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Agricultural Research Division News

The Institute of Agriculture and Natural Resources

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October 1994

Volume 29, Number 2

COMMENTS FROM THE DEAN

Dear Colleagues:

I have previously written about the increasing demand by decision makers and clientele for more accountability on research funding provided by taxpayers. We have responded to these demands by publishing *RESEARCH Nebraska* and *Endeavors* and by disseminating news releases featuring accomplishments from your research projects. We have also provided "accomplishment" reports to CSRS and ESCOP for use with Congress, national commodity groups, and consumer organizations. The unit administrators and ARD staff have used your research accomplishments as centerpieces for presentations made to various Nebraska groups.

As a part of this year's Form AD 421 (annual report of research project) process, we are asking project leaders to assess their accomplishments and the potential impact of their research. This information is needed as input for our information dissemination/accomplishment reporting efforts. We have previously relied on our knowledge of your research projects or on "tips" from unit administrators as the basis for accomplishment reports. The project leader is the ideal person to provide information on accomplishments and impact.

We will request information on accomplishments and impact on three year intervals. Detailed instructions and a form will be provided for listing accomplishments and potential impact. These materials will be sent to each project leader with the Form AD 421 during mid October. We request your diligent assistance in providing the accomplishments and impact information. Our collective future may depend to a large extent on the how well we are able to convince decision makers and taxpayers that funding research is an excellent investment in the future.

Darrell W. Nelson
Dean and Director

Diane Says

Nothing is politically right which is morally wrong.

NORTH CENTRAL REGION SARE and ACE PROGRAMS

Sixteen preproposals of the 109 received by the North Central Region Sustainable Agriculture Research and Education (SARE) program in September were from Nebraska. Of the total, 69 were for the USDA/CSRS SARE program and 40 were for the USDA/EPA Agriculture in Concert with the Environment (ACE) program. About 65 percent of the preproposals were research-based with the remainder being educational.

In October, the regional program will release an Invitation for Proposals for a newly created $300,000 competitive grant program -- Socioeconomic Influences in the Adoption of Sustainable Agriculture. Proposals, which are due January 23, can be in one of two categories: Interactions and Influencing Factors between Structure of Agriculture and Sustainable Agriculture and Relationships between the Quality of Life and Agricultural Production Systems. The University of Nebraska-Lincoln is the host institution for the NCR SARE program. For more information about the program, contact Steven Waller, Regional Coordinator, at (402) 472-7081.

	SARE			ACE		
State	Total	Research	Educational	Total	Research	Educational
Other	2	2	0	1	0	1
IA	10	4	6	10	8	2
IL	3	2	1	0	0	0
IN	1	1	0	1	1	0
KS	3	2	1	5	5	0
MI	6	3	3	1	1	0
MN	5	3	2	5	4	1
MO	8	6	2	4	3	1
ND	2	2	0	1	1	0
NE	12	7	5	4	2	2
OH	5	0	5	3	2	1
SD	3	3	0	2	2	0
WI	9	5	4	3	2	1
	69	40	29	40	31	9

University of Nebraska-Lincoln faculty members recently received four grants from the North Central Region Sustainable Agriculture Research and Education (SARE) program for a total of $268,384. Thirteen SARE grants

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were awarded in the 12-state North Central Region for a total of $960,088. Projects funded in Nebraska were:

Estimation of Reduced Machinery Ownership Costs in Diversified Cropping Systems. Glenn A. Helmers, Agricultural Economics, project coordinator.

Quality of Life Effects of Conventional, Transitional and Sustainable Production Systems on Rural Communities and Family Farms in the Western Corn Belt. John C. Allen, Agricultural Economics, project coordinator.

Comparing Farming systems with Different Strategies and Input Levels: A Research/Education Program with Replicated Micro-Farms. Charles Francis, Agronomy, project coordinator.

Improving Sustainability of Cow-Calf Operations with Natural Forage Systems. Don Adams, Animal Science, and Richard Clark, Agricultural Economics, project coordinators.

