MINNESOTA Science
Agricultural Experiment Station
University of Minnesota
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Shifting Feelings About Who Does What

Household roles in modern society are changing. Researchers surveyed how satisfied couples are with the distribution of responsibilities in their family.

It used to be, there was "men's" work and "women's" work. And everybody knew which was which. Husbands and wives may not have liked their roles, but they had no doubt about what society expected of them.

Today, society expects couples to change the traditional role distinctions. Husbands are told to be more nurturing, to do more housework. Wives are told to know more about family finances.

But do men and women really want to change? And, what kinds of couples are most successful in making changes?

Two University of Minnesota Agricultural Experiment Station family social science researchers asked that in a recent study. Telephone interviews with 235 married couples in the seven county Twin Cities metropolitan area provided M. Janice Hogan and Patricia Spaulding with wide ranging data.

Hogan and Spaulding conclude that couples feel the need for change. But nearly half the wives surveyed say they are satisfied with their own and their husband's family roles. This is especially true among older women with fewer children at home.

But when couples do break from traditional roles, most wives want still more change. Women whose husbands are doing more housework now than when they were first married, want their husbands to continue taking on new household responsibilities.

By contrast, most husbands (65 percent) want very little change in either their or their wives' responsibilities. Only 18 percent say they need to greatly increase their own responsibility. These are the youngest men, with the lowest income. Most had several children.

Hogan and Spaulding asked the couples how satisfied they were with the resources available to them, including money, space, time, and energy. They found it wasn't necessarily the richest

Roles *continued on back page*

MINNESOTA Science

Manufacturing Is Key to State's Economic Base

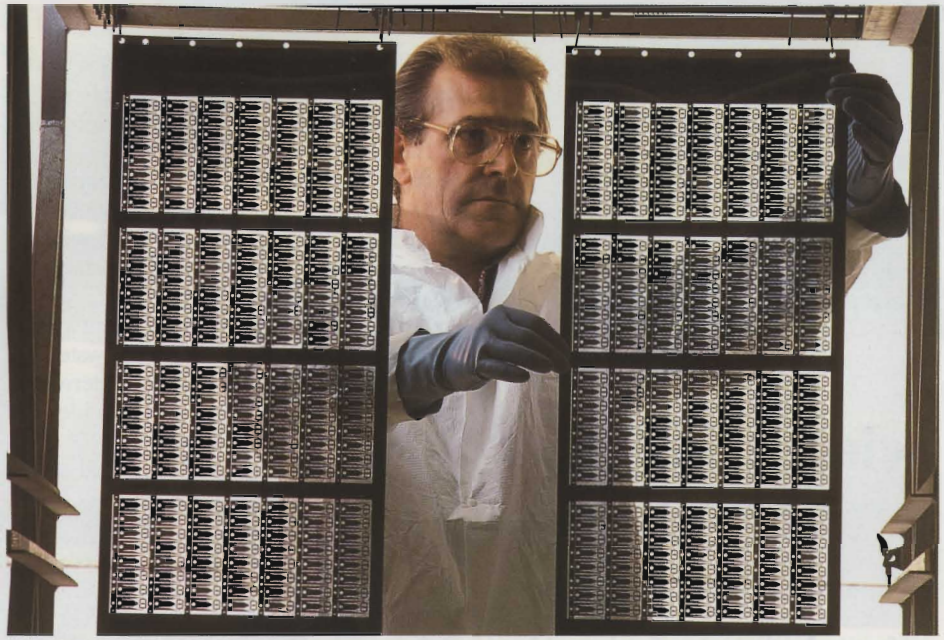
Field and factory have come together to form a more diversified economic base in parts of rural Minnesota.

"In rural areas in a 100- to 125-mile radius of the Twin Cities metropolitan area, manufacturing shares the economic base with farming," says Wilbur Maki, economist with the Minnesota Agricultural Experiment Station.

And the products made in rural areas are particularly dependent on export markets. Over 50 percent of the dollars coming into Minnesota are already generated by manufacturing, and by the year 2000, manufacturing will have become more important to Minnesota's economy than agriculture was in 1950, Maki says.

Manufacturing non-electrical machinery is a growth industry in the state, and computers are an important part. Minnesota produces nearly 10 percent of all computers and related equipment and nearly 4 percent of all non-electrical machinery produced in the United States. This includes engines and turbines, farm machinery, garden and construction machines, computers and peripheral equipment.

