that protects landowners who allow people on their land "for the purpose of outdoor recreation," which covers hunting, fishing, camping, swimming, hiking, skiing, bicycling, horse riding, nature study, even hang gliding, rock climbing, and pleasure driving of off-road vehicles including snowmobiles. It also protects landowners who allow access for cleanup of litter, or fish and wildlife projects. Landowners that allow people to carry out these activities on their land are not liable for unintentional injuries to these users.

However, if you decide to charge a fee for access to your land, you lose this protection and should talk to your lawyer and insurance agent about your liability risk. The only exception to this is for those who charge for the cutting or gathering of firewood, in which case a maximum administrative fee of \$25 may be charged.

This law does not prevent the liability of landowners for injuries resulting from dangerous man-made conditions that are known by the landowner but not readily apparent to the recreational user and that are not clearly posted. An example of this would be a known mineshaft surrounded by

brush but with no warning signs. Man-made recreational areas, such as ponds, trails, and roads are still covered under the limitation on liability. To read the law, go to <http://www.leg.wa.gov/rcw/index.cfm>.

Washington Soil to be in Smithsonian

[Cathy Perillo](#), WSU Crop and Soil Sciences

Tokul, a Washington State Soil, will be featured along with 52 other soils in the Smithsonian Institution's National Museum of Natural History (NMNR). The Exhibit is currently being developed with help from a Washington State Committee that includes soil science professionals from a variety of organizations. Project information can be found on the web at <http://css.wsu.edu/smithsonian.htm>.

The exhibit will open to the Washington DC museum's 6 - 9 million annual visitors in 2006. The exhibit will display soil horizons from every state, as well as interactive educational exhibits with program modules on soils as life, food, medicine, organisms, and cultural history. The opportunity to bring Soils so prominently into the public arena is exciting!

The interactive display will run for two years, after which the exhibit will be loaned to other museums around the country. The soil monoliths will be a permanent exhibit. The project also includes plans for educational curricula to be distributed to teachers and an educational web page for teachers, students and the general public.

EVENTS

Small-scale Forestry in a Changing Environment



The international symposium on "Small-scale Forestry in a Changing Environment" will be held in Vilnius, Lithuania, May 30 to June 4, 2005.

Continued on next page

Climate Friendly Farming, Bioenergy and Bioproducts Presentation

Spokane Ag Expo (January 11 - 13, 2005), specific date and time TBA shortly. For more information contact Dave Bauermeister, dbauermeister@chamber.spokane.net 509-459-4114.

ANNOUNCEMENTS

Oregon Producers Tout Environmental Responsibility

ATTRA. November's Oregon Bounty marketing campaign promotes the state's pears, hazelnuts, wine, and cheese and has a special focus on the environmental responsibility shown by producers of these products, says a story on Bend.com. "Consumers are increasingly interested in purchasing food from folks who are not only concerned about what they produce, but how they produce it," says Katy Coba, director of the Oregon Department of Agriculture. Oregon's producers are meeting that demand by using sustainable practices such as cover crops, water conservation, integrated pest management, water quality protection and riparian restoration.

Washington Ranchers to Launch "Cascade Range" Beef Brand

A group of ranchers in Snohomish County, Washington, are working together to launch a local beef brand that will help them sell their product, [reports the Daily Herald](#). "Cascade Range" beef will be local, grass-fed beef not given antibiotics or growth hormones. Participating ranchers hope that the brand will help them access local restaurants and retailers, and retain more profit from selling their animals. The brand is set to launch soon, with a goal of selling 1,000 cattle in 2005.

WSDA Organic Program Accredited

Washington State Department of Agriculture Organic Program has been IFOAM accredited for its European Organic Verification Program. The full scope of the accreditation will be available on the IOAS website <http://ioas.org>.

RESOURCES

Agriculture

Spelt for Human Health and Nutrition



Spelt is very closely related to wheat and spelt flour is used to make bread, pasta, cold and hot cereals, and baking mixes. This new publication, EB1977, answers common questions that consumers may have regarding whether or not spelt can be used as alternative to wheat, especially for those people who suffer from wheat allergies or gluten intolerance. This publication also provides nutritional and cooking information for spelt and is available through [WSU Publications](#).