NATIONAL RESEARCH INITIATIVE UPDATE

A total of 3,450 proposals were received and evaluated by the NRI program in FY 1994. This number compares with 2,893 proposals received and evaluated in FY 1993. Thirty four panels were convened between March 15 and June 30 to evaluate the proposals, including one joint panel with NSF and DOE and two panels for strengthening awards. This compares with 27 panels convened during the same period in FY 1993. Four new programs were initiated in FY 1994 (Biological Control Research, Assessing Pest Control Strategies, Water Resources Assessment and Protection, and Agricultural Systems). One of the new panels was Weed Science, formerly combined with Plant Pathology.

The funding available in FY 1994 was $96,966,142. This amount was net out of the FY 1994 appropriation of $105,421,000. This compares with $91,814,480 net available in FY 1993. Thus, while the number of proposals is up by 19.25 percent, the increase in funds available for the proposed research amounted to only 5.6 percent. The NRI funded fewer than 20 percent of the proposals received this year compared to nearly 25 percent funded last year. Based on the merit of the proposals, the NRI could easily fund 50-60 percent of the proposals received.

FY 1995 CSRS BUDGET

The FY 1995 CSRS budget contains some good news and some bad news. Most of the major programs have level funding as compared to the FY 1994 budget. Last year's recision reduced the funding appropriated for the National Research Initiative and Special Grants by 6 percent below what was originally appropriated. We were pleased with the increased FY 1995 funding for the Sustainable Agriculture Research and Education and Global Change programs. Likewise we were disappointed with the reductions assigned to the Water Quality, Pesticide Clearance, IPM/Biological Control, and Pesticide Impact Assessment programs. The Nebraska Congressional Delegation provided funding for seven high priority research projects that address specific issues of importance to Nebraska and the North Central Region although funding for five programs was reduced by about 10 percent.

Program	FY 1994	FY 1995
	--------thousands of dollars--------	
Base Funds:		
Hatch Act	171,304	171,304
McIntire-Stennis	20,809	20,809
Animal Health	5,551	5,551
National Research Initiative	105,421	103,123
Special Grants:		
Aquaculture Research	297	0
Biofuels/Biomass	470	0
Global Change	1,175	1,650
IPM/Biological Control	3,034	2,757
Minor Use Animal Drugs	611	550
Natural Biological Impact Assessment	282	254
Pesticide Clearance	6,345	5,711
Pesticide Impact Assessment	1,474	1,327
Rural Development Centers	470	423
Water Quality	4,230	2,757
Nebraska Specific Grants:		
Dought Mitigation	0	200
Food Processing Center	47	42
Midwest Food Manufacturers Alliance*	470	423
Non-food Agricultural Products	103	93
Rural Housing Policy	75	68
Rural Policy Research Institute**	494	644
Sustainable Agriculture Systems	66	64
Other Research Projects:		
Aquaculture Centers	4,000	4,000
Sustainable Agriculture Research and Education	7,400	8,112
Supplemental and Alternative Crops	1,818	1,318
Rangeland Research	475	475

* In partnership with several North Central Region universities.
** In partnership with Iowa State and Missouri.

PRESIDENT CLINTON'S RESEARCH AND DEVELOPMENT GOALS FOR FY 1996

President Clinton, working through the Office of Science and Technology Policy (OSTP) and the Office of Management and Budget (OMB), has announced six goals that the administration hopes to achieve from Research and Development investments in FY 1996. The goals are the result of a review of Research and Development priorities by the nine committees of the National Science and Technology Council (NSTC). The six goals are:

- A healthy, educated citizenry
- Job creation and economic growth
- World leadership in science, mathematics and engineering
- Improved environmental quality
- Harnessing information technology
- Enhanced national security

Although none of these goals directly addresses production agriculture, many of our research programs relate to

one or more of the goals. For example, food safety, molecular and cellular biology, genetics, human nutrition, environmental health and safety, environmental contamination assessments, contaminant detection, and improved pest management alternatives will be high priorities. We will be interested in how USDA will translate the goals into programs that benefit rural citizens and producers.

