




Status Report on Alternative Uses for Grass Straw

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Executive Summary

Purpose

This “status report” provides a snapshot of uses for straw that is leftover from reduced bluegrass field burning in Washington. The information presented is primarily for use by members of the Straw Utilization Task Force, chaired by Director Jessernig, Department of Agriculture. It includes information on grower responses to reduced bluegrass field burning and possible future options and corresponding barriers. The baseline year for information is the harvest year 1998, with some of the research and interviews extending into mid-1999. As this report goes to print, some ongoing parts may already be seeing additional activity, particularly in the category of off-farm uses (e.g., strawboard).

Background

For several decades, it was common practice for farmers to burn the residue (straw) left over after harvest of grass seed. Beginning in 1996, the Department of Ecology (Ecology) began to restrict the amount of acreage burned. In the spring of 1998, Ecology adopted revisions to Washington Administrative Code 173-430, Agricultural Burning, that certified mechanical residue management as an alternative practice to burning. Burning for this crop is now drastically reduced. What was once burned is now baled. This baled straw is piling up in several areas, emphasizing the need to identify uses for it.

Straw Use Options Evaluated

The Straw Use Workgroup was formed to evaluate straw use options and to promote the use of the most promising options. The workgroup first estimated the amount and location of straw resulting from reduced burning. Next, the group identified options for using straw and grouped them into three categories:

- **Off-farm disposal** – Primarily landfills and incinerators.
- **On-farm use** – Composting straw.
- **Off-farm use** – Options that may provide a variety of new markets for straw residue use in commercial products and processes. The options evaluated include strawboard and composite building products plants, more extensive use of straw as animal feed for export, commercial composting, ethanol production, straw pulp, and biomass chemicals.

As part of its evaluation, the workgroup identified barriers associated with each straw use option. The workgroup also investigated grant and loan opportunities for individual farmers, groups of farmers, private enterprises, and government agencies. While many general funding opportunities exist, few are directed specifically at straw utilization.

Conclusions and Recommendations

The Straw Use Workgroup concludes the following:

- Composting grass straw, while somewhat resource-intensive, is an available option for most farmers, although it is not commonly used at this time.
- The cost of disposing of grass straw in landfills or incinerators is typically too high for this to be a viable option.
- Strawboard and marketing grass straw as a feed are promising and emerging options. However, private investments are needed before we see their full potential.
- Start-up funding and transportation costs are the most significant barriers to straw use options.

Based on these conclusions, the workgroup recommends the following actions:

- Increase storage capacity and reduce transportation costs.
- Increase feed market opportunities.
- Promote straw building products manufacturing and use in Washington.
- Promote straw as a raw material for manufacturing.
- Promote on-farm use research.
- Provide technical assistance.

Overview

Background

Burning bluegrass stubble after seed harvest has been common practice in eastern Washington since the 1960s. Growers contend field burning enhances the production of bluegrass seed by removing the stubble and allowing the plant to grow and produce seed at maximum rates. However, burning also produces substantial amounts of smoke that adversely affects the health and quality of life in Spokane and other population centers.

The problem of smoke from field burning drew legislative attention, and by 1973, the Washington State Legislature declared it the policy of the state that “strong efforts should be made to minimize adverse effects on air quality from grass field burning.” The Washington Clean Air Act authorizes Ecology to reduce the acreage burned on a pro-rata basis and to “disallow” burning of grass fields when practical alternative practices are certified and reasonably available.

Over several decades, Ecology and other government agencies tried several approaches to reduce burning. These included a permit requirement, research into alternatives to burning, and multi-interest committees (i.e., Field Burning Summit). These efforts did not reduce burning. By 1995, grass field burning was generating an estimated 1,700 tons of particulate matter annually, along with an increasing number of complaints and persistent media attention. In 1996, Ecology took action to reduce burning of grass fields in response both to these complaints and to forceful testimony by the Spokane medical community about the seriousness of smoke-related health effects. Ecology first restricted the amount of burning by two-thirds, then evaluated and certified an alternative practice – mechanical residue management. Prior to 1996, almost 60,000 acres were burned each year. Now only a few thousand acres are permitted for burning each year in areas with steep slopes and other exceptional circumstances.

Currently, the straw from grass fields is baled and removed from the fields. In 1996 and 1997, much of this straw was sold as feed to local domestic markets. In 1998, alfalfa production was very high in relation to demand, and the resulting low price dried up the market for grass straw. A large amount of the 1998 straw was stockpiled for future use in feed export markets and an emerging strawboard production facility. However, substantial quantities have also been stacked on the sides of fields with no clear option for disposal or use.

Other states are also reducing agricultural burning and dealing with the question of what to do with the straw residue. Oregon began a grass seed field burning reduction program in the late 1980s. California has been reducing rice straw burning in the Sacramento area since 1992. Currently, neither state is returning to burning as the primary residue management technique.

Both Oregon and California heavily subsidized various industry segments to “jump start” straw use options. In Washington, this phase is proving more difficult. This is due to restrictions prohibiting state agencies from lending state credit, and a tax structure that relies on business and occupation tax and various use taxes.

Extent of the Problem

Grass seed is produced in various regions of Washington State. Each of these regions faces specific challenges in using grass straw based on geographic, economic, and political factors. The following table estimates, by key region, the straw remaining in spring 1999 that was baled following harvest in the summer/fall of 1998. These estimates are based on information provided by grass seed industry representatives and other knowledgeable sources.

1998 Grass Straw Baling and Use

Region	Production Acres	Straw Baled (tons)	Remaining Baled Straw (tons)	Straw Utilized (%)	*Straw Covered (%)	**Centrally Stored (%)
Spokane/N. Whitman Counties	34,000	32,000	26,000 – 29,000	7 - 10	75	80
S. Whitman/Garfield Counties	4,650	4,000	800 - 1,100	70 – 75	?	0
Franklin/Benton Counties	5,800	8,000	6,000 – 7,000	20 – 25	5 – 10	5
Adams/Grant Counties	5,100	7,500	6,300 – 6,500	10 - 15	5	0
Lincoln County	1,900	2,000	200 – 300	80 – 90	0	0
Statewide Totals	51,450	53,500	39,300 – 43,900			

*percent of straw bales that are either covered by a tarp or in a storage shed

**percent of straw bales that have been moved off the fields to a centralized location

Spokane/North Whitman Counties

The Spokane County/north Whitman County region is the largest grass-producing area in the state, and produces almost exclusively Kentucky Bluegrass. Livestock is not plentiful and, therefore, local feed markets for straw are not readily available. Small-niche feed markets have used a very small percentage of the straw baled. In most cases, a neighbor with a few head of cattle was either given the straw or purchased the straw for a small fee.

The bulk of the straw baled in this region has been moved to two locations. Seeds, Inc. has collected straw from growers who produce seed for them, and currently is storing the bales at their Setters, Idaho seed processing site. Most other growers provided straw to Fresh Air Ag, which has stockpiled straw at a Rockford, Washington location. At both locations, the majority of the straw is in stacks of four-foot by four-foot bales covered by tarps. Both locations have many weathered and broken bales. (See the photos on the following page.)



Fresh Air Ag Site, April 1999 (Photo provided by the Department of Ecology Eastern Regional Office)



Seeds, Inc. site, April 1999 (Photo provided by the Department of Ecology Eastern Regional Office)

South Whitman/Garfield Counties

The south Whitman County/Garfield County region is a dryland Kentucky Bluegrass producing area. Garfield County and south Whitman County both have several small livestock operations. Although much of the 1998 straw was used by these livestock operations as a feed supplement, most of it was simply given away. Growers were not able to recover the cost of removing the straw from their fields. The 800–1,100 tons of remaining straw is scattered throughout the region on individual farms.