Organic Farming Is a Winner for Sustainability

"According to an Agricultural Research Service (ARS), U.S. Department of Agriculture five-year study, organic crop rotation is at least as sustainable as no-till farming or chisel tillage in terms of nitrogen loss and corn yields. Three-year rotations of organic corn, soybeans, wheat and a legume cover crop had nitrogen losses and corn yields similar to those on land where either chisel-tillage or no-till farming had been used.

The organic rotation relied on poultry litter, soybeans and a hairy vetch legume cover crop as nitrogen sources. The study showed the highest risk of leaching nitrogen to groundwater was on fields with no-till or chisel tillage where both commercial fertilizer and poultry litter had been used. Future studies are planned to measure or estimate leaching losses."

School Food, Public Policy, and Strategies for Change

Marion Nestle, Paulette Goddard Professor in the Department of Nutrition, Food Studies, and Public Health at New York University, writes that "School food is a "hot button" issue, and it well deserves to be. It lies right at the heart of issues related to equality in our society. Americans live in a pluralistic society. For democracy to work, the interests of constituencies must be appropriately balanced. School food is about the balance between corporate interests and those of advocates for children's health." Check out the [full article](#).

New Book Takes a Critical Look at Organic Agriculture in California

ATTRA - The first comprehensive study of organic agriculture in California challenges the popular notion that organic farming is dominated by small family-owned farms and shows how the industry's regulatory structure has thwarted the very benefits that have generated strong public support for organic agriculture. "Organic farming is seen as an answer to the crisis in our food system, but organic agriculture in California has evolved in some peculiar ways that effectively limit the number of acres that are in organic cultivation," said Julie Guthman, author of the new book, *Agrarian Dreams: The Paradox of Organic Farming in California* (Berkeley: University of California Press, 2004). "One percent of U.S. agricultural acreage is organic, compared to nearly 30 percent in Australia," said Guthman. "We have 2,000 organic farms in California, but Italy has 45,000. There's been much more widespread transformation in different political environments. We really have to ask ourselves how successful our approach has been."

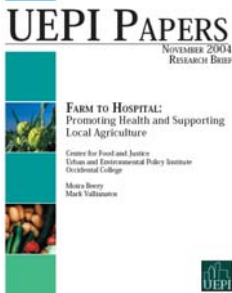
Study Challenges Biotech Crop Safety Testing

ATTRA - A peer-reviewed [scientific paper published recently in Biotechnology and Genetic Engineering Reviews](#) challenges claims that biotech or genetically modified (GM) crops are thoroughly tested, regulated and proven

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safe. "Safety Testing and Regulation of Genetically Engineered Foods," reveals fundamental flaws in how biotech companies test and the U.S. government regulates GM crops. The paper raises serious questions whether GM foods, on the market since 1994, are in fact safe as claimed by the biotech industry and U.S. regulators. The paper includes a comprehensive case study of two types of insecticide-producing GM corn, showing how flawed testing and regulation permitted these varieties into world markets despite evidence that they could cause food allergies.

New Farm to Hospital Research Brief Available



The Center for Food and Justice at Occidental College has published a new paper that explores the contradictions between the missions of many hospitals and the reality of their on-site

food options and offers suggestions for improvement along with several case examples. Just as farm to school programs can be an effective way to improve school food options and support local farmers, this report promotes expanding the scope of the model to include hospitals and clinics as institutions through which the same goals can be accomplished. Titled [Farm to Hospital: Promoting Health and Supporting Local Agriculture](#), the report says farm to hospital programs could result in fresher and healthier patient and cafeteria foods, facilitate health education and promotion strategies, and help support small local farms with a portion of the health care industry's annual \$3.3 billion food budget.

Eat Well Guide Helps Families Eat Healthy for the Holidays



The [Eat Well Guide](#) lists sustainable family farmers selling meat, poultry, dairy, and eggs. Sponsored jointly by

the Global Resource Action Center for the Environment (GRACE) and the Institute for Agriculture and Trade Policy.

WSDA Free Fresh Fruit and Vegetable Program

The Washington State Department of Agriculture, Office of the Superintendent of Public Instruction and Department of Health are happy to [announce](#) that 25 schools in WA state will be a part of the Free Fresh Fruit and Vegetable Program! WSDA is educating these schools about Washington grown foods, and potential agricultural partners in their area. Agricultural organizations interested in providing agricultural education with schools (such as "local produce tasting, and/or farmer in the classroom") or farmers interested in providing fruits and vegetables are encouraged to contact the food service director from each district individually to get the details.

