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Center for Sustainable Agricultural Systems Newsletter

January-February 1997

SARE Producer Grants Due May 1

Farmers and ranchers interested in exploring new possibilities for higher profits, environmental stewardship, or community development have the opportunity to do so with funds for research and education projects from the USDA's North Central Region (NCR) Sustainable Agriculture Research and Education (SARE) Producer Grant Program.

Over 160 producer grants have been awarded in the NCR since the inception of this competitive grant program five years ago. This year, \$200,000 is available — up to \$5,000 to individual producers investigating any sustainable practice or concept and up to \$10,000 to groups of producers proposing creative marketing projects.

Producers must reside in the 12-state region: IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI. Applications are due May 1, 1997. Funds will be available in mid-fall for the 1998 crop production season. Call the NCR SARE Office, 402-472-7081, or e-mail sare001@unlvm.unl.edu for an application.

New Sustainable Agriculture Information Retrieval Service On the Internet

Ecological Agriculture Projects (EAP) at McGill University in Canada is launching a unique new sustainable agriculture information retrieval service. It is a membership-based organization, providing a full range of information services. EAP is home to one of the world's largest collections of materials on sustainable agriculture. Founded in 1974 by Dr. Stuart Hill, the EAP collection consists of nearly 100,000 articles, more than 2,000 books, and hundreds of journals and newsletters. It has been used regularly by farmers, gardeners, researchers, extension agents, business people and consumers to further their knowledge of ecological and alternative farming practices. The collection is going on-line in spring 1997. Promotional material says it will be the most sophisticated ecological agricultural site on the Internet, and will include a mix of full texts and excerpts from key documents selected from its collection, back issues of important farm magazines and newsletters, all of EAP's writings, and the syntheses and fact

sheets prepared for its Agro-Bio and Eco-Info services. In addition, it will be hosting on-line conferences. At the same time, it will launch another new service, providing members with commentary on sustainable agriculture news and events. Part of the site will be freely accessible to all Web browsers.

For more information, including membership costs, see <http://www.agrenv.mcgill.ca/Extension/EAP>

RR Soybeans: Delaying the Inevitable?

Margaret Mellon, editor of the newsletter *The Gene Exchange*, attended an October 1996 conference on biotechnology. Monsanto's new product, Roundup Ready (RR) soybeans, dominated discussions. The following is excerpted from her column.

* * *

The scientists in the room agreed that the RR soybeans will work to control weeds and perhaps lower costs in conventional systems — for the short term. But they also pointed out that sooner or later weeds will begin to develop resistance to Roundup and more applications of the herbicide will be required. Increasing use of Roundup, of course, will likely increase the rate of herbicide resistance development and pretty soon, farmers will again have lots of weeds and even fewer weed control options.

At that point, according to the scientists, farmers will have to turn to crop rotation, innovative cultivation techniques, intercropping, and other methods for weed control. These methods are harder to adopt than a new variety of soybean, but once adopted, work reliably and safely over the long term.

From my perspective as a consumer and environmentalist, I could not help but wonder why we are waiting.... We should have started down the road of making it possible for farmers to permanently reduce the use of toxic chemicals years ago. Instead it looks like we may need to wait for the failure of yet another silver bullet.

Source: *The Gene Exchange*, December 1996

Economic, Environmental and Sociological Effects of Whole-Farm Production Systems in Eastern Nebraska

*First in a four-part series: **Classifying Producers/Production Systems***

[With primary funding from an Agriculture in Concert with the Environment (ACE) grant, a team of UNL researchers conducted one of six regional studies that will be aggregated to assess the national impact of moving toward a more sustainable agriculture. The goal of the Nebraska project was to study existing whole-farm system groups along a continuum from “conventional” to

“alternative” and compare the economic, environmental, and sociological performance/characteristics of each group. Team members of the 1993-1996 study were Glenn Helmers, Kevin Bernhardt, John Allen, Alice Jones, and William Powers. For more information, contact Pam Murray in the CSAS office.]

Cluster Analysis

A classification method was needed to identify farm systems originating from surveys for rigorous comparison research. The method used was cluster analysis. The method proved to be successful with 59 crop production practice variables being cluster analyzed into five groups. The groups ranged from a virtually all irrigated monocrop corn system to one that is near organic.