Franklin/Benton Counties

Most grass production in this region is under irrigation. Growers produce Kentucky Bluegrass as well as other species of grass, including Fine Fescues. Irrigated production generally results in more residue generated per acre than dryland production. While the region supports several livestock operations, a large number of the farmers in the area grow alfalfa, which is a better quality feed. Due to an overabundance of alfalfa resulting in very low prices, the 1998 grass straw was not used for feed. Most straw is baled and remains stacked uncovered near the field.

Adams/Grant Counties

This region's grass seed production occurs mainly in Adams County. Grass fields in both Adams and Grant counties are under irrigation. Kentucky Bluegrass is the most common type of grass grown, but other types of grass are also produced. Almost all 1998 straw baled in this region remains unused and on individual farms. It is unlikely that the straw is in storage sheds or is covered with tarps. This region has fewer use options than the southern part of the Basin, where there are more large livestock operations and there is more accessible shipping on the Columbia River.

Lincoln County

Most grass seed production in Lincoln County is specialized grasses. Growers produce grasses for conservation purposes (seed that is used for the Conservation Reserve Program or habitat rehabilitation projects). Most of the straw baled in 1998 was given away as feed or shipped to mushroom production areas in the Okanogan. The only straw remaining unused has no feed value. These straw bales sit uncovered on the edge of the fields.

Storage and Transportation

Protecting straw and maintaining its quality throughout the year following harvest is essential to preserve the straw for later use. Straw that is protected from weather, especially moisture, maintains its value longer. Storage is especially important for grass straw destined for the export cattle feed market. Straw that is not properly stored deteriorates until it is only suitable for disposal or composting.

Storage

Covered storage allows a farmer flexibility to time the shipping and processing to occur when straw prices are the highest, usually in the winter. This offers the farmer a greater return. Either permanent or temporary storage can be used to cover and protect straw. Temporary tarps can be strung on the top and sides of the straw stacks. These tarps cost about \$5 per ton to cover the top of the stack and an additional \$3 per ton to cover the sides. Tarps can be used for several years before they need to be replaced. The calculated annual cost for temporary storage covering the top and sides of stacks is about \$4 per ton per year, if tarps are assumed to last two years. Permanent hay buildings are priced from \$7 to \$10 per ton per year, or about \$50 per ton for the initial capital cost. This is based on a 3,000-ton capacity structure with a construction cost of \$150,000.

The state of Oregon helped finance storage facilities at the farm level where straw can be stored until it is transported to processing plants. The straw is condensed and then transported to Asian cattle markets. Oregon is currently reaping the benefits of this investment in storage by exporting over 350,000 tons of grass straw feed annually.

Transportation

Transportation is an integral part of the infrastructure of storing and processing grass straw. Grass seed-producing areas in eastern Washington are at a transportation disadvantage to the producing areas of the Willamette Valley in Oregon. The cost of transporting straw to Ellensburg, the center of hay processing in Washington, ranges from about \$25 per ton from Spokane to about \$15 per ton from Pasco. This transportation cost effectively lowers the economic value of eastern Washington straw compared to Oregon grass straw. In addition, the large bales produced in eastern Washington are costly to transport long distances because they do not fit efficiently on hay trucks. Haulers cannot get a full load, which in turn increases the cost per ton of transporting. Local transport of straw from stacks in the field to a disposing facility ranges from \$10 to \$20 per ton for a 100 - 150 mile round trip, depending on the variability of loading and unloading and other factors affecting efficiency. Some farmers are purchasing balers that create bales that match up more efficiently with truck beds, lowering the cost per ton of hauling straw.

Flat-bedded trucks require straw to be held together as bales even if the straw is destined for disposal or composting. Straw that is not contained in bales would require hauling in containers or trucks with sides. Hauling costs for loose straw are comparable to the

figures identified for baled straw hauling, but could be higher depending on the ratio of volume to weight.

Processing

Much of the grass straw in eastern Washington is baled in large bales weighing over 1,000 pounds. Large bales are favored over smaller bales because the balers that create them can operate on the steeper dryland fields. These balers also operate more quickly and less expensively. However, the larger bales have disadvantages. Hay processing for cattle feed requires that large bales be cut down to go into common feed processing machines that prepare straw for export. These machines are designed to use much smaller three-string bales, which are sized 22 inches by 18 inches by four feet and weigh just over 100 pounds each. A complete condensing system for processing export-quality feed is reported to cost \$350,000 - \$500,000. This system includes a front-end cutter that downsizes the large 1,000-pound bales. Unfortunately, many existing processing facilities do not have the front-end cutter machine to process the larger bales. Front-end cutter machines are only recently available as an add-on to existing machines. The cost of purchasing the machine as an add-on is about \$70,000 - \$80,000.

Options for Using Straw

Summary of Straw Use Options

Options for using grass seed straw in eastern Washington can be grouped into three basic categories: off-farm disposal, on-farm use, and off-farm use. The first two categories include options currently available to farmers. Disposal options are generally more costly than on-farm use. Some off-farm use as domestic feed or bedding has been available in some areas. Other off-farm use options provide minimal revenue for farmers, or are still in the construction, capital raising, or research modes.

Off-Farm Disposal

Off-farm disposal options include landfills and incinerators (“waste-to-energy facilities”). The location of existing commercial disposal facilities will affect transport costs. In addition, tipping fees must be added to transportation and handling costs. Tipping fees vary widely and can be quite high in some areas. The capacity to handle large quantities may be limited at some facilities as well.

On-Farm Use

Composting and other on-farm uses return straw residue directly to the soil, increasing the amount of organic matter. This increases soil erosion protection and retains soil moisture, aiding in seed germination and crop growth. Fertilizer requirements (potash and potassium) are reduced, and transportation and tipping fees are avoided. On-farm options can be adapted to any farm regardless of location. For these reasons, on-farm use of straw is beneficial and should be investigated further.

Off-Farm Use

Off-farm use options may provide a variety of new markets for straw residue in eastern Washington. Some of these options are still in research mode and others are in the planning and research stage. Promising options include off-farm composting, strawboard and composite building-products plants, and more extensive straw use as animal feed for export. Although ethanol manufacturing facilities currently under construction in Washington could use grass straw, none of the plants have plans to supplement their feedstock with straw at this time. Straw pulp and biomass chemical plant researchers are considering using eastern Washington straw as a raw material. The location of any new plants will determine the transportation costs for each farmer to access these markets.

The two primary barriers to commercial straw use today are the lack of current manufacturing facilities capable of using straw as a feedstock, and the cost of storing and transporting straw. New manufacturing plants require investors and capital for start-up and ongoing operation. New ventures are perceived as risky, and capital to build plants has not been readily available for the past several years. New plants also require a guaranteed supply of straw, which may be difficult to secure since the suppliers are independent farmers making decisions about what to do with their straw.

Straw collected from grass fields needs to be stored properly, mainly to protect it from rain. The cost for constructing permanent straw storage buildings or paying for temporary tarping has proved difficult for farmers in the short-term. Straw also should be sized in bales that efficiently pack on flat-bedded trucks for short hauling distances. For longer hauls, the straw needs to be condensed to reduce the cost of transporting to more distant end-use markets or manufacturing plants.

Off-Farm Disposal

Landfills

Summary

Landfills are a possible disposal option for grass straw residue. A landfill or transfer station is available in the majority of counties where grass seed is grown. For grass straw residue, landfills accept material “at the gate” for a price. The individual grower is responsible for loading, transporting, and unloading the straw.

Cost

There are both transportation and handling costs and tipping fees. Transportation and handling costs can be found on pages 8-9, *Storage and Transportation*. Tipping fees range from \$21 to \$69 per ton. Some facilities are willing to negotiate the tipping fee (see the contact list on the following page).