International Ecoagriculture Conference

ATTRA - Ecoagriculture Partners co-sponsored the recent meeting, International Ecoagriculture Conference & Practitioners Fair, Sept. 27 - Oct. 1, 2004, at the World Agroforestry Centre (ICRAF) in Nairobi, Kenya. The purpose of the meeting was to "to assess the state of ecoagriculture systems and practices, and to develop a strategy to promote and support ecoagriculture development around the world." See conference [session summary](#).

American Land Conservation Award

Amos Funk recently received the American Land Conservation Award after a 75-year career in farmland conservation in Lancaster County, Pennsylvania. See the [full article](#).

Community Farm Chapbook Celebrates Local Food

The Rattlesnake Community Farm in Missoula, Montana recently published a book of reflections on food from writers William Kittredge, Gretel Ehrlich, Barbara Kingsolver, and Wendell Berry along with the work of local poets and writers in a celebration of local food production. Proceeds will help fund Garden City Harvest, the nonprofit

organization that grows crops at the farm for the local food bank, offers university students sustainable agriculture education, provides therapy for at-risk youth, and operates a CSA.

Growing Trend in Number of Female Farmers Noted

National Public Radio's All Things Considered aired [a story](#) about the growing number of female farmers in America, who now manage one in every ten American farms.

Report Looks at Genetically Engineered Crops and Pesticide Use

ATTRA - Ag BioTech InfoNet makes available the seventh in a [series of technical papers](#) on the development, costs and benefits, and environmental impacts of genetically engineered (GE) crops in the United States. The report notes pesticide use levels have increased since the introduction of genetically engineered corn, soybeans, and cotton.

Agritourism and Aquaculture Responsible for Ranch Turnaround

A [Visalia Times-Delta article](#) tells how one family altered the fortunes of their California ranch by introducing agritourism and aquaculture.

Conservation Security Program

Eleven watersheds in Washington have been selected for the Conservation Security Program (CSP) authorized in the 2002 farm bill which pays growers for their conservation practices in selected watersheds. For background on CSP, read "The Conservation Security Program: Linking Farm Payments to Clean Air, Land and Water" in the September 2004 edition of *Sustaining the Pacific Northwest* at <http://csanr.wsu.edu/whatsnew/PNW-v2-n3.pdf>.

Agricultural Marketing Resource Center (AgMRC)

The [October/November issue](#) features how value-added agriculture has the potential to revitalize the rural economy of the United States.

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[2005 Farming Sourcebook](#)

The 2005 Farming Sourcebook is now available to download. The Sourcebook features regional information and resources on:

Certification and labeling

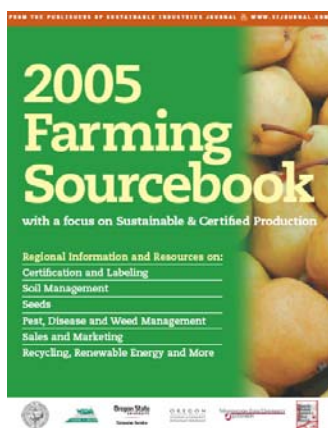
Soil management

Seeds

Pest, Disease and Weed Management

Sales and Marketing

Recycling, Renewable Energy, and More



[New Book to Tout Benefits of Local Food](#)

A new book by Worldwatch Institute senior researcher Brian Halweil explains that the shift to local foods in eating habits not only delivers better taste, but is better for peoples health, the livelihoods of small farmers, and the global environment. *Eat Here: Reclaiming Homegrown Pleasures in a Global Supermarket* depicts people everywhere as taking control of their food supply.

[The Case for U.S. Farm Policy Reform](#)

American Farmland Trust (AFT). U.S. farm policy subsidizes farmers with \$20 billion annually from the American taxpayer, but this policy does not help most farmers, distorts the market, discourages trade, and harms the environment. Subsidies target farmers growing a narrow number of crops (corn, soybeans, wheat, cotton, rice and feed grains) and does little to promote environmental stewardship, stabilize ru-

ral communities or promote diversified farming. AFT thinks we can do better than this policy developed in the 1930's. How? See http://www.farmland.org/policy/farmland_reform.htm.