"We ship out sales worth $50 billion," Maki says. Manufactured machinery, including electrical, accounts for a large proportion. And $5 billion to $6 billion of the total are sales to buyers outside of the U.S. "We're the Japan of the northwestern Unied States in terms of exports," he says.



Mid-size manufacturing companies have overtaken agriculture as the economic base of greater Minnesota. The production of computer peripherals at this plant is but one example.

Over 1,200 machine manufacturing plants in Minnesota together employ more than 100,000 people. Another 700 plants manufacture fabricated metals such as tools, containers, heating products, and cutlery, accounting for about 40,000 jobs.

"Manufacturing fabricated metals and machinery were natural outgrowths of agriculture in rural Minnesota," Maki says. These industries are especially strong in Greater Minnesota. The state is also strong in manufacturing scientific and controlling instruments.

To support manufacturing growth in rural areas, Maki says five things are businesses, sufficient information, communication and education.

"Public education plays an important role in rural development," Maki says. And most Minnesotans live within 35 miles of an Area Vocational Technical Institute, Community College, State University or branch of the University of Minnesota.

"A prospective small manufacturing plant needs a labor pool of people with high school or higher education. Most new businesses are started by people with 2- or 4-year college degrees."

Minnesota's economic outlook to the year 2000 may depend on the success of manufacturing industries. "But manufacturing in Minnesota depends on trade and is sensitive to business cycles. It can

Why Isn't Everyone Into Sustainable Agriculture?

Experiment Station Releases Three New Soybeans

The Minnesota Agricultural Experiment Station has released three new soybean varieties, Kato, Sturdy, and Proto. Each meets a special need, says James Orf, University of Minnesota agronomic scientist who heads the station's soybean improvement program.

Last year, Orf and other station scientists discovered that Minnesota-grown soybeans average two to three percent less protein than soybeans grown outside the Midwest. This puts Minnesota farmers and soybean processors at a disadvantage. But it is hoped that Kato will help remedy the problem.

Orf says, "Kato is notable for its high protein content—in Minnesota trials, about 1.5 percent more than Sibley and over 2.5 percent more than Hodgson 78."

The outstanding characteristics of Sturdy, according to Orf, include good yield and "standability," and the ability to resist iron chlorosis in high-pH soils. Orf says its yields have been equal to or better than the best yielding varieties of similar maturity.

Proto is a special-purpose variety, whose exceptionally high (at least 44 percent) protein content makes it well suited for the manufacture of human food products, such as tofu. Orf says Proto has acceptable agronomic characteristics, and farmers could contract to grow it for food processors and export, markets that could call for the production from several tens of thousands of acres.

Certified seed of Kato will be available to farmers in 1990 and certified seed of Sturdy and Proto will be

If some low-input farming techniques cost less, provide a better quality of life for farm families, and help reduce erosion and groundwater pollution, why haven't more farmers switched from "conventional" farming to "sustainable" agriculture? The answer, says University of Minnesota agricultural economist Steve Taff, is that despite the potential benefits of sustainable agriculture, our system works against it.

"Farmers are reluctant to adopt regenerative techniques mainly due to inhibiting effects of the institutions—policies, laws and property rules—that have grown up around 'conventional' farming," says Taff, who does research for the Minnesota Agricultural Experiment Station on the effect of public policies on private land use.

For example, the government insures *crop* risk but not *income* risk. "The fear of going broke makes farmers less willing to gamble," he says. "And adoption of sustainable agriculture is clearly a gamble—especially since a fully functioning rotation may take five years or more to establish."

Government price supports provide incentives to concentrate on a handful of crops more than they otherwise would, Taff says. This works against adoption of regenerative farming practices which depend more on rotations with other crops not now eligible for government price support.

Also, farmers are largely immune from pollution control regulations, and are not rewarded for adopting agronomic practices that result in less pollution, Taff says.

Taff believes that if sustainable agriculture is to significantly alter the way Americans grow food, its advocates must address all of these institutional constraints. "It's not enough to convince farmers that sustainable agriculture is the 'right' thing to do, because farmers may not have a choice," he says.

—Jennifer Obst

necessary. These are a qualified labor pool, entrepreneurs interested in starting

be Minnesota's nemesis," he says.

—Jack Sperbeck

available for general planting in 1991.