This classification method statistically and without *a priori* knowledge (1) classifies farms into homogeneous subgroups based on similarity of their production systems, (2) develops subgroups along a continuum from “conventional” to “alternative,” (3) conducts the classification such that results would be suitable for statistical analysis, and (4) results in an unbiased mathematical classification of the data. What follows are the results of the cluster subgroups:

Irrigated-Monocroppers: This group has the highest feedgrain base, and are highly dependent on chemical means of weed and insect control. They also depend largely on synthetic sources of nitrogen fertility, especially anhydrous ammonia, and virtually no nitrogen from organic sources. Ridge or conventional tillage is the most common tillage system. This group also used crop consultants and soil testing more than any other group, has one of the higher education levels, and has the most conventional score on the Alternative-Conventional Agricultural Paradigm (ACAP) scale.

Young-Business-Technocrats: This group is the youngest, and tends to be more aggressive in employing new technologies for both business and production aspects of their operations as evidenced, in part, by their much larger use of computers and no-till tillage systems. Common rotations for this group are corn-corn-soybeans on irrigated acres and corn-soybeans on dryland. They monitor nitrogen application more than other groups and are second for soil testing and crop scouting. They have the largest average farm size, but own less percent of their farm compared to the other groups. This group is also one of the more educated groups and tends to use off-farm sources of information more than any other group.

Integrated: The integrated group employs a spectrum of practices. They use synthetic fertilizers and chemical means of pest control, but they are also among the highest users of natural nitrogen sources and organic means of pest control. Whereas the young-business-technocrats are early adopters of mechanical type technologies, the integrated group is more likely to adopt on-farm or method type technologies such as strip cropping, parasitic means of pest control, and double, inter, or relay cropping. They generally employ conventional tillage, but are much more experimental with alternative cropping patterns and rotations. They receive almost half of their income from livestock, and their paradigmatic view of the

world tends to be more toward the alternative point of view. Finally, they and the near organic group are the only groups to have some affiliation with the Nebraska Sustainable Agriculture Society.

Urban-Fringe (Traditional): The urban-fringe group is the hardest to label. This group seldom was characterized as being the highest or lowest user of any practice with the exception that their percent of income coming from the farm was 15-20% lower than any of the other groups. They tended to be fairly conventional with respect to nitrogen and chemical use, but were further towards the alternative side of the ACAP scale than either the irrigated-monocroppers or the young-business-technocrats. They also tend to use alfalfa in their crop rotations, which is more in keeping with the integrated and near-organic groups. Another interesting characteristic of this group, and the source of their name, is that they tend to be located around major metropolitan areas, which may explain the higher level of household income coming from off the farm and smaller farm size.

Alternative-Conventional Agricultural Paradigm (ACAP) Scale

A statewide study of Nebraska agricultural producers was used to test whether a relationship exists between producers' world view/paradigm and the actual production systems they employ. Assessing the linkage for areas of attitudinal commonality or divergence can contribute to a better understanding of the nature and sources of conflict between conventional and alternative agriculturalists. The ACAP scale was developed by Curtis Beus and Riley Dunlap to determine how adherents of the (two) camps see the agricultural world and, in the process, shed light on the roots of agricultural policy debates. Their purpose was to develop a tool for determining the degree of divergence between alternative and conventional agriculturalists, for identifying the elements of the debate over which there is the greatest (and least) divergence, and for examining the degree to which each camp holds consistent positions across these elements. Study results indicate that, overall, a relationship does exist. Further, conventional vs. alternative paradigmatic views generally correlate with the appropriate conventional vs. alternative production system. Not surprisingly, divergence of opinion was greatest with respect to how food and fiber should be produced. For example, the question with the most divergence between the conventional and alternative groups was that farmers should use natural fertilizers and production methods vs. using synthetic fertilizers and pesticides. Perhaps more interesting for policy development than where divergence occurred is where there was commonality. Farm operators in today's social climate are often stereotyped. Conventional producers are purported to be anti-environment and anti-community while alternative producers are radicals that advocate a complete restructuring of agriculture. However, results do not support either view. In fact, no matter what camp they adhere to, producers appear to share similar long-term goals for agriculture. All producers scored conventionally with the views that farming should be handled as a business with the aim of earning an above average standard of living, that U.S. agriculture is the most successful in the world, and that modern agriculture is a minor cause of ecological problems.

All groups scored on the alternative paradigm side of the scale with respect to farmland being farmed so as to protect the long-term productive capacity of the land even if this means lower profits, that farm traditions and culture are essential for good farming, and that healthy rural communities are essential for modern agriculture's future success.

Editor's Note: The second article in this series will address the economic aspects of the study.

Southern Region Meets to Discuss Sustainable Agriculture Education

“Sustainability is a direction rather than a destination, like a star that guides the ships at sea but remains forever beyond the horizon. However, sustainability can still be an important guiding principle.”