[Organic Roots Database](#)

ATTRA - The Organic Roots database developed by the Alternative Farming Systems Information Center, features USDA research papers published before the widespread use of synthetic chemicals. It makes information about organic production methods more accessible, while preserving an important body of research.

[Western SARE Surveys Extensionists on Sustainable Agriculture](#)

ATTRA - University extension educators are generally knowledgeable about the concepts of sustainable agriculture, but they don't perceive a high level of producer interest in the subject, according to [a survey of 626 agricultural extension educators](#), or county agents, in 13 Western states. The survey, conducted by the Western SARE Profession Development Program in cooperation with the University of Arizona Cooperative Extension Service, asked educators about their knowledge of sustainable agriculture, their programming and partnerships in that arena and additional information they'd like. The survey found that nine of 10 educators rate their interest in sustainable agriculture as moderate to high, but roughly the same number said they perceive producer interest to be low to moderate. The study also found that extensionists hold strong knowledge in whole farm or ranch planning and integrated farming systems, but were less knowledgeable in farm business planning for sustainable agriculture, impact analysis of adding new farm or ranch enterprises, community-based food systems and establishing farmer-to-farmer information networks.

[Orchard Monitoring Manual](#)

Available online in English and Spanish, the [Orchard Monitoring Manual for Pests, Natural Enemies and Diseases](#)



[of Apple, Pear, and Cherry: An Illustrated Guide for Washington State](#), comprises 51 pages of text and 22 sheets of color photos. The manual was compiled by Naná Simone, pest management consultant and director of CAP's Hispanic Orchardist IPM Education Program. The manual is available on-line in PDF format only.

[Restaurant Receives WSDA Organic Certification](#)

The Sterling Café, a Seattle restaurant, became the first to be certified organic by the Washington State Department of Agriculture (WSDA). Certification indicates the restaurant voluntarily chooses to comply with standards regarding the purchase, storage and preparation of food that is in compliance with federal standards. Certified restaurants may display both a USDA and WSDA logo and advertise itself as a certified organic establishment. For additional information about Organic Restaurant Certification, contact [Brenda Book](#), Organic Program Specialist, (360) 902-2090.

[Rethinking School Lunch](#)

The Center for Ecoliteracy's *Rethinking School Lunch* is a comprehensive guide to transforming school meals into the focus for integrated food systems curricula.

[Food Joins Academic Menu in Berkeley School District](#)

[Thinking Outside the Lunch Box](#)

Series of essays on education for sustainability.

Continued on next page

Oregon's Largest Growers' Co-op Explores Stewardship Guidelines

ATTRA - The [Capital Press](#) reports that NORPAC, the largest growers' cooperative in Oregon, is developing stewardship guidelines covering food safety, environmental issues and workers' rights.

New Study Examines USDA Small Farm Programs

ATTRA - A [Wallace Center study](#) finds most USDA programs have not been evaluated on their effectiveness of selected programs in serving the needs of small farms, so their success in enhancing the economic well-being of the nation's small farms is not known. Entitled *USDA Programs: What Do We Know About Their Effectiveness in Improving the Viability of Small Farms?*, the study focused on 19 programs housed within seven agencies or offices of the U.S. Department of Agriculture.

Farm To School Site Updated



The Farm to School website hosted by the Center for Food and Justice, a division of the Urban and Environmental Policy Institute at Occidental College, serves as a one-stop resource for anyone interested in farm to school programs. It contains useful resources and materials that can be downloaded, and highlights farm to school initiatives in 15 states (and more are being added).

Forestry

Family Forest Fish Passage Program

This program provides 75%-100% the cost of replacing, repairing, or removing fish barriers such as culverts, weirs, dams, spillways and other artificial instream structures. To qualify, you must be a small forest landowner (harvest less than 2 million board feet of timber per year) and have a fish barrier that is on forestland. Application Deadline: June 30, 2005.