ROLE OF THE PRIVATE SECTOR IN AGRICULTURAL RESEARCH

Private companies are becoming the predominate entities conducting agricultural research in the United States as measured by amount of funds invested.

In 1993, investments in agricultural research were as follows: private sector, 65 percent; SAESs, 25 percent, and USDA, 10 percent. In 1993, the total amount of funds invested by SAESs was about $2 billion and, thus, the total investment in agricultural research was about $8 billion. A historical perspective on investments in agricultural research is given in Table 1 below.

Most private agricultural research and development is currently directed in two areas: (1) food processing and (2) production and sale of farming inputs such as ag chemicals, farm machinery, and seeds. Private research and development is largely applied research using the principles deduced by basic research to develop new products. Public research and development is generally more basic in orientation although problem-solving research has always been an important component of public agricultural research. Little public sector research and development is directed at product development.

Employment patterns of U.S. scientists with doctoral degrees are also changing over time. The percentage of agricultural scientists employed by private industry has been steadily increasing whereas the proportions of agricultural scientists employed by universities and the federal government is decreasing (Table 2).

Table 1. Agricultural Research Expenditures Over Time

Year	Public Ag Research			Private Ag Research
	USDA	SAESs	Total	
	----------Millions of Constant 1984 dollars----------			
1925	196	97	293	140
1945	261	227	488	346
1956	194	419	614	891
1965	385	631	1016	1368
1975	440	853	1293	1578
1985	503	1088	1591	2550
1990	459	1193	1652	3150

Table 2. Employment of U.S. Agricultural Scientists

Employer	1975	1985	1989
	----------% of total----------		
Universities	61	57	52
Government	20	16	17
Industry	19	28	31
Total number	12,360	18,733	20,169

Information adapted from: Huffman, W. E. 1993. The trends and market for agricultural Research and Development, available scientists, and new scientists and Duvick, D. N. 1993. Funding agricultural research: An assessment of current innovation. *In*: R. D. Weaver, ed. U.S. Agricultural Research: Strategic Challenges and Options. Agricultural Research Institute, Bethesda, MD. Information was also obtained from Huffman, W. E. and R. E. Evenson 1993. Science for Agriculture: A Long Term Perspective. Iowa State University Press, Ames, IA.

GRADUATE STUDENT ENROLLMENT FOR 1994-1995

The table below provides data on the number of graduate students matriculating in degree programs administered by IANR units. Compared to the previous academic year, the number of graduate students increased by 24 in CASNR units and 11 in CHRFS units. In addition, 84 "unclassified" students are enrolled in the new distance learning M.S. program administered by CHRFS. These students are not counted in number of CHRFS graduate students presented in the table.

The number of graduate students in CASNR units has increased by 11.7 percent and 4.2 percent during the past two years. The number of graduate students in CHRFS increased by 8.7 percent during the past year. The overall number of graduate students in IANR units increased by 5 percent as compared to the 1993-94 academic year.

In CASNR units, M.S. and Ph.D students represent 48.8 percent and 51.2 percent of the total, respectively. Conversely, Ph.D. students represent only 16.7 percent of the total graduate students in CHRFS units. Women comprise 26.5 percent of the graduate students in CASNR units and 84.8 percent of the graduate students in CHRFS units.

International students represent 45.6 percent of the graduate students in CASNR units. but only 13 percent of the graduate students in CHRFS units. In CASNR units, graduate students are supported as follows: state GRA, 18.1 percent; grant-funded GRA, 35.2 percent; state GTA, 2 percent; international agency, 11.7 percent; and own funds, 32.9 percent. In CHRFS units, graduate students are supported as follows: state GRA, 18.1 percent; grant-funded GRA, 12.3 percent; state GTA, 7.2 percent; international agency, 0.7 percent: and own funds, 61.6 percent.

Our graduate education programs continue to be strengthened both quantitatively and qualitatively. Much of a universities' research reputation depends on the quality of graduate students and post-doctoral scientists developed within the research programs. We encourage all IANR scientists to maintain high educational standards for graduate students and post-doctoral research associates.