Availability

See the map on page 17 for locations of landfill facilities.

Barriers

Cost: The costs for both transportation and tipping fees are a barrier for using this option, with total costs ranging from \$40 to \$100 per ton.

Individual landfill requirements: Because each landfill has the ability to establish its own rules, requirements vary between the facilities. The most common types of requirements include:

- Prior approval
- In-county residue only
- Quantity (too large or too small a quantity may be a problem)
- Baled residue

Broken straw bales: Many landfills accept baled straw only. Currently, most of the straw is baled for removal from the field. Most growers have some broken straw bales to contend with. Transporting loose straw to facilities that accept it can be more expensive than transporting baled straw. This cost increase is due to inefficiencies in the volume to weight ratio of the loose straw. See pages 8-9, *Storage and Transportation*.

Capacity: Several of the counties do not have municipal solid waste landfills, so they truck their waste to the Roosevelt Regional Municipal Solid Waste (MSW) Landfill in Klickitat County. The following counties do not have a MSW landfill and use the regional landfill: Lincoln, Adams, Whitman, Garfield, and Columbia. Whitman County does, however, have a special use facility (primarily for demolition). Although transfer stations are located in Adams and Columbia counties, these stations operate as a “temporary” storage before transfer to a disposal facility.*

In other counties, the landfill capacity is limited. For example, the Franklin County facility anticipates reaching capacity in less than five years. Grant, Asotin, and Walla Walla counties anticipate more than 10 years before capacity is reached. * Thousands of tons a year of straw residue will impact the capacity at these facilities.

**Solid Waste in Washington State-Seventh Annual Status Report, December 1998.*

Location of Facilities/Contacts

The listing below identifies landfilling facilities in areas where grass seed is grown. The listing is shown by county and includes information on tipping fees, operating hours, and other requirements. A map of landfill locations is shown on page 17.

County Landfills

Asotin County

Asotin County MSW
Steve Baker (509) 758-1965
Open 8-4; Mon-Sat
Tipping Fee: \$54.31/ton (March 1999)

Delano Landfill
Will not accept

Franklin County

New Waste Inc.
Larry Dietrich (509)547-4802
Open 8-4:30 7 days
Tipping Fee: \$30/ton *for baled* (March 1999)

Walla Walla County

Sudbury Road
Dennis Rakestraw (509) 527-4463
Open 8:30-4, 7 days
Tipping Fee: \$25.28/ton (March 1999)
Landfill: (509) 527-3746

Grant County

Ephrata Landfill
Phil Slaugh (509) 754-4319
Tipping Fee: \$21/ton (March 1999)
No out of county

Spokane County

Graham Road Recycling and Disposal
Darrell Startin
Tipping Fee: \$8.50/cub yrd (March 1999)
Must be baled

Whitman County

Whitman Co. Landfill
Tim Davis (509) 334-2400
Open 8-5, Mon-Sat
Tipping Fee: \$69/ton (March 1999)
Must be baled

Regional Landfills

Columbia Ridge Landfill

Arlington, Oregon
Waste Management, Inc.
Darrell Startin, (509) 244-1051
Email: dstartin@wm.com

Roosevelt Regional Landfill

Roosevelt, Washington
(509) 386-5641

Incinerators



Summary

Grass straw residue can be disposed of at incinerators. The Workgroup investigated two facilities: the Avista (formerly known as Washington Water Power) facility at Kettle Falls; and the Regional Waste to Energy Facility in Spokane. The Avista facility was eliminated as an option because using agricultural residue creates serious problems with a build-up of “clinkers” (unburnable materials) in the boilers. At this time, no commercially available solution exists to correct this problem.

The information in the remainder of this section focuses on the Regional Waste to Energy Facility. This facility would store grass straw onsite for use as needed.

Cost

There are both transportation and tipping costs. See pages 8-9, *Storage and Transportation*. Tipping fees are \$97/ton. The facility indicated willingness to negotiate tipping fees.

Availability

The facility is located in Spokane.

Barriers

The barriers are fees and transportation costs.

Contact

Spokane Regional Waste to Energy Facility
Damon Taam (509) 456-7403

Composting Facilities in Washington State

<i>Facility Name</i>	<i>County</i>	<i>Public/Private</i>	<i>Owner/Contact</i>	<i>City</i>	<i>Phone</i>	<i>Total Waste Composted 1997</i>	<i>Comments</i>
Spokane Regional Compost Facility	Spokane	Public	Spokane Regional Compost Facility	Spokane	(509) 456-7403	23,294 tons Yard waste	At capacity
Cheney Wastewater Treatment & Reclamation Facility	Spokane	Public	City of Cheney Bob Meldrum	Cheney	(509) 235-7300	2,671 tons Wood waste, yard waste and biosolids	Primarily a facility to treat biosolids from wastewater plant. Potential for using limited quantities. Tip fee.
*Ecocycle, Inc.	Spokane	Private	Ecocycle, Inc Jim Boyd	Spokane	(509) 244-4303	13,092 tons Wood and yard waste	Capacity = 87 acres. Using about 1/3 now. Tip fee = \$11/ton but willing to talk about straw use (*Uncertain whether this facility is accepting material at this time)
Soil Life Systems, Inc.	Walla Walla	Private	Soil Life Systems, Bob Meldrum	Pasco	(509) 547-7365	53,618 tons 85% waste from Georgia Pacific; 15% from feedlot	Not taking yard wastes
WSU/ Pullman Compost Facility	Whitman	Public	WSU Gene Patterson	Pullman	(509) 335-7514	10,710 tons	WSU composting facility. Uses only WSU materials
Cheyne Road Landfill	Yakima	Public	Cheyne Road Landfill	Yakima	(509) 574-2450	0 tons	
*Lincoln Composting Facility	Yakima	Private	Lincoln Composting Facility	Zillah	(509) 829-6771	7,700 tons Yard waste, manure and other	(*Uncertain whether this facility is accepting material at this time)
City of Yakima	Yakima	Public	City of Yakima	Yakima		(no information)	
Total composted in 1997 = 113,082 tons							

Information derived from the 1997 Solid Waste in Washington State: 7th Annual Status Report published by the Department of Ecology's Solid Waste and Financial Assistance Program.

On-Farm Use

On-Farm Straw Composting



(Photo provided by Agriculture Research Service, USDA)

Summary

On-farm composting is piling or windrowing of straw on the farm. Crop residues are raked and piled, usually in windrows in the field. Windrows are turned several times when the temperature and moisture are right to enhance decomposition. Composting can reduce the volume of straw by up to 90 percent in less than a year.

Cost

Composting for volume reduction alone, with few pile turnings, costs about \$15 to \$30 per acre, depending on how many times the piles are turned. If water trucks or watering are needed, costs are higher. Irrigation systems might save watering costs where fall rains cannot be expected, or if all precipitation comes as snow.

A large one-pass, straddle-type compost turner costs about \$200,000. A two-pass machine, which must work both sides of each windrow to complete each turning, costs about \$40,000. Front-end loaders will also work, but take longer. Straddle turners have chopping capability, which speeds the composting action with long straw by reducing the particle size.

Availability

On-farm straw composting is available at all farms; however, a farm would need to use about one percent of its acreage for composting.

Barriers

On-farm composting is not widely accepted by growers for a variety of reasons. Straw decomposes slowly because of its ability to shed rather than absorb water and its high carbon to nitrogen ratio. It takes fungi and bacteria a long time to break down the lignin and cellulose in the woody cell walls of straw. Supplemental nitrogen may be needed to speed composting. Windrow turning is required to replenish the oxygen supply and sustain aerobic composting at a

fast rate. Water may need to be added in dry climates, which adds to the cost of composting straw.