John Ikerd, University of Missouri, used this metaphor to begin his keynote address at the Southern Region Professional Development Program (PDP) meeting in Gainesville, Florida, January 15-16. Ikerd described the many dimensions of sustainable agriculture and strategies for management. He asserted that the texts for understanding and teaching the fundamentals of sustainable agriculture already have been written by people outside the production mainstream.

Several directions emerged in group discussions about the future of PDP in the South:

- Expand networking among Extension, commodity organizations, nonprofits, and others
- Improve access to information on sustainable agriculture education
- Broaden the base of stakeholders
- Gather and publish success stories to increase credibility

The next morning a diverse group spoke on their perspectives of PDP. Michael Sligh, with Rural Advancement Foundation International, challenged the audience to think of future issues when designing the call for proposals. Clack Garland, University of Tennessee, and Steve Isaacs, University of Kentucky, recounted the trials and successes of forming a two-state team to develop a sustainable dairy systems manual. Tom Trantham, a dairy farmer from South Carolina, praised Extension for its past help, but said the organization needed to commit more time and effort to sustainable agriculture education. A proceedings of the meeting will be available from ATTRA, 800-346-9140.

Submitted by Heidi Carter

Did You Know...

A fall 1995 survey indicated there are 29 universities in the U.S. that have an agroforestry program. To obtain a directory listing detailed information about each program, call Clover Shelton at the National Agroforestry Center, 402-437-5178, ext. 14.

Integrated **F**arm

Windbreaks Increase Pepper Yields

A bell pepper evaluation was conducted on the Integrated Farm at the UNL Agricultural Research and Development Center in Ithaca, Nebraska during the summer of 1996. Our objectives were to determine if cultivars responded differently to production under wind-protected culture than to production under more open conditions, and to identify cultivars that show promise for high yields of marketable fruit of excellent size and quality.

A key quality factor in bell peppers is wall thickness, which is reflected in the average weight per fruit. Genetics, cultural practices, and temperature affect wall thickness. This past summer was atypically cool for Nebraska and contributed to the excellent quality in the peppers, since high temperatures contribute to thinner walls.

On each harvest, we picked from an average of 3.3 plants/sq. ft. in the sheltered plot but only 1.3 plants/sq. ft. in the exposed plot even though the stand counts were identical. A significant factor in the reduced yields from exposed plot vs. sheltered plot was the much more severe development of bacterial leaf spot in the wind exposed plants. Wind abrasion provides entry points for this devastating disease. The genetic leaf spot resistance in cultivars such as 3XRCamelot held up in our situation. Weekly copper sprays held the disease in check in the sheltered plots, and infestation was much less severe.

Continuous data recorders monitored environmental conditions in the plots.

Unfortunately, several weeks of wind data were lost due to malfunctioning. We normally obtain roughly 47% reduction in wind speed in the zone 1-2X the height of the windbreak, which was the location of the pepper plot. There were very high winds during the first week of July, 3 weeks from transplanting. From transplanting through the fifth harvest, the seasonal accumulated air temperature was 43% higher in the sheltered area. In our heavy clay soil, the soil heat unit accumulation, measured 3 inches deep, was 61% higher in the sheltered areas. Wind significantly reduced plant height, the number of flower buds initiated, and the number of open flowers and fruit set. Fruit set four weeks after transplanting indicated significantly higher numbers of reproductive structures on plants in the

sheltered plot. This early advantage carried through to the seasonal harvest. Five weekly harvests were made between July 31 and August 30. There was 63% more early (harvest 1+2) peppers and 358% more total marketable peppers in the sheltered plots compared with the exposed plots. No cultivar showed a unique response to shelter (nonsignificant interaction of treatment and cultivar), thus the primary differences in yield were due to shelter and cultivar acting independently on yield. Cultivars that produced good early yields were Vidi, King Arthur, Gator Bell, Renegade and North Star. Vidi is a very elongate bell pepper; Gator Bell, Renegade, and King Arthur are somewhat elongate; and North Star is a square blocky bell. The average weight per marketable fruit is indicative of both size and wall thickness. Individual fruit size is also a function of how much total fruit is on the plant. There were significantly more culls due to fruit shape from the sheltered plants, mostly because the fruit became crowded on the plant. When sheltered, Keystone Resistant Giant #3 produced the heaviest average fruit weight (8.2 ounces), and when exposed, Gator Bell averaged 8.4 ounces for the heaviest fruit. On average, cultivars producing fruit averaging at least 7.5 ounces include Camelot and X3RCamelot, Galaxy, Elisa, KRG#3, Clovis, and Gator Bell. The average bell pepper fruit from the sheltered plot was 30% heavier than from the exposed plot. Overall, there were more culls from the sheltered plots because there was more fruit! Significant increases in culls in sheltered production were due to shape, insect damage (mostly grasshopper), and hail damage which occurred between the first and second harvest.