—Sam Brungardt

Sheep From Across the Border May Be Welcome Imports for Minnesota Sheep Dairying

Animal scientist Bill Boylan imported Arcott dairy sheep from Canada. They are being bred and evaluated for use in Minnesota's potential dairy sheep industry.

Sheep dairying could be a route to extra income for farm families who raise sheep. Sheep milk cheese is both a gourmet product and an alternative for some people who are allergic to cow's milk.

All these are reasons why Minnesota Agricultural Experiment Station animal scientist Bill Boylan hopes his current evaluation of two new Canadian sheep breeds can help Minnesota's fledgling sheep dairying industry. The two-year research project, begun last fall in cooperation with Agriculture Canada, is evaluating the milking potential of the Outaouais Arcott and Rideau Arcott, two breeds developed by Agriculture Canada.

Raising sheep for milk is rare in North America. That's unlike some European countries, where sheep milk produces high quality cheeses, including Roquefort and feta.

Boylan, who heads the project with Agriculture Canada animal scientist J. N. B. Shrestha, believes there's a market for sheep milk, if the sheep produce enough milk.

Boylan has 50 ewes and 6 rams of the two breeds. He is evaluating their growth, reproduction, and wool and milk production. A similar evaluation is under way at the University of Manitoba, but lactation in milking trials is only being measured in the University of Minnesota flock.

The Outaouais Arcott and Rideau Arcott may have arrived at just the right time. "We've been interested in dairy sheep for some time," Boylan says. "But until these sheep arrived, we didn't have access to genes from the East Friesian breed. The Rideau Arcott contains 14 percent East Friesian genes. The East Friesian is internationally recognized for its superior milk production and has been the basis of many high-producing dairy flocks in Europe and the Middle East."

The University of Minnesota was the first public institution in North America to research sheep dairying and the manufacturing of sheep milk cheese. The Arcott flocks at the University of Minnesota are the only ones outside Canada.

A North American Dairy Sheep Symposium will be held at the University of Minnesota July 25-28. Anyone interested in more information can call 612/625-1978, or 800/367-5363.

—Sam Brungardt

MINNESOTA Science

Rainmakers and Robots: All to the Aid of Water Quality Research

In the public arena, scientients now debate the potential for superconductivity and the possibility of room temperature fusion. Such debates focus attention on the process of research. It's a mysterious activity to many. We hear about the breakthroughs and the insights, but how does science actually get done? Here's a look inside some experiment station scientists' labs, where researchers seek sometimes novel solutions to practical problems.

Rainmaking Is a Science in This Laboratory

At least one University of Minnesota laboratory can forecast rain with 100 percent accuracy, provided you don't go outdoors. It's the laboratory of Agricultural Experiment Station soil scientist Satish Gupta. In that laboratory, he and graduate student David Freebairn are so phenomenally accurate because they make the rain themselves.

The researchers are simulating rain to develop better soil management practices, to reduce groundwater contamination from agricultural chemicals.

Their rainmaker uses about 2,000 hypodermically thin needles, spaced about five inches apart, to produce simulated raindrops. The researchers test the impact of these drops on various types of soil by raining them down onto samples 12 feet below.

"We can simulate some kinds of rain, but not all," notes Gupta. "The size of our simulated rain is determined tween the larger particles?" Gupta asks. "If we can understand the mechanism of surface seals, then we can use models to predict the proportion of runoff for a given rainstorm."

That predictive ability would help them determine whether contamination of groundwater is more from runoff water or more from infiltration. "Think of a watershed that is one acre in size, on which we have one inch of rain," suggests Gupa. "If the rain is distributed evenly over the whole watershed, it would probably soak into the soil to a depth of about five inches. But if all that water doesn't go into the soil; if that one-acre-inch of water collects in a one-twentieth acre pond down slope, you have perhaps 20 inches of standing water which has all the nutrients it brought down from the landscape.

"That water, with all those chemicals, is still going to infiltrate,

Laboratory Robot Does Drudge Work With No Complaints

William Koskinen is a robotics innovator, but he's not a mechanical or electronics engineer. He's a soil scientist at the University of Minnesota. Recognizing the value of laboratory scale robots, he has set one up to expand the capability of his lab to keep pace with increasing demand for pesticide analyses of water and soils.

"We're studying the movement of pesticides through soil to groundwater," Koskinen says. "To be able to determine that, we have to do a lot of pesticide analyses. We have to extract the pesticide out of soil and water, and this says his system is relatively unique now, but won't be for long. "I think it's one of the first laboratory robotics systems in a university doing this kind of work.