Department	M.S. Students		Ph.D. Students		Total Graduate Students	
	Men	Women	Men	Women	1993-1994	1994-1995
	----------Number of Students Reported----------					
CASNR UNITS:						
Agr. Economics	12	3	18	3	36	36
Agr/Lead, Ed. and Com[1]	11	1	2	0	18	14
Agr. Meteorology[2]	(3)	(3)	(8)	(2)	(16)	(16)
Agronomy	52	22	78	17	172	169
Animal Science	19	10	33	9	78	71
Biochemistry	4	1	13	10	28	28
Biol. Systems Eng.[4]	34	6	24	1	51	65
Biometry	12	4	0	0	19(1)[2]	16
Entomology	7	3	19	4	28	33
Food Sci and Tech	12	15	17	2	39	46
Forestry, Fish/ Wildlife	20	13	6	3	35	42
Horticulture	6	6	7	2	22	21
Plant Pathology[3]	1	3	7	5	12	16
Vet Biomedical Sci[5]	11	3	13	12	34	39
Total:	**201**	**90**	**237**	**68**	**572**	**596**
CHRFS UNITS:						
Fam and Consumer Sci	9	32	0	0	46	41
Nutrit Sci/Dietetics	3	53	3	4	47	63
Tex., Clothing/ Design	2	8	0	0	11	10
Interdepartmental	0	9	4	11	23	24
Total:	**14**	**102**	**7**	**15**	**127**	**138**
Grand Total:	**215**	**192**	**244**	**83**	**699**	**734**

[1]Ph.D. students obtain degrees in ACI or CHR programs in Teachers College.
[2]Graduate degree programs are not offered so degrees are obtained from other departments. Numbers are not included in total.
[3]Degrees obtained through Biological Sciences. Head count credit is in the School of Biological Sciences.
[4]Engineering degrees are obtained through College of Engineering and Technology.
[5]Ph.D. degrees are awarded by UNMC.

GOOD LABORATORY PRACTICES VIDEO

Good Laboratory Practices (GLPs) was initiated by USEPA after they discovered an impressive level of scientific misconduct in the early 1970s. Key points that a research organization should be able to document are:

1. How a project was done.
2. Who did the work.
3. The quality of the work.
4. The location of all data.
5. Where data are archived.

An important point is that GLPs do not address the scientific merit nor quality of a research project.

GLPs are now required by some federal agencies for their own work and for sponsored research. They are probably going to become more important as accountability increases in our research programs.

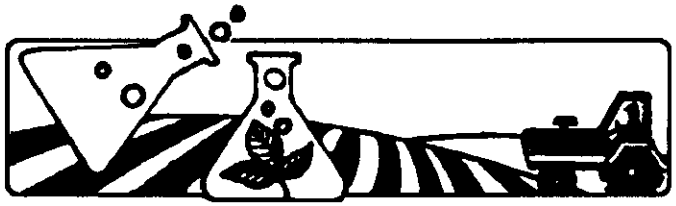
The South Carolina Agricultural Experiment Station, Clemson University, recently sponsored a seminar on GLPs for their research faculty. The seminar was videotaped and the video along with the visuals used by the speaker were made available to other Agricultural Experiment Stations. ARD has obtained a copy of the video and the visuals and would be happy to loan these out for use in departmental seminars. Anyone interested in borrowing these should contact the ARD office.

FORM FOR RECORDING INDUSTRY OR FOUNDATION INCOME

When submitting an industry or donor's check with the "Form for Recording Industry or Foundation Income", please be sure the check is written to the University of Nebraska. If the check is written to an individual, he or she will have to declare it as income if the company issues a 1099 form to them on the contribution.

REQUEST FOR PROPOSAL APPROVAL AND SUBMISSION

Please submit a completed "Request for Proposal Approval and Submission" for all external grant proposals and agreements/contracts. Proposals prepared for internal grant programs and state commodity boards do **not** require a "Request for Proposal Approval and Submission" form until the principal investigator is notified that the research is funded.