Other Experimental Methods

The chop and spread method is an experimental on-farm option similar to composting. This method is now used extensively in western Oregon. The straw is finely chopped using mechanical methods and is spread on the field immediately following seed harvest. Chopping breaks the residue down into much finer pieces, which are easier for fungi and bacteria to decompose. More research is needed to find out how this process would work in the drier region of eastern Washington.

Contacts

The Center for Sustaining Agriculture and Natural Resources, Washington State University

Compost Connection Home Page: <http://csanr.wsu.edu/compost/>

Compost Connection Newsletter:

David Granatstein, Wenatchee Fruit Tree Station

(509) 663-8181

Jim Moore, Bioresource Engineering Department

Oregon State University, Corvallis, Oregon

(541) 737-2041

Jack Lincoln, Lincoln and Associates (custom composting)

Zillah, Washington

(509) 829-6771

Off-Farm Use

Options Currently Available to Washington Growers

Off-Farm Straw Composting

Transporting straw to a commercial composting facility is an option. Commercial composting facilities are located in a few counties in eastern Washington (Spokane, Walla Walla, and Whitman); see the map on page 17. Many facilities are already at or near capacity and are not accepting material. Tipping fees at these facilities can be up to \$90 per ton. Some facilities, however, indicated a willingness to negotiate the tipping fee.

Not all facilities still accepting material are willing to take straw. Straw takes longer to decompose and needs to be worked more than other materials. Straw must be mixed with less woody material and turned more often than other materials. The Cheney facility currently is beginning to experiment using grass straw as a feedstock. The Spokane Regional Compost Facility in Colbert has experimented with wheat straw. Based on these “trials,” the Spokane facility now accepts only seed-free straw, and tests before accepting straw.

Strawboard

Strawboard is currently produced using technology similar to that used in the wood products industry. The straw is pulverized, blended with adhesive, formed into a mat, pressed, sanded, and cut to size for use in the building and wood-working industries.

Numerous strawboard plants are currently in operation around the world, with a few here in the U.S. and Canada. There is currently one small production facility under construction, one in the planning stage, and one being considered by a Canadian company that has existing operations elsewhere.

Animal Feed

Straw is currently being used for animal feed. The straw by itself has very little nutritional value, but works well when mixed with other feed. It is used as an extender for traditional feeds such as alfalfa. The major markets for this use are currently in Asia, which requires shipping through major port facilities such as Seattle, Tacoma, and Portland. Proper storage to maintain quality is critical to success in export markets.

Future Possibilities

Straw Pulp

This technology is currently in the research stage. A few of the large pulp and paper companies (Weyerhaeuser, Boise Cascade, and others) are interested in developing this process. The pulp and paper sciences lab at the University of Washington and others are conducting tests using both grass and wheat straw. A feasibility study is currently underway to look at the possibility of locating a 100-ton production facility in Whitman County. The main concern is potential

problems related to the handling of the straw through the process. It cannot be done with the traditional wood chip handling equipment.

Straw Panels

Straw panels are very solid fiber panels comprised of highly compressed agricultural waste fibers. These fibers include the waste stalks and other remains of wheat, rice, barley, oats, rye, and elephant and Kentucky blue grass, as well as similar agricultural products for which farmers do not have widespread use. Panels are covered with a durable paper membrane which, if treated, are resistant to water. Sodium borate is added to enhance the compressed agricultural waste straw's fire resistant capabilities and to repel insects.

Ethanol

Straw can be used as a feed stock for an ethanol production plant in place of the traditional types of grain. The process used is similar to that for grain, but the handling, cooking, and fermenting have to be done differently, and each stage has its own set of problems to overcome. There are currently plants in the midwest that are using straw, but none in the west.

Composite Building Products

Straw is pulverized and blended with recycled plastic film (grocery bags, shrink wrapping, etc.), heated, and then extruded into product sizes for use as outdoor decking materials. There are existing plants located in the east, midwest, and Canada. Plans for a production facility to be located in Whitman County are in the investment capital raising stage at this time.

Biomass Chemicals

Research is currently being done to determine if straw can be used as a feed stock to produce Levulinic Acid. This is a high-value chemical used in many different applications such as resins, coatings, adhesives, dyes, food additives, cosmetics, nylon and others. A company is currently looking at Washington as a possible location for a production facility. They are in the process of studying their process designs to determine if straw can be used as a feed stock. They are aware of the estimated volumes available of both grass and wheat straw.

Straw Bale Construction and Insulation

Straw has been used as a building material since early times. Many communities in Mexico and the desert southwest use straw bales for construction of houses. Straw bale housing looks similar to adobe or rammed earth building types. Straw bale construction is also used in larger structures: the U.S. Postal Service is constructing an 8,500 square-foot building in Corrales, New Mexico using 1,000 straw bales.

Professor David Riley of the University of Washington's Department of Building Construction tested an experimental straw bale, post-and-beam structure in 1998 for flame spread, long-term stability, moisture content, lateral capabilities, and insulation. Test results satisfy King County's Department of Development and Environmental Services requirements.

Barriers

Barriers to off-farm use are transportation and storage costs. See pages 8-9, *Storage and Transportation*.

Conclusions and Recommendations

Conclusions and Recommendations

Conclusions

On-farm composting is available now, though not eagerly adopted by farmers. Also available now is the option to dispose of grass straw at landfills or incinerators. However, this option is typically costly. The most feasible use of straw in good condition over the near-term (within two to three years) is export to Asian livestock feed markets. Storing straw to protect it from moisture is critical in light of stringent quality requirements for feed export.

The use of grass straw as feedstock in various other commercial ventures (straw building products manufacturing) is potentially the best option for straw use, both in the near-term and the long-term, depending on farm location and transport costs. The most likely alternative to be more widely available in the longer-term (within three years) is strawboard. One small company is presently operating in the North Idaho area and two other firms are interested in establishing plants. Other productive uses such as paper, building materials, ethanol, or levulinic acid have great promise, but appear to be further in the future.

Also in the future are additional on-farm composting methods. Further research is needed to adapt these methods for use in the various rainfall areas of eastern Washington. One such method involves chopping the straw in such a way that it will quickly decompose in the field without requiring removal.

Recommendations

The Straw Utilization Workgroup identified six key objectives and, in the following section, recommends specific actions that can be taken to achieve the objectives.

I. Increase Storage Capacity and Reduce Transportation Costs

- Explore feasibility of low-cost storage capacity at government surplus buildings and ports. *Responsible Agencies: Department of Agriculture explore and identify barriers and report to the Natural Resources Joint Cabinet. (Begin Fall 1999)*
- Assist in developing the financing of machinery to increase condensing capacity and transportation efficiency. *Responsible Agencies: Department of Ecology, Department of Community Trade and Economic Development), and Department of Agriculture identify sources of financing and provide application assistance. (Begin Fall 1999)*

II. Increase Feed Market Opportunities

In addition to the two actions listed above, under “Increase Storage Capacity and Reduce Transportation Costs:”

- Identify and enhance opportunities to market straw in the most promising market regions (currently Asia). *Responsible Agencies: Department of Agriculture. (Ongoing)*

III. Promote Straw Building Products Manufacturing and Use in Washington

- Determine the feasibility of purchasing straw-based construction materials and paper products through state contracts taking into consideration price, performance, and environmental criteria. *Responsible Agencies: Departments of Ecology, Agriculture, Community Trade and Economic Development, and General Administration. (Begin Fall 1999)*
- Work with industry to develop “use” criteria for straw-based products. *Responsible Agencies: Department of Ecology. (Begin 2001)*
- Recognize or reward businesses that manufacture or use straw-based products. *Responsible Agencies: Department of Ecology. (Begin 2001)*