Forest Certification Matrix

Confederation of European Paper Industries (CEPI) launched the on-line

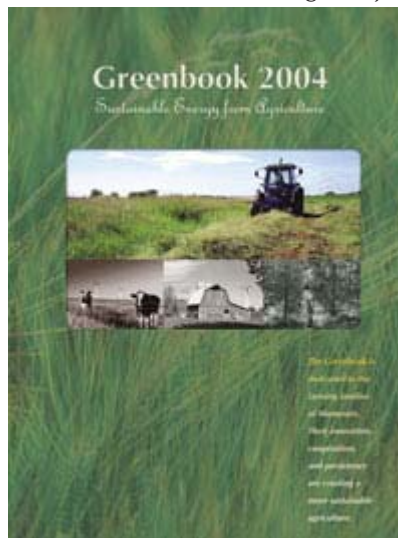
version of Forest Certification Matrix, a new web-based tool that allows access to and comparison of up-to-date data on all existing forest certification schemes. See story at http://www.paperloop.com/inside/stories/wk11_29_2004/62.html.

Small Family Tree Farmer Develops Alternate Plan for Saving Salmon

You don't have to love salmon to save them. In the case of Herb and Grace Payne, it's enough to love your children and grandchildren and the cedar trees that grow on their 100-acre timberland.

Sustainable Ag / Agroforestry in MN

In the latest, 15th edition of [Greenbook: Sustainable Energy from Agriculture](#), several projects on Minnesota farms related to agroforestry are described. "Collaborative Character Wood Production and Marketing Project"



(PDF 332kb) is a project to produce specialty wood for sale to woodworkers as a farm woodland enterprise. "Treating Field Runoff through Storage and Gravity-fed Drip Irrigation System for Grape and Hardwood Production" (PDF 299kb) demonstrates the use of a rock inlet waterway weir system and a contour curb system to irrigate black walnut and grapes. The Greenbook is a publication of the Minnesota Department of Agriculture's Agricultural Resources Management and Development Division (ARMD). It highlights the project results of creative

and innovative farmers and researchers involved with the *Sustainable Agriculture On-farm Demonstration Grant Program*.

Family Forests, Tree Farm, and FSC

[This report](#) explores the challenges and opportunities of family forest certification and the relative strengths and weaknesses of the American Tree Farm System (ATFS) and Forest Stewardship Council (FSC) programs as they relate to family forestlands. This paper also touches on the other approaches that are available for these landowners. The goal is to increase the reader's understanding of these programs and to assist family forest owners, and organizations working in their interest, in selecting and promoting the certification approach that best fits their needs and objectives.

WSU Developing List of Small-scale Mill Operators

WSU King County Extension is developing a database of small-scale mills in Western Washington with milling specifications and contact information for owners and operators of small mills. If you own a small mill, or know someone who does, please contact [Amy Grotta](#) at:206-205-3132 to be listed in the database.

Converting Small Trees to Methanol

The University of Washington has developed a process to quickly convert even the smallest trees and branches into methanol, which is used as a power source for fuel cell technology. See the [Spokesman Review article](#).

Study Indicates Wood Is Most 'Green' Building Material



A new report from [The Consortium for Research on Renewable Industrial Materials](#) (CORRIM) concludes that wood uses less overall energy than other products, causes fewer air and water impacts, and does a better job of carbon sequestration.

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[Family Forest Foundation](#)

[Washington Farm Forestry Association](#)



Washington
FARM FORESTRY
ASSOCIATION



Learning Modules for Landowners

The National Learning Center for Private Forest and Range Landowners launches [seven learning modules](#) targeted to landowners.



[Human Dimensions of Family Farm and Community Forestry](#)

[Forest Landowners Tax Council](#)

Agroforestry Online Forum

The Association For Temperate Agroforestry invites you to visit the [Temperate Agroforestry online Forum](#). The Forum is an online meeting place for anyone interested in agroforestry education, demonstration, research and practice.



Temperate Agroforestry Forum

Sponsored by the Association for Temperate Agroforestry

[Online Guide to Direct Marketing](#)

Direct marketing can be a lucrative marketing channel for those producing value-added agroforestry and nontimber products. The Direct Marketing Resource Guides includes annotated listings of information resources.

Find USFS Publications with TreeSearch

Locate and print publications by USDA Forest Service Research and Development scientists using the [Treesearch database](#), including many related to agroforestry. Publications include monographs, papers published by other organizations in their journals, conference proceedings, and books. Search by author, keyword, originating station, or date.



Submitting articles: Submit articles electronically to [Doug Stienbarger](#) in MS Word or RTF formats. Photos and graphics are encouraged.

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