

## Solar Grain Dryer Beats High Energy Costs

Solar energy is getting another look from researchers. This solar grain dryer was built as a joint project between farmers and engineers at the University of Saskatchewan.

Leroy Bader, an extension agrologist with Saskatchewan Agriculture and Food and one of a team of people who collaborated on the project, says that tests of the unit proved that it could successfully dry about 3,000 bushels of wheat from 17 per cent moisture to 13 per cent moisture in about four days (under suitable environmental conditions).

"The solar collector design is a 12 by 28-ft triangular shape with the transparent fiberglass face inclined at a 70 degree angle. The bottom and sides are insulated and there are openings on each end for air circulation," he explains. "A 7-hp. centrifugal fan was mounted in the insulated outlet duct to draw warm air from inside the unit and out into the grain bin. We've tested it through three

consecutive harvest seasons and it has worked well."

Thin copper sheets painted flat black were mounted on 1/2-in. plywood and located behind the fiberglass. Bader says aluminum or steel sheets painted black could also be substituted.

Since the prototype was also designed to heat an insulated water storage unit for storing heat to be used on days when the sun is not out, the unit also incorporated a network of half-inch copper tubing attached to copper plates. An anti-freeze solution could be circulated in the tubes to absorb the heat and carry it to the water tank.

The fan costs between \$300 and \$500 and the rest of the dryer cost \$3,000 to build, but that amount could be reduced depending on the materials used. For example, the fiberglass could be replaced with greenhouse plastic sheeting.



**Solar grain dryer measures 12 by 28 ft. and has a transparent fiberglass face inclined at a 70 degree angle.**

According to Bader, the simple design and flexibility of the unit makes it ideal for farmers to economically build themselves.

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## Sawdust Stove Heats With No Moving Parts

If you're looking for a cheaper source of heat, take a look at Paul Schlabach's gravity-feed sawdust burner.

The stove feeds sawdust from a hopper onto a grate in the firebox using no moving parts. Air flow through the grate, which determines the speed at which sawdust burns, is controlled by a highly reliable, non-electronic thermostat. What's more, the stove has a built-in heat exchanger that also has no moving parts.

It's made of several tubes running through the heat chamber at an angle, with the back end higher than the front. "As air in the tubes warms, it rises out the higher end creating a vacuum at the lower end to pull cool air in," Schlabach explains. "There's enough of a draw through the tubes that warm air circulates easily throughout the room with no fan."

To operate the stove, Schlabach says you



**Stove feeds sawdust from a hopper onto a grate in the firebox.**

merely dump sawdust into the hopper, set the thermostat, and then light the sawdust on the grate. Heat from the burning sawdust rises, pulling combustion air up through the grate.

Sawdust drops by gravity onto the grate as needed.

"Lighting the sawdust is easiest with a torch, but I usually just use wadded up paper," he notes.

Schlabach says green (fresh) sawdust seems to work best in the stove, but dry sawdust performs well, too, if a little water is added. "Coarse, dry sawdust has more air pockets. And if the sawdust is too fine, it doesn't flow as well. I've found recently that mixing one part fine and two parts coarse sawdust is best," he says.

His biggest stove has a 46-gal. hopper and puts out more than 180,000 btu. The firebox is made of 1/4-in. plate steel and the heat chamber is made of a 3/16-in. plate. It weighs 605 lbs.

One customer is heating a 20 by 68-ft. greenhouse with two stoves. "He says he previously used a heating system that was rated at 400,000 btu. The sawdust stoves easily maintain temperatures throughout the

greenhouse of 60 degrees or higher, even when it's 0 degrees outside," he says.

While sawdust may not be readily available everywhere, Schlabach says it's usually considered a nuisance to mills and builders who have it, so the cost is usually no more than hauling it away. One hopper full can provide several hours of heat. Even on the coldest days it doesn't need to be refilled more than two or three times a day. During warmer winter periods, it may need to be filled only once a day. "I usually top it off morning and evenings as a routine. Then I can add more during the day if it's really cold," Schlabach says.

Schlabach has been selling sawdust stoves for about a year, having purchased the idea from an acquaintance who came up with it about eight years ago, but didn't want to bother with making and selling the stoves.

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## Tree Saw Cuts, Carries and Stacks

Keeping trees out of pasture has become a real battle for livestock farmers and ranchers, and chainsaws and brush cutters just aren't cutting it anymore.

Farmer/rancher Mark Underwood, Burr Oak, Kansas, is attacking trees head-on with a skid-steer loader and a saw he designed to cut, carry and stack small trees.

"I wanted something that would save time and be easy to maintain," he says. With no moving parts and a replaceable cutting edge, his saw fits the bill. The saw can be fitted with a universal mount to fit onto a skid-steer loader or a quick-tach for a tractor loader as well.

His tree cutter looks like a sickle mower section with a long snout on it. From front to back, it measures 8 ft. Both outside edges are heavily serrated with high carbon hardened steel teeth. If an individual tooth should be bent or broken, it can be repaired or welded back in place.

"To use it, you push the snout against the tree and drive forward," he says. It will cut a tree up to about 14-in. in diameter with just one push. For trees bigger than 14 in. and up to nearly 30 in. in diameter, Underwood says you just have to make multi passes at it on both sides. An integral part of the saw is a wedge that tips the tree away from the tractor or skid steer, and a 6 x 6 ft. grate to augment the tractor's or skid steer's ROPs — just in case the tree should fall the wrong direction.

"One of my criteria was to be able to cut flush with the ground surface, so none of the stump was left sticking up," he says. While the saw was designed to work flat on the ground, you can, if you want, leave a stump as high as the lift on your tractor or loader will allow.

Another of his criteria was making the cutting edge replaceable. Underwood says designing the cutting edge so it would cut quickly and could be replaced was one of the toughest parts of putting the saw together.

The combination of the blade and tractor or loader allows him to cut any tree the saw is capable of felling in a few minutes. "Smaller trees are gone in a matter of just a few seconds," he says.

Once the tree is down, the operator can put the snout under it, pick it up, and carry it off the field. An optional "tweezer grapple" allows him to grab and hold several trees on the snout of the saw. "This is a steel bar with teeth on it. A hydraulic cylinder on it allows you to clamp down on the trees, so they don't fall off the saw while you're carrying them," he says.

The long snout on the saw can also be used to dig around a tree so it can be cut below the soil surface, or to dig out stumps, too.

Another option is a sprayer, with the nozzle mounted under the saw that applies brush control herbicide to the stump and surrounding area after the tree is cut. "This



**Big tree cutter is able to cut flush with ground surface. To use it, you push snout against tree and drive forward. Cuts trees up to 14 in. in diameter with just one push.**

combines another recommended practice for preventing brush regrowth and maintaining pasture productivity," he says.

"I don't recommend the sprayer option if you're going to be using it on a tractor," he says. "It'll be more difficult to see the stump from a tractor seat, so you'll have trouble spraying it."

He's named his saw the Bad Boy Tree Saw. His manufacturing company, Second Look, started producing saws last fall. The saw alone is priced at \$3,700. The sprayer adds another \$500 and the tweezer grapple will cost just under \$1,000. The replacement blades, which come in three pieces, cost \$700.

Contact: FARM SHOW Followup, Second



**Optional "tweezer grapple" allows operator to grab and hold several trees on snout of saw.**

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