IV. Promote Straw as a Raw Material for Manufacturing

- Evaluate the use of straw bale/straw panel as a material for migrant worker housing. *Responsible Agencies: Departments of Agriculture and Community Trade and Economic Development. (Begin 2000)*
- Promote Washington as a location for strawboard/panel manufacturing or related facilities. *Responsible Agencies: Department of Community Trade and Economic Development. (Ongoing)*
- Expedite permitting for manufacturing companies using straw as a feedstock. *Responsible Agencies: Department of Ecology. (Begin 2000)*

V. Promote On-Farm Use Research

- Promote key research projects (such as composting and chop and lay methods) at the Center for Sustainable Agriculture at Washington State University and other research institutions. *Responsible Agencies: Departments of Agriculture, Ecology, and Community Trade and Economic Development. (Begin Fall 1999)*

- Request Washington State University host a workshop on research needs. *Responsible Agencies: Washington State University, Department of Agriculture, Department of Community Trade and Economic Development, Department of Ecology. (Workshop to be held by 2001)*
- Evaluate carbon sequestration on agricultural lands. *Responsible Agencies: Department of Agriculture, Department of Ecology, and Washington State University. (Begin Fall 1999)*

VI. Provide Technical Assistance

- Jointly support tax incentives specifically targeted to end-users, manufacturers, and exporters. *Responsible Agencies: Departments of Agriculture, Ecology, and Community Trade and Economic Development. (Begin 2000)*
- Identify and assist agencies, commissions, businesses or growers in preparing grant applications (state or federal). Grant opportunities have been identified and a source list included in the appendix. *Responsible Agencies: Departments of Ecology, Agriculture, and Community Trade and Economic Development. (Begin 2000)*

Appendices

Technical Assistance and Funding Opportunities

Technical Assistance

Washington State Department of Licensing, **Business Information Workshops:** Offers valuable information on state and federal requirements for starting and operating your business. Representatives from the Departments of Licensing, Labor and Industries, Revenue, Employment Security, and Community, Trade and Economic Development/BAC, and the Internal Revenue Service participate at the workshops.

Master License Service (360) 664-1400

<http://www.wa.gov/dol/bpd/workshop.html>

Washington State Department of Community, Trade, and Economic Development, **Access to Business Capital:** Provides a range of technical assistance and financing services to businesses including obtaining capital for start-up and expansion projects that create or retain jobs, stimulating private investment, increasing local tax base, and strengthening community economic vitality.

Cathy Norwood-Chance, Managing Director (360) 586-4856.

Washington State Department of Community, Trade, and Economic Development, Business Assistance Center, **Washington Manufacturing Services (WMS):** Provides high quality, affordable technical services for Washington State manufacturers. These services range from implementing management, process and product improvements to strategic planning and change management assistance.

1-800-637-4634, Email to george.sutherland@juno.com

www.tecnet.org/wms.

Washington State Department of Community, Trade, and Economic Development, Business Assistance Center, **The Business Information Hotline:** A statewide, toll-free information and referral service, providing information regarding [state business licensing](#), registration, technical assistance, [other state agencies](#) or one-to-one business counseling.

Business Assistance hotline: (800) 237-1233.

Washington State Department of Community, Trade, and Economic Development, **The International Trade Division:** Assists Washington companies in exporting their products and services to foreign markets. Trade specialists make international connections through trade shows, missions, and buyer and distributor networks.

<http://www.trade.wa.gov/text/>

PNWERCATALIST: Provides trade leads and market information through a proactive database.

(206) 389-2845

Straw Bale Construction Association: Information on straw bale construction, with WEB stie providing access to the article “Straw: The Next Great Building Material?” Environmental Building News, Volume 4, No. 3 – May/June 1995
31 Old Arroyo Chamiso, Santa Fe, New Mexico 87505
(505) 986-1427
<http://www.ebuild.com/Archives/Features/Straw/Straw.html>

Business Assistance Center: Offers consulting, referral, planning, and troubleshooting services with direct access to all state government business assistance services.
1-800-237-1233

Washington State Department of Ecology **Permit Assistance Center:** Provides technical assistance on a variety of environmental issues. Provides referrals to agency technical experts on pollution prevention, recycling, composting, dust control, and more. Can provide contact/locator information on recycling, composting, waste reduction, and related businesses.
(360) 407-7037 FAX: (360) 407-6904
300 Desmond Drive SE, Lacey, WA 98504-7600
Email: ecypac@ecy.wa.gov

United States Department of Agriculture, **The Alternative Agricultural Research and Commercialization Corporation (AARC):** Wholly owned government corporation of the USDA serving as an industrial agricultural clearinghouse to business and technology information. The AARC forms partnerships to assist private firms involved in commercializing research and technology that bring new, environmentally friendly, renewable resource-based products to the marketplace.
(202) 690-1634, FAX: (202) 690-1655
USDA, AARC, 0156 South Building, 14th and Independence Street SW, Washington, DC 20250-0400.
<http://www.usda.gov/aarc/>

United States Department of Agriculture, Agricultural Research Service, **National Center for Agricultural Utilization Research (NCAUR):** Invents new uses of agricultural commodities for industrial and food products, develops new technology to improve environmental quality, and provides technical support to federal regulatory and action agencies. NCAUR eases and accelerates commercialization of promising products and technology.
(309) 685-4011, FAX: (309) 681-6686
USDA, ARS, NCAUR, 1815 N. University Street, Peoria Illinois 61604-3999
<http://www.ncaur.usda.gov/>

United States Department of Agriculture, **Export Advice and Assistance:** Provides information and assistance to companies in the beginning stages of market research or experienced exporters. This resource site lists some of the state and federal resources available to agricultural exporters by the type of assistance offered. Resources are broken down by state department of agriculture and associated organizations; general market research and market trends; foreign market information; export assistance programs and services; foreign country import requirements; U.S.

export requirements; U.S. export inspection, grading, and certification; export transportation; export financing; trade policy; other; and the trade information center.

[http://amsdev.usda.gov/tmd/export/exporter assistance.html](http://amsdev.usda.gov/tmd/export/exporter%20assistance.html)

United States Department of Agriculture, Foreign Agricultural Service,

Ag Exporter Assistance: Provides information and assistance on exporting, marketing research, U.S. and foreign import requirements and certifications, channels of distribution, finding customers and foreign buyers, promoting your product, shipping your product, and exporting guidance.

<http://www.fas.usda.gov/exporter.html>

United States Department of Energy, **Office of Industrial Technologies for Agriculture:**

Develops partnerships between private industry and OIT for using plants as starting materials for industrial products. First competitive solicitation for research and development scheduled for summer of 1999.

Doug Faulkner, Agriculture Team Leader.

(202) 586-2119

Email: doug.faulkner@ee.doe.gov, <http://www.oit.doe.gov/>

United States Department of Agriculture, Natural Resources Conservation Service

(NRCS), Air Quality Information: The NRCS Air Quality Team works to include air quality concerns in NRCS programs and operations. Air Quality Scientists, Air Quality Training, and other information can be found on the NRCS's Web Page.

<http://soils.ecn.purdue.edu/~vining/NRCSAQHomepage.html>

United States Department of Agriculture, Cooperative State Research Education and Extension Service, Farm*A*Syst: Partnership between government agencies and private business to prevent pollution on farms using confidential environmental assessments.

<http://www.wisc.edu/farmasyst>

Washington Farm*A*Syst: Links to contacts in Washington State.

<http://www.wisc.edu/farmasyst/contact/wa.html>

United States Department of Agriculture, Cooperative State Research Education and Extension Service CSREES' **Small Farm Program:** This program is committed to meeting the needs of the small farm community. The goal of the CSREES small farm program is to improve the income levels and the economic viability of the small farm enterprises through partnerships with the Land Grant System, public and private sectors by encouraging research, extension, and education programs that meet the specific needs of small farmers.