"But it's the method of the future for doing a lot of this. With the number of samples to be analyzed continually increasing, you just can't afford to staff to do it anymore."

The robot itself is far more similar to heavy duty assembly line robots than to the humanoid robots of science fiction. It looks like a big table with a central arm and a lot of different stations set up around it.

by the size of the needles. We are stuck with a size of rain, but we can vary the intensity by adding more pressure."

Simulated rainfall lets Gupta and Freebairn study how soils disintegrate under rain's impact, and how soil particles move when soil erodes. They are currently working on soils like those found in southeastern Minnesota.

"We're looking at how the water moves across the landscape. Is it really moving as runoff, or is it going through the soil and then going to the groundwater?" Gupta asks. The researchers' idea is that runoff from slopes concentrate at low points of a landscape and infiltrate from there.

Gupta says southeastern Minnesota soils are high in silt. Rain crashing down onto bare soil creates a kind of seal that enhances runoff. In the lab, he and Freebairn are trying to determine how that seal forms.

"How does that soil disintegrate? How do the small particles fit in be-

though at that lower part of the landscape it's more likely that the 20 inches of water is going to saturate the soil to about 8 feet, and that's more likely to go to the groundwater.

Satish Gupta (left) and David Freeman track infiltration of simulated rainfall on three soil surfaces.

"Water is going to go to the soil whether it goes uniformly through the landscape or it concentrates at one place, and then infiltrates. Our idea is to have uniform movement.

"The more of that water that goes directly into the soils, then the better the chances that nutrients and chemicals are going to be held back by the soils rather than carried down with runoff."

The bottom line for Gupta and Freebairn is finding soil management practices to both minimize erosion and keep agricultural inputs where they are applied, in the upper levels of the soils where the plants can use them.

—Larry Etkin

Two New Semidwarf Wheat Varieties Released

The University of Minnesota's Agricultural Experiment Station and the U.S. Department of Agriculture have released Vance and Minnpro, two semidwarf hard red spring wheat varieties.

Vance is notable for its high yields while Minnpro excels in protein content, says Robert Busch, USDA-Agricultural Research Service wheat geneticist who heads the experiment station's wheat improvement program.

Both exemplify the improvements that have been made in protein content, yield and agronomic traits since the Minnesota Agricultural Experiment Station introduced Era, its first semidwarf variety, in 1970, Busch says.

—Sam Brungardt

LeEtta Jarvis teams up with a laboratory robot to help water quality researchers analyze movement of pesticides through soils.

is very expensive and time-consuming using manual labor," he says.

Koskinen's laboratory robot and one worker can prepare more than twice as many samples as three or four student workers employed full-time. It processes up to 200 samples a week and will pay for itself in about three years from the savings in labor, he says. Those savings are significant. The system cost $70,000.

"But even more important is that while the robot does everything in the preparation for pesticide extraction, and works all night, we've dramatically increased the precision of our work," Koskinen says. Sample variation of 15 percent with human labor dropped to 2 percent with the robot.

Development of the robot was financed by the Minnesota Agricultural Experiment Station and the USDA Agricultural Research Service. Koskinen

The arm picks up a tube with a soil and water sample and mixes it. It puts it into a centrifuge, pulls it back out, pulls out the extracted solution of pesticide, cleans it up, and runs it through a number of different steps. "The end product is a small amount of solution in a vial that's automatically capped and ready to go for analysis," says Koskinen.

"Our system has different hands to do different things. If it has to pick up a large tube, it goes and puts a big hand on the arm, and then if it has to pick up a small tube, it parks the big hand and picks up a small hand."

After a sample is prepared, a lab assistant carries it to a second lab where another automated system analyzes the sample. Essentially, it's a two-robot system with a human go-between and, of course, another human evaluating the final analyzed result.

—Larry Etkin

Tracking Groundwater Quality Easier with Digital Soil Surveys

Computer technology is making Minnesota's long, technical county soil survey reports more up-to-date and user friendly. And, it's adding new information on water, to aid in determining areas of groundwater quality sensitivity.

The PC-based system is already available in about 30 counties, mostly in the agricultural belt of southern and western Minnesota. "We do it on an individual contract basis with each county," says project operations coordinator Jim Harris, "so having the entire state on line is a ways away."

"This system is essentially the county soil survey report, which exists for most counties in the state, put on computer for quicker access and easier use," he says.