In summary, weather conditions, cultural practices, and harvest timing all affect marketable yields. Our yields, while approximately the U.S. average, were not competitive with major production areas. The higher yielding cultivars, when grown under sheltered conditions, come the closest to the desired 20,000 lb/acre marketable yield. The use of black plastic mulch and higher fertilization rates if combined with drip irrigation and sheltered production may improve yields. We anticipate repeating this study in 1998 using fewer cultivars and larger plots.

Submitted by Laurie Hodges

Editor's Note: For more detailed information on this study, contact Laurie Hodges, 402-472-1639, hort034@unlvm.unl.edu.

“The first endangered species act is where Noah is asked by the Creator to take two of every kind and preserve their lineages.”

Dr. Calvin DeWitt
Director, Au Sable Institute of Environmental Studies

Resources

Sustainable Practices for Vegetable Production in the South. \$28.95 + \$4.50 s&h. Covers both the concepts of sustainable agriculture and specific technical information on how to implement these concepts in the southern U.S. Focus c/o PBS, PO Box 390, Jaffrey, NH 03452, 1-800-848-7236, pullins@seacoast.com, <http://www2.ncsu.edu/sustainable/>

Biological Control Web Page. Center for Integrated Pest Management and Consortium for International Crop Protection. Provides links to biological control organizations, databases and other web sites with information about biological control. <http://ipmwww.ncsu.edu/biocontrol/biocontrol.html>

Direct Marketing Resource Notebook. \$20 (+ 5% for Nebraska residents). Produced by the Midwest Sustainable Agriculture Working Group. Available from Nebraska Sustainable Agriculture Society, PO Box 736, Hartington, NE 68739, 402-254-2289.

Alternative Farming Systems — Economic Aspects, March 1993-June 1996. Free. Bibliography. Alternative Farming Systems Information Center, National Agricultural Library, 10301 Baltimore Ave., Room 304, Beltsville, MD 20705-2351, 301-504-6559, afsic@nal.usda.gov, <http://www.nal.usda.gov/afsic>

New Partnerships for Sustainable Agriculture. \$14.95 + \$3.50 s&h. World Resources Institute Publications, PO Box 4852, Hampden Station, Baltimore, MD 21211, 1-800-822-0504, ChrisD@wri.org.

Integrated Animal Waste Management. \$20 + \$3 s&h. Council for Agricultural Science and Technology, 4420 West Lincoln Way, Ames, IA 50014, 1-800-375-CAST, cast@cast-science.org.

Proceedings: Fourth North American Agroforestry Conference. \$35 + \$5 (\$10 non-U.S.) s&h. Sections of the proceedings from the July 1995 conference in Boise, ID include: Agroforestry Potential, Biology of Temperate Agroforestry Systems, Economics of Agroforestry of North America, Evolving Systems for Varying Temperate Conditions, Riparian Buffer Strips, Silvopastoral Systems in Temperate Zones, Temperate Zone Alleycropping and Intercropping, and Windbreaks and Shelterbelts. Conference Proceedings, Attn. John Ehrenreich, College of Forestry, Wildlife, and Range Sciences, U. of Idaho, Moscow, ID 83844-1135, 208-885-7600, johne@uidaho.edu.

Social Capital and Sustainability: the Community and Managing Change in Agriculture (22 min. video). \$20. Demonstrates how social capital and community are critical for managing change in agriculture, as well as how sustainable agriculture contributes to vital rural communities. Extension Distribution Center, Iowa State U., 119 Printing and Publications Building, Ames, IA 50011-3171, 515-294-5247, pubdist@exnet.iastate.edu. Specify publication EDC-88.

National Organic Research Policy Analysis Project. \$15 donation requested. Final report of two-year study that reviewed the “organic content” in USDA’s agricultural research programs. Organic Farming Research Foundation, PO Box 440, Santa Cruz, CA 95060, 408-426-6606, research@ofrf.org

Successful Whole Farm Planning: Essential Elements Recommended by the Great Lakes Basin Farm Planning Network. \$6. Report articulates the consensus of a diverse group of 120 farmers, nonprofit groups, researchers, and agency staff from seven states and Ontario who are working together to explore, test, and evaluate different approaches to whole farm planning. The Minnesota Project, 1885 University Ave. West, Suite 315, St. Paul, MN 55104, 612-645-6159, water007@gold.tc.umn.edu. Or view the text at: <http://www.centers.agri.umn.edu/misa/mnproj.html>
Also available on this web site are past issues of The Whole Farm Planner, the bimonthly newsletter that explores innovations, experiences, and policies related to whole farm planning.