Small Farm Program, USDA-CSREES, Plant and Animal Systems, Stop 2220, 901 D Street, S.W., 868 Aerospace Center, Washington, DC 20250

Toll-free: 1-800-583-3071; FAX: 202-401-5179

<http://www.reeusda.gov/smallfarm>

Economic Development Office, Pacific Northwest National Laboratory, Operated by Battelle for the U.S. Department of Energy: Contracts to test new technologies and to provide technical information.

<http://www.pnl.gov/edo/>

New Uses Council, Inc.: Nonprofit organization dedicated to expanding the development and commercialization of new industrial, energy, and non-food consumer uses of renewable agricultural, forestry, and livestock products.

<http://users.eforest.com/jharsch/newuses>

United States Department of Commerce, **Business Advisor**: Provides businesses with one-stop access to federal government information, services, and transactions.

(703) 487-4608

<http://www.business.gov/>

United States Department of Energy Energy, **Saving Tips for Small Businesses:**

This informative site walks small businesses through the energy efficient steps they can take to save money. In addition to quick tips, they have provided detailed information about how to implement your own long-term energy conservation efforts, where to turn for expert assistance, and a list of further references and sources.

<http://www.eren.doe.gov/energytips/>

United States Environmental Protection Agency's **Small Business Gateway:** Offers a centralized location from which to access a wide range of environmental information and technical assistance resources. The Frequently Answered Questions page covers such questions as obtaining permits, registering pesticides, and what to do in the event of an environmental emergency. This site also provides links to contacts for compliance and technical assistance, to the laws and regulations affecting your business, and to environmental programs that can help you save money and improve profits.

<http://www.epa.gov/smallbusiness/>

United States Environmental Protection Agency's, **Renewable Energy- Biomass Information WEB site:** Provides information on using biomass (plant residue/straw) for fuel including burning to transform water into steam which drives turbines and "co-firing" which adds small amounts of biomass (5-15% by heat content) with coal in traditional coal-fired generating units. Links to "energy from biomass" sites are also given.

<http://199.223.29.233/epa/rew/biomass.html>

Grant and Loan Assistance

United States Department of Agriculture, **Western Region Sustainable Agriculture Research and Education (SARE):** A USDA competitive grants program. SARE provides a research and education base for the future economic viability of U.S. Agriculture. The mission of SARE is to expand knowledge and adoption of.

<http://wsare.usu.edu/>

United States Department of Agriculture, **Federal-State Marketing Improvement Program**: Program designed to assist in the study and development of innovative approaches to marketing of agricultural products. Funds can be used for processing, packaging, handling, storing, transporting and distribution of agricultural products. State Departments of Agriculture and other appropriate state agencies are eligible to apply for funds. Partnerships are encouraged. Applications are due 6/14/99.
Larry Summers, (202) 720-2704.

United States Department of Agriculture, **Environmental Quality Incentives Program (EQIP)**: Provides funding to farmers and ranchers to improve the environmental health of the nation's farm and ranch land with long-term conservation contracts. EQIP provides cost-share for up to 75 percent of the cost of certain conservation practices. Incentive payments can be made for up to three years to encourage producers to perform land best management practices. Total cost-share and incentive payments are limited to \$10,000 per person per year and \$50,000 for the length of the contract, which can run from 5 to 10 years. The program is limited to persons engaged in livestock and agricultural production in designated priority areas.
Jeffrey Loser, Conservation Operations Division, Natural Resources Conservation Service, PO Box 2890, Washington, D.C. 20013-2890.
Phone: (202) 720-1845. Also contact your local conservation district or NRCS Office.
<http://www.nhq.nrcs.usda.gov/OPA/FB96OPA/EQIPfinal.html>

United States Department of Agriculture, **Rural Rental Housing Loans**: Under the Guaranteed Rural Rental Housing Program, USDA's Rural Housing Service provides loan guarantees to lenders, who in turn provide loans for the construction of multi-family housing complexes in rural areas. USDA will guarantee the lender's loan, up to 90 percent of the total development cost. Rural rental housing using straw-bale construction and/or straw insulation could be eligible for loan support under this program. Program applications and procedures will be published in the Notice of Funding Availability in the June 17, 1999 Federal Register. Interested lenders must submit loan applications to their local Rural Development State Office by 5:00 p.m., Aug. 31, 1999. For more information about this program, visit your local USDA Rural Development office or USDA Service Center, call the Rural Development national office at (202) 720-4323, or check the web page at: <http://www.rurdev.usda.gov>.

Environmental Protection Agency (EPA), EPA's **Small Business Innovation Research (SBIR) Program**: The Environmental Protection Agency (EPA) is one of 10 federal agencies that participate in the SBIR Program established by the Small Business Innovation Development Act of 1982. The purpose of this Act was to strengthen the role of small businesses in federally funded R&D and help develop a stronger national base for technical innovation. A small business is defined as a for profit organization with no more than 500 employees. The small business must be independently owned and operated, not dominant in the field of operation in which it is proposing, and have its principal place of business located in the United States. Joint ventures and limited partnerships are eligible for SBIR awards, provided the company qualifies as a small business. EPA issues annual solicitations for Phase I and Phase II research proposals from science and technology-based firms. Under Phase I, the scientific merit and technical feasibility of the proposed concept is investigated. EPA awards firm-fixed-price Phase I

contracts of up to \$70,000 and the period of performance for these contracts is typically 6 months. Through this phased approach to SBIR funding, EPA can determine whether the research idea, often on high-risk advanced concepts, is technically feasible, whether the firm can do high-quality research, and whether sufficient progress has been made to justify a larger Phase II effort. The Phase I report also serves as a basis for follow-on commitment discussions. Phase II contracts are limited to small businesses that have successfully completed their Phase I contracts. The objective of Phase II is to further develop the concept proven feasible in Phase I. Competitive awards are based on the results of Phase I and the scientific and technical merit and commercialization potential of the Phase II proposal. Under Phase II, EPA can award contracts of up to \$295,000 and the period of performance is typically 2 years. The goal of Phase II is to complete the R&D required to commercialize the technology or product. EPA's next Phase I Solicitation will open on August 11, 1999, and close on October 13, 1999. The Solicitation will be posted on National Center for Environmental Research and Quality Assurance. EPA SBIR Helpline: 1-800-490-9194, <http://www.epa.gov/ncerqa>
Links to Other Federal Agency SBIR Sites: <http://es.epa.gov/ncerqa/links.html#agency>

Environmental Protection Agency (EPA), Pollution Prevention Incentives for States Grant Program: Multi-media pollution prevention/source reduction programs to support state programs that address the reduction or elimination of pollution across environmental media (air, land, and water). FY99 solicitation closed 2/11/99. 50% match required. Funds go to Department of Ecology only.
Carolyn Gangmark, (206) 553-4072.

United States Department of Agriculture, Rural Business-Cooperative Service: For FY99, \$1.0 million in competitive cooperative agreement funds is available for research related to agricultural cooperatives serving rural communities. The intent of the funding is to encourage research on critical issues vital to the development and sustainability of cooperatives as a means of improving the quality of life in rural communities. Applications are due June 30, 1999 to: "Research on Rural Cooperative Opportunities and Problems" USDA, Rural Business-Cooperative Service, 1400 Independence Avenue, SW, Room 5050 South Building, Washington DC 20250
(202) 720-1400
<http://web.fie.com/htdoc/fed/agr/any/any/proc/any/fr04129902.htm>

United States Department of Agriculture **Funding Opportunities and Guidance:**

1. **Rural Business Enterprise Grants:** Grant funds provide public bodies (towns and villages, boroughs, townships, counties, States, authorities, districts, Indian Tribes on Federal and State reservations, and other Federally-recognized Indian Tribal groups in rural areas to facilitate development of small and emerging business enterprises areas including land acquisition and development, building construction, and equipment purchase.
<http://www.rurdev.usda.gov/rbs/busp/rbeg.html>
2. **Rural Business Opportunity Grants:** Grant funds provide for technical assistance, training, and planning activities that improve economic conditions in rural areas. Applicants must be located in rural areas (this includes all areas other

than cities of more than 10,000 people). Nonprofit corporations and public bodies are eligible. A maximum of \$1.5 million per grant is authorized by the legislation. RBS is designing the program to promote sustainable economic development in rural communities with exceptional needs.