"One of the big areas of interest around the state is water quality and that's where this system has a big advantage over what existed before. We've added a whole set of water quality interpretations to our software."

The on-line data base, one of the first in the country, can also be continually updated as new information becomes available, an impossible task for a printed publication. The project was initiated and developed by soil scientists Pierre Robert and Richard Rust. It was jointly funded by the Minnesota Agricultural Experiment Station and the Legislative Commission on Minnesota Resources.

—Larry Etkin

Holstein Beef: Lean and at Popularity Peak

In the 1930s, a farmer feeding Holstein steer for the meat market might have been thought a bit strange. Holsteins, a dairy breed, by tradition were not for beef production.

"A self respecting cattle feeder simply didn't feed Holsteins," says retired Minnesota Agricultural Experiment Station animal scientist Ken Miller. "That was like a Minnesota fisherman going out for bullheads."

But demand for leaner meats has turned that proposition on its head, says Hugh Chester-Jones, Miller's successor at the University of Minnesota's Southern Experiment Station at Waseca. It may be only a temporary blip in the beef market, but today, he says, demand for Holstein beef is at an all-time high. And demand may grow substantially in the short term as marketing improves.

The improved meat qualities of Holsteins are an unintentional byproduct of developing more productive dairy cows. Offshoots of that work are genetic traits toward lean muscle tissue.

As a consumer product, Holstein beef was just waiting for our increased health consciousness, and our demands for leaner meat.

Dairy breeding is done mostly with artificial insemination, which allows more cows to be bred to the few bulls with the most productive offspring. That means most bull calves aren't needed anymore.

About 400,000 dairy bull calves are born in Minnesota each year, Miller says, strictly as a byproduct of maintaining our dairy cow herds. Some are raised for veal, but that market isn't big enough to use them all.

That's why back in the 1950s, Miller says, he started getting questions

Holstein steers produce lean beef, a product in demand in today's market. Perry Rieck feeds the University's research herd at the Southern Experiment Station, Waseca.

mediocre for both characteristics."

There's no genetic reason why a dual purpose animal can't be bred, both Miller and Chester-Jones agree. But Chester-Jones says, "we've found here that there is too much variation in genetics in the Holstein market to make that a short term proposition."

"When you select for a lot of traits, it's very difficult to improve or even maintain any of the traits," adds Miller.

The market may not wait for better bred Holstein beef. "Down the road there is going to be more and more competition from traditional beef and exotic beef for the Holstein lean market," says Chester-Jones. "I think the larger beef breeders in this country are going to refine their genetics to meet the market needs. The Holstein steer, I think, is going to reach a peak or plateau out, in terms of marketability, within ten years."

Different arguments lead Minnesota extension meat specialist Richard Epley to similar conclusions. Though markets for leaner meats are currently expanding, surveys still show "taste" topping the list of what consumers consider most important about meats. And "taste in meat is very strongly related to the fat content, the marbling," he points out.

But there is a split market, and opportunities to an unknown degree, for

Holstein *continued on back page*

Some Vegetables Have Better Vitamin "Staying Power"

Concerning vitamins, not all vegetables are created equal. For example, some vegetables are especially high in vitamin C, such as broccoli, cabbage, collards, brussels sprouts, kale, cauliflower and mustard greens. Now we know that some vegetables are also better at holding on to what they've got.

That's what Agricultural Experiment Station food scientist William Shafer and research assistant Julie Albrecht have found. "Cruciferous vegetables that are high in sulfur—broccoli, brussels sprouts, cabbage and cauliflower—retain 75 to 100 percent of their ascorbic acid after three weeks in storage," Shafer says. "In contrast, the noncruciferous vegetables we tested that are relatively high in sulfur—spinach, green peas, asparagus and green beans—retain only 17 to 75 percent."

"We've also noted great differences in the ability of varieties of a particular vegetable—say broccoli—to resist wilting and to retain color and vitamin C when kept in refrigerated storage over time," he says.

Shafer and Albrecht collaborate with Luther Waters, a University of Minnesota horticultural scientist on ways to maintain the quality of vegetables after harvest.

Shafer says the produce industry may gain new sophistication as more is learned about nutrient composition and retention. For instance, seed companies may intentionally develop vegetable varieties high in vitamins or other health-promoting compounds.

—Sam Brungardt

from southern Minnesota farmers. The questions were all about the feeding and management of Holstein steers.