Study Associates Nitrate in Drinking Water with Greater Cancer Risk

In a study published in the September, 1996 issue of the journal *Epidemiology*, scientists from the University of Nebraska Medical Center in Omaha and Johns Hopkins University in Baltimore assessed the average amount of nitrate consumed daily in tap water by Nebraska residents diagnosed with non-Hodgkin’s lymphoma (NHL), a cancer of the lymphatic system, and by a control group of persons without the disease who lived in the same area. Both groups used public water supplies. The study concluded that persons with NHL were twice as likely to be in the group that consumed the highest levels of nitrate from their drinking water as those without the cancer.

One advantage of the new study is that the researchers calculated nitrate consumption levels for each person rather than simply comparing cancer rates in large populations with differing nitrate levels in their water supplies.

“This is one of the first epidemiologic studies to suggest a link between drinking-water nitrate and risk,” said Mary H. Ward, Ph.D., the study’s lead author.

However, it is uncertain whether the findings truly reflect the effect of nitrate, she added. An alternate possibility is that nitrate exposure is simply a surrogate or “marker” variable that is correlated with another NHL risk factor that was not directly measured in the study.

Since 1973, incidence of NHL in the U.S. has increased about 75% — one of the largest increases among major cancer sites.

The article from which this excerpt was taken was provided by the Cancer Information Service, which operates a nationwide telephone service for cancer

patients and their families, the public, and health care professionals. The toll-free number is 1-800-4-CANCER.

Primary Source: M.H. Ward et al. Drinking Water, Nitrate and the Risk of Non-Hodgkins Lymphoma. *Epidemiology*, September 1996.

Secondary Source: Nebraska Sustainable Agriculture Society Newsletter, Winter 1997.

Coming Events

Contact CSAS office for more information:

- Mar. 1-2 — Ohio Ecological Food and Farm Association Annual Conference, Soul and Soil: Feeding Field and Communities, Wooster, OH
- Mar. 3-4 — Conservation Tillage Conference, Ada, OH
- Mar. 4-5 — Experiential Learning in Sustainable Agriculture, Minneapolis, MN
- Mar. 7-8 — Upper Midwest Organic Farming Conference, near Dubuque, IA
- Mar. 12-14 — Cover Crops, Soil Quality and Ecosystems Conference, Sacramento, CA
- Mar. 19-21 — International Conference on Ag Production and Nutrition, Boston, MA
- Mar. 26-27 — Livestock and the Environment Symposium, Kearney, NE
- Apr. 14-15 — Interactions: Investigating Ecosystem Dynamics at the Watershed Level, Athens, GA
- May 18-21 — Feeding People without Poisons — PAN International Meeting, La Habana, Cuba
- May 25-28 — 8th Global Warming International Conference & Expo, New York, NY (<http://www2.msstate.edu/~krreddy/glowar/glowar.html>)
- June 3-5 — Wind Erosion: An International Symposium/Workshop, Manhattan, KS (<http://www.weru.ksu.edu/>)
- June 8-9 — XVIII International Grassland Congress '97, Manitoba and Saskatchewan, Canada
- June 21-22 — Pacific Northwest Bamboo Agro-forestry Workshop, Ft. Worden, Port Townsend, WA
- June 25-28 — 3rd International Interdisciplinary Conference on the Environment, Boston, MA (<http://www.assumption.edu/html/academic/conf/iicecall.html>)
- June 13-26 — Training Workshop on Sustainable Agroecosystems and Environmental Issues, West Texas A&M University
- July 23-26 — Soil and Water Conservation Society Annual Conference (focusing on ecosystem management within watersheds), Toronto, Ontario
- July 30-31 — Leopold Center for Sustainable Agriculture's 10th Anniversary Conference, Ames, IA

<p>The Center for Sustainable Agricultural Systems bimonthly newsletter is currently available free in hard copy to U.S. addresses, and electronically via: SANET, PENPages, and the internal IANRNEWS.</p>

Current and back issues, along with other sustainable agriculture information is also available on the Internet:

<http://www.ianr.unl.edu/ianr/csas/>

For comments or questions, or to be added to the mailing list for hard copy, contact the editor at the masthead address, or e-mail csas001@unlvm.unl.edu.

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