<http://www.rurdev.usda.gov/rbs/busp/rbog.html>

3. ***Intermediary Relending Loan Program (IRP)***: IRP finances business facilities and community development projects in rural areas. All of the IRP loan funds received by an intermediary must be re-loaned to ultimate recipients. Loans from intermediaries to ultimate recipients must be for the establishment of new businesses, the expansion of existing businesses, creation of employment opportunities, saving of existing jobs, or community development projects.

<http://www.rurdev.usda.gov/rbs/busp/irp.html>

4. ***Business and Industry (B&I) Direct Loan Program*** : Provides loans to public entities and private parties who cannot obtain credit from other sources. Loans to private parties can be made for improving, developing, or financing business and industry, creating jobs, and improving the economic and environmental climate in rural communities (including pollution abatement). This type of assistance is available in rural areas (this includes all areas other than cities or unincorporated areas of more than 50,000 people and their immediately adjacent urban or urbanizing areas).

<http://www.rurdev.usda.gov/rbs/busp/b&i.dir.html>

5. ***Rural Economic Development Loans (REDL)***: promotes rural economic development and/or job creation projects. Zero interest loans may be made, at the discretion of the Rural Business-Cooperative Service (RBS) Administrator, to any RUS borrower that is not delinquent on any Federal debt or in bankruptcy proceeding. Rural Business-Cooperative Service, Specialty Lenders Division, Phone: (202) 720-1400

<http://www.rurdev.usda.gov/rbs/busp/redl.html>

United States Department of Agriculture's **Guaranteed Loan Program**: Farm Service Agency (FSA) provides financial assistance to individual farmers. FSA total loan limit is \$700,000 for purchasing and farm/ranch operations.

Steve Thompson, (202) 720-7961, Steve_thompson@wsc.usda.gov

United States Department of Agriculture, **Conservation Farm Option (CFO)**: The Conservation Farm Option is a pilot program for producers of wheat, feed grains, cotton, and rice. The program's purposes include conservation of soil, water, and related resources, water quality protection and improvement, wetland restoration, protection and creation, wildlife habitat development and protection, or other similar conservation purposes. Eligibility is limited to owners and producers who have contract acreage enrolled in the **Agricultural Market Transition Act program**, i.e., production flexibility contracts. The CFO is a voluntary program. Participants are required to develop and implement a conservation farm plan. The plan becomes part of the CFO contract which covers a ten-year period. CFO is not restricted as to what measures may be included in the conservation plan, so long as they provide environmental benefits. During the contract period the owner or producer (1.) receives annual payments for

implementing the CFO contract and (2.) agrees to forgo payments under the Conservation Reserve Program, the Wetlands Reserve Program, and the Environmental Quality Incentives Program in exchange for one consolidated payment. *Contact: USDA, Farm Service Agency or Natural Resources Conservation Service .*

<http://www.nrcs.usda.gov/NRCSProg.html#Anchor-Stewardship>

United States Department of Agriculture **CSREES Natural Resources and**

Environment Unit: Grants fund research to develop knowledge and new technologies related to wood products, wood utilization, air quality, and *alternative, renewable fuel sources*. Wood Utilization, *Biomass, Biofuels, Alternative Fuels, Air Quality*, and Waste Treatment Research; Rangeland Research Program (PL 89-106)— focus on research to develop knowledge and new technologies including alternative, renewable fuel sources.

<http://www.reeusda.gov/new/about/nre2.htm#Wood>

United States Department of Agriculture, **The Small Business Innovation Research (SBIR):** Makes grants that are competitively awarded to qualified small businesses for the purpose of supporting high quality research proposals containing advanced concepts related to important scientific problems and opportunities in agriculture that could lead to significant public benefit if the research is successful. The SBIR Program does not make loans and does not award grants for the purpose of helping a business get established. SBIR Phase I grants are limited to \$65,000 and a duration of 6 months. The FY 2000 Program Solicitation is expected to open June 1, 1999.

<http://web.fie.com/htdoc/fed/agr/any/any/proc/any/fr05219901.htm> <http://www.reeusda.gov/sbir>.

Dr. Charles F. Cleland, Division Director, Small Business Innovation Research Program, CSREES/USDA, Stop 2243, 1400 Independence Ave. SW, Washington, D.C. 20250-2243, Phone (202) 401-4002, FAX (202) 401-6070, ccleland@reeusda.gov

OR

Ms. Ruth Lange, Assistant Program Director, Small Business Innovation Research Program, CSREES/USDA, Stop 2243, 1400 Independence Ave. SW, Washington, D.C. 20250-2243, Phone (202) 401-4002, Fax (202) 401-6070, rlange@reeusda.gov

United States Department of Agriculture's **National Research Initiative Competitive Grants Program (NRI):** Soliciting proposals for competitively awarded **research grants addressing key problems of national and regional importance to agriculture**, forestry, and related sciences. Proposals should address the goals of an NRI program described herein (see Research Opportunities) and, where appropriate, be consistent with the development of systems of sustainable agriculture.¹ Sustainable agriculture is defined as an integrated system of plant and animal production practices having a site-specific application that will, over the long term: (1) satisfy human food and fiber needs; (2) enhance environmental quality and the natural resource base upon which the agricultural economy depends; (3) make the most efficient use of nonrenewable resources and on- farm resources and integrate, where appropriate, natural biological cycles and controls; (4) sustain the economic viability of farm operations; and (5) enhance the quality of life for farmers and society as a whole. Funding categories for Fiscal Year (FY) 1999 are: **Markets, Trade, and Policy FY 99 (\$3.6M)** and **New Products and Processes FY 99 (\$6.3M)**. Eligibility requirements for the NRICGP are as follows: Except

where otherwise prohibited by law, state agricultural experiment stations, all colleges and universities, other research institutions and organizations, federal agencies, private organizations or corporations, and individuals are eligible to apply for and to receive a competitive grant. National Research Initiative Competitive Grants Program, Cooperative State Research, Education, and Extension Service, United States Department of Agriculture, Stop 2241, 1400 Independence Avenue, S.W., Washington, D.C. 20250-2241
(202) 401-5022

nricgp@reesuda.gov <<mailto:nricgp@reesuda.gov>>

For application materials: <http://www.reeusda.gov/crgam/nri/programs/progdesc/contents.html>

United States Department of Agriculture, **Foreign Agricultural Service (FAS)**: Provides technical assistance to promote the export of, and improve the market access for U.S. agricultural products to emerging foreign markets. Unified Export Strategy (UES) of FAS provides the means for interested applicants to apply for Program funds. Private agricultural or agribusiness organizations are eligible to apply. FY99 solicitation closed 3/26/99.

<http://web.fie.com/htdoc/fed/agr/any/any/proc/any/fr02059901.htm>

United States Department of Energy, Golden Field Office, **Innovative Technologies for Conversion of Biomass to Transportation Fuels**: 20% match required for proposals for developing innovative technologies that will increase the efficiency or lower the cost of producing and converting biomass to transportation fuels. FY99 Solicitation closed 1/29/99.