"The reason they were interested at that time was that western feeder steers, the traditional beef and beef cross type, were quite expensive. They could buy Holstein steers for about half the cost."

For a long time, the experiment station was actively trying to breed cattle good for meat and milk production. "They never did come up with a good desirable dual purpose animal," said Miller. The results, he said, "were just

IN PRINT

While U.S. milk production continues to increase, Minnesota's share of that production has declined since its peak year in 1965. There has been a decline in the number of dairy farms and dairy cows in Minnesota.

A new publication of the Minnesota Agricultural Experiment Station profiles Minnesota's dairy producers. This Minnesota Report compiles the results of an in-depth survey of nearly five percent of Minnesota's dairy farms. It paints statistical pictures of Minnesota dairy operations: their size, productivity, equipment and facilities, management practices and other characteristics.

Copies of *The Minnesota Dairy Farm Sector: Summary of the 1988 University of Minnesota Dairy Farm Survey* (Item no. AD-MR-3919) are available through the Distribution Center, 3 Coffey Hall, University of Minnesota, St. Paul, MN 55108. Cost is $4.00 + 6% sales tax, prepaid. Please include title and item number when ordering.

—Larry Etkin

Stretching Minnesota's Aspen Resource

Aspen is big news in Minnesota. The billion dollar expansion of the panelboard industry makes headlines in the business pages. Roland Gertjejansen and other University of Minnesota Agricultural Experiment Station investigators are working hard to see that this northern Minnesota boom industry doesn't go bust.

And the industry has been booming. "Ten years ago there was one waferboard plant in the U.S.; it was located in Minnesota. Now, in 1989, there are 30 structural panelboard plants in the United States and 5 are in Minnesota," says Gertjejansen. It's good for the economy, he says, but "this unprecedented growth, plus expansion of the paper industry, has placed great demands on the aspen resource."

Heavily dependent on aspen, these industries will need options to continue producing while a younger generation of trees mature. "There will be a shortage around the year 2000 that may last for 20 years," Gertjejansen says.

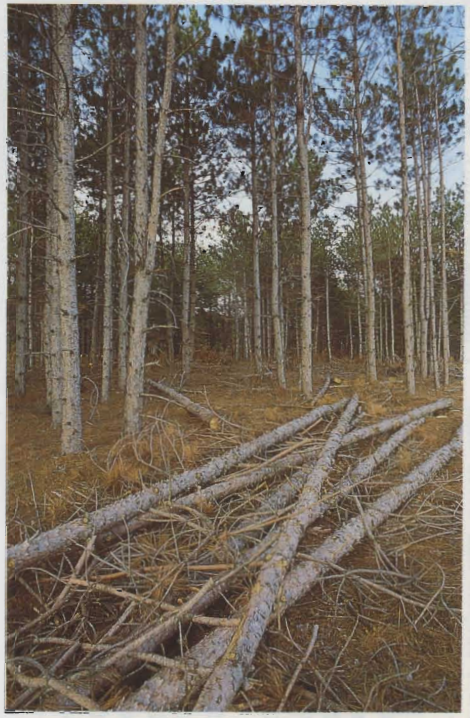
"Because paper generates more income per cord of aspen than does oriented strandboard (OSB) or waferboard, the board plants will be forced to use alternative species." Gertjejansen, a forest products researcher, helped during the early establishment of the waferboard industry in Minnesota.

Today, his hot press in Kaufert Laboratory on the St. Paul campus turns out sample boards from birch, plantation red pine and balsam poplar. All are underutilized species he uses with aspen to make waferboard and OSB equal or stronger than totally aspen boards.

In Minnesota, less than a third of the birch that should be cut each year is harvested, and 70 percent of that is cut for fuel and burned. This year, mill managers will have an opportunity to try a formula for a birch core waferboard developed by Gertjejansen, David Ritter, and Robert Kroll, all in the Department of Forest Products.

Their birch formula requires wafers and strands thinner than the aspen. "Thin paper birch core wafers and strands resulted in waferboard and OSB with properties that exceeded those of the all-aspen boards," Ritter says.

Red pine wafers also work as a mix for structural panelboards. The higher resin content of the pine caused "blows" in some panels. But Gertjejansen and Ritter find that pine performs better as narrow wafers that allow resinous gases formed during manufacturing to escape easier.



Red pine in overcrowded plantations may find use in waferboard and OSB, to supplement aspen.

Where will the red pine come from? About 18,000 acres of immature pine are scattered through central Minnesota. According to John Krantz, DNR Forestry Division, these 20- to 40-year-old trees are too small for lumber and no other current market exists for all the "juvenile wood" that must be thinned to give the remaining trees room to grow.

Gertjejansen has also worked with balsam poplar. It is related to and grows alongside aspen, but has a much higher moisture content. This means it must be handled separately or the moisture will affect the bonding of waferboard.

Balsam poplar also is very unpredictable when waferized. It often produces fine, fibrous material that "gunks up" manufacturing. Gertjejansen's team is collecting samples from different locations to see if this machinability problem is determined by a specific physical property of balsam poplar.

"If it is," Kroll explains, "our next step is to see if the characteristics are related to a specific soil type, tree size, or other trait. If so, then selective logging can be practiced."

These options to the looming aspen shortage may not be used soon. However, the structural panelboard industry in northern Minnesota may depend on them in the next century. "The paper birch and red pine results illustrate that it is possible to reduce the aspen consumption by a board mill and also produce a superior product," Gertjejansen concludes. "This is going to be extremely important when the aspen crunch arrives."

—Dave Hansen

Roles *continued from front page*

couples who were the most satisfied. Those couples that felt content with their resources wanted the greatest change in family roles. More women than men saw their resources as adequate.

What if one spouse wanted change and the other didn't? Interviewing spouses separately, and comparing responses, Hogan and Spaulding found that 59 percent of the couples had "complementary preferences." Another 27 percent of the couples had relatively minor differences.

Only 14 percent of the couples were "highly disparate" in their preferences. Some of these couples had wives wanting major changes with the husband preferring the status quo. For others, each spouse simply wanted less responsibility only for himself or herself.

Will hopes for change translate into action? We'll know in a few months, because followup interviews are now being done.

"We'd like to see, over time, how these couples cope," said Hogan. "Especially for the highly disparate couple, we want to see how they negotiate the differences and what changes, if any, result."

—Evelyn Anderson

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Pass the. . .What?

Looking for a way to dazzle your guests at your next dinner party? Try this menu: green salad with canola dressing; amaranth crackers and fava-bean soup; stir-fried shiitake mushrooms, tempeh and broccoli; bison roast; lupine pasta; triticale bread and crescent rolls filled with sweet adzuki bean paste.

These out-of-the-ordinary foods were on the menu of a "Diversity Dinner" put on by alternative crop researchers last winter on the St. Paul campus.

The dinner acquainted University of Minnesota faculty, staff, and students with the variety of foodstuffs that can be produced in the state. Sponsored by the Center for Alternative Plant and Animal Products, it also gave some researchers a look at their crops from a new perspective—from over a stove.

"Our aim was to stimulate interest and involvement in the Center and in these food products, which represent new or potential industries," says agronomic scientist Dan Putnam. He conducts research on new and uncommon crops for the Agricultural Experiment Station.

The Center exists partly to research a product's potential uses, says Putnam. Researchers put this idea on the table at the "Diversity Dinner," and it tasted fine.

If you'd like copies of their recipes, write: the *Minnesota Science* Editor, 405 Coffey Hall, University of Minnesota, St. Paul, MN 55108.

—Sam Brungardt

Holstein *continued from p. 4*

leaner Holstein cuts. "Historically, retailers have been on a Choice beef program, which is what they have felt the consumer wanted," says Epley. "Now, more and more retailers are offering two grades, Choice and Select, recognizing that some consumers want the marbling and the taste they get in Choice and others want less marbling and less fat."

"The whole country has gone Holstein-beef crazy basically," notes Chester-Jones. "I heard something like 300,000 calves are leaving the Wisconsin and Minnesota area and going to feed lots in the other parts of this country."

"More and more people are getting on the Holstein bandwagon, recognizing that there is more understanding through research of how to feed them. You've got to feed them a high energy diet to make money in a normal year."

So for the moment, our surplus midwest Holsteins enjoy a premium position in the meat marketplace. And while dairy beef production will continue as a dairy by-product for at least some time, Chester-Jones, Miller and Epley agree that dairy beef will find its market niche.

"Acceptance among cattle feeders may never be total, but I think people are realizing that if they can make money with these things, and the market is there, then they'll sacrifice their pride a little bit in favor of capitalistic values," concludes Chester-Jones. In value and popularity, the Holstein steer may be more like the Minnesota walleye than the bullhead.

—Larry Etkin

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