John Motz (303) 275-4754

<http://www.eren.doe.gov/golden/solicit.htm>

United States Department of Energy, Argonne National Laboratory of the Chicago Operation Office, **Energy Efficiency and Waste Reduction for Plant/Crop Based Resources Technology in the Agriculture Industry**: Cost-shared research and development of technologies which will reduce energy consumption and waste in the agriculture industry and enhance U.S. competitiveness with the ultimate goal of commercialization. FY99 solicitation posted on 2/2/99.

United States Department of Energy, Pacific Northwest National Laboratory, **New Technology Demonstration Program**: Seeks proposals for the evaluation of energy efficient and renewable technologies that promise significant cost and energy savings through application in federal facilities. Technologies must be commercially available at the time the evaluations are completed and must not have significant application currently in place in the federal sector. Applications accepted at any time during FFY99.

Karen Walker (509) 375-2733

United States Department of Energy Office of Industrial Technologies (OIT), **Inventions and Innovation (I&I) Program**: The goal of I&I is to improve energy efficiency through the promotion of innovative ideas and inventions that have a significant potential energy impact and a potential future commercial market. I&I is related to several industries including **Agriculture**. Up to \$40,000 available for conceptual and technical feasibility studies; up to \$200,000 for development, commercial validation or demonstration. Proposals due 7/30/99.

James Damm, (303) 275-4744. Refer to Sol# DE-PS36-99GO10426.

United States Department of Energy, **Small Business Innovative Research (SBIR)**: Program provides funding assistance for research and development of 40 technical topics including biomass utilization. A small business employs 500 or less employees. Solicitations usually released in December with March application due date.

Program Office (301) 903-1414 Sbir-sttr@oer.doe.gov
<http://sbir.er.doe.gov/sbir>

“Rural Business-Cooperative Development”

<http://web.fie.com/htdoc/fed/agr/crs/any/proc/any/fr04129901.htm>

California Air Resources Board **Innovative Clean Air Technologies**: Co-funding for companies that are developing technologies supporting clean air objectives for California. Washington businesses may compete, but technology needs to show how jobs in California will be created.

<http://www.arb.ca.gov/research/icat/icat.htm>

California Air Resources Board **Rice Straw Demonstration Project Fund**: Provides grants to help establish a commercial market for rice straw in Sacramento Valley. For information purposes: see what California is doing with its rice straw utilization.

<http://www.arb.ca.gov/rice/ricefund/mt042299.html>

Pacific Northwest Pollution Prevention Resource Center (PPRC) Funding Page: Provides information on grant opportunities and how to receive solicitation forms.

<http://pprc.pnl.gov/pprc/rfp/rfp.html>

United States Department of the Treasury, **Community Development Financial Institutions Fund**: Community Development Financial Institutions (CDFI) Fund promotes economic revitalization and development in distressed urban and rural communities. The fund provides access to capital and local economic growth. The fund also encourages economic opportunity by advancing the role of microenterprise development.

(202) 622-8662

<http://www.trea.gov/cdfi/>

Washington State Department of Community, Trade, and Economic Development **Access to Business Capital:**

- **Washington State Development Loan Fund**: Provides gap financing to businesses which create new jobs or retain existing jobs in non-entitlement areas of the state experiencing high unemployment. (Gap: that portion of a project which cannot be financed through other sources, but which is the last portion needed before the overall investment can occur.) Loans up to \$700,000 for the acquisition, engineering, improvement, rehabilitation, construction, operation, or maintenance of any property that is used or is suitable for use by an economic enterprise. Richard Paulsen (360) 753-4306

- **Community Development Finance Program:** Helps business and industry secure long-term expansion loans. Loan programs are available for real estate, new construction, renovation, major leasehold improvements, machinery, equipment, and working capital. Provides assistance and loan packaging assistance designed to access long-term financing to create jobs, using state and federal programs such as Development Loan Fund and Small Business Administration Loans. (360) 753-0325

Tax-Exempt Manufacturing/Processing Equipment Financing Program (WEDFA): A program designed for equipment financing of \$250,000 or greater. WEDFA is authorized by the legislature to issue nonrecourse tax-exempt/taxable economic development revenue bonds. Another related program is the “**Taxable Tail**” program which issues bonds used in conjunction with tax-exempt or industrial revenue bond financing and those not so eligible. Jonathan Hayes, WEDFA, 1000 Second Ave., Suite 2700, Seattle, WA 98104-1045 (206) 587-5634/5640 or your local economic development office

Washington State Department of Ecology, **Water Quality Grant Programs:** Centennial Clean Water Fund, Washington State Water Pollution Control Revolving Fund, and Federal Clean Water Act Section 319 Nonpoint Source Fund
<http://www.wa.gov/ecology/wq/funding/guidelns.html>

Washington State Department of Transportation **Funding Sources Database:** A compilation of loans, grants, and technical assistance programs available to non-profit organizations, local government, and state agencies in Washington. This site provides access to numerous resource agencies and a large number of funding opportunities.
http://www.crab.wa.gov:591/funding_sources/

American Philanthropy Review: Access to WEB sites dedicated to fund raising, volunteer programs, tax-exempt organizations, US laws regarding tax-exempt organizations, etc. For information purposes: check out the wide variety of assistance available.
<http://charitychannel.com/Forums/>

Biobased Products get Boost from "Greening the Government Executive Order"

On September 14, 1998, Agriculture Secretary Dan Glickman announced that environmentally preferable biobased products will get a boost in the marketplace by being specifically included in President Clinton's Executive Order issued today on "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition." Statement by the President: "Today I'm pleased to sign an Executive Order strengthening federal efforts to protect the environment and promote economic growth through the purchase of recycled and other environmentally preferable products."

"I have long been a proponent of research and development of new uses for agricultural products," Glickman said. "From microscope to the marketplace, new biobased products bring us more opportunities to work in concert with the environment while providing significant and far-reaching economic benefits. Discovering new, earth-friendly ways to tap the abundance of our natural, renewable resources benefits farmers, businesses, consumers, and society as a whole."

With the implementation of today's Executive Order, federal, state, and local governments will now be required to give consideration to these products in their procurement activities. USDA was named, along with the White House Federal Environmental Executive and the Environmental Protection Agency, as part of the leadership body which will implement the Executive Order. In addition, USDA will join the General Service Administration, EPA, and the Federal Environmental Executive in outreach efforts to state and local governments.

Executive Order 13101:

September 14, 1998

EXECUTIVE ORDER

GREENING THE GOVERNMENT THROUGH WASTE
PREVENTION, RECYCLING, AND FEDERAL ACQUISITION

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Solid Waste Disposal Act, Public Law 89-272, 79 Stat. 997, as amended by the Resource Conservation and Recovery Act (RCRA), Public Law 94-580, 90 Stat. 2795, as amended (42 U.S.C. 6901-6907), section 301 of title 3, United States Code, and in order to improve the Federal Government's use of recycled products and environmentally preferable products and services, it is hereby ordered as follows:

PART 1 - PREAMBLE

Section 101. Consistent with the demands of efficiency and cost effectiveness, the head of each executive agency shall incorporate waste prevention and recycling in the agency's daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference and demand for such products. It is the national policy to prefer pollution prevention, whenever feasible. Pollution that cannot be prevented should be recycled; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner. Disposal should be employed only as a last resort.

Sec. 102. Consistent with policies established by the Office of Federal Procurement Policy (OFPP) Policy Letter 92-4, agencies shall comply with executive branch policies for the acquisition and use of environmentally preferable products and services and implement cost-effective procurement preference programs favoring the purchase of these products and services.

Sec. 103. This order creates a Steering Committee, a Federal Environmental Executive (FEE), and a Task Force, and establishes Agency Environmental Executive (AEE) positions within each agency, to be responsible for ensuring the implementation of this order. The FEE, AEEs, and members of the Steering Committee and Task Force shall be full-time Federal Government employees.