GRANTS AND CONTRACTS RECEIVED AUGUST AND SEPTEMBER, 1994

Agronomy	
Graef, G. — USDA/ARS	11,000
Johnson, B. — Pioneer Hi-Bred International	31,750
Kaeppler, S. — Pioneer Hi-Bred International	7,500
Schepers, J. and Peterson, T. — UN Foundation	7,500
Specht, J. — North Carolina State University	58,625
Miscellaneous Grants Under $5,000 each	73,637
Animal Science	
Miller, P. S. — Nebraska Pork Producers	15,765
Miscellaneous Grants Under $5,000 each	7,745
Biochemistry	
Golbeck, J. — NSF	22,000
Spreitzer, R. — USDA/CSRS	150,000
Biological Systems Engineering	
VonBargen, K. — E. I. DuPont deNemours and Company	8,600
Entomology	
Miscellaneous Grants Under $5,000 each	35,300
Food Processing Center	
Miscellaneous Grants Under $5,000 each	1,590
Food Science and Technology	
Jackson, D. — National Honey Board	17,000
Miscellaneous Grants Under $5,000 each	11,699

Forestry, Fisheries and Wildlife	
Brandle, J. — USDA/FS	11,500
Miscellaneous Grants Under $5,000 each	3,419
Horticulture	
Horst, G. — UN Foundation	23,104
Miscellaneous Grants Under $5,000 each	22,795
Industrial Agricultural Products Center	
Miscellaneous Grants Under $5,000 each	30
Northeast Research and Extension Center	
Miscellaneous Grants Under $5,000 each	21,104
Panhandle Research and Extension Center	
Baltensperger, D. — Kansas State University	15,280
Yonts, C. — Burlington Northern via UN Foundation	17,500
Miscellaneous Grants Under $5,000 each	54,610
Plant Pathology	
Mitra, A. — UN Foundation	14,500
VanEtten, J. — National Institute Health	200,600
Miscellaneous Grants Under $5,000 each	10,598
South Central Research and Extension Center	
Miscellaneous Grants Under $5,000 each	12,950
Veterinary and Biomedical Sciences	
Rogers, D. — USDA/ARS	25,000
Miscellaneous Grants Under $5,000 each	1,050
Water Center/Environmental Programs	
Spalding, R. — Nebraska Department of Agriculture	30,000
Miscellaneous Grants Under $5,000 each	5,000
West Central Research and Extension Center	
Miscellaneous Grants Under $5,000 each	12,650
Grand Total	**941,401**

PROPOSALS SUBMITTED FOR FEDERAL GRANTS

The following is a listing of proposals that were submitted after August 1, 1994 by faculty for federal grant programs. While not all grants will be funded, we applaud the faculty member's effort in submitting proposals to the various agencies.

James R. Brandle — USDA Forest Service — Guidelines for Riparian Buffer Strip Plant Selection in the Great Plains — $11,500

George Graef — USDA/ARS — Genetic and Physiological Dissection of Seed Component Characters in Soybean: Nebraska — $11,000

Jeffrey S. Royer — USDA/RDA — The Impact of Farm Policy and Economic Factors on the Viability of Marketing Cooperatives — $37,958

Jeffrey S. Royer — USDA/RDA — The Competitive Impact of Marketing Cooperatives in Vertically Coordinated Raw Product Markets — $34,958

Chris R. Calkins — USDA/ARS — Role of Endogenous Proteases in Muscle Growth and Postmortem Tenderization — $8,000

Martin Dickman — USDA/BARD — Pathogenicity and Sclerotial Development of *Sclerotinia sclerotiorum*: Involvement of Oxalic Acid and Chitin Synthesis — $181,186

Bob Volk — USDA/ARS — Integrated Nitrogen, Water, and Pesticide Management Systems to Protect Ground Water Quality — $210,000

Norman L. Klocke — US Environmental Protection Agency — Irrigation Management Strategies to Reduce Nitrate Pollution of Ground Water and Sustain Economic Return — $182,851

Luther D. Clements — USDA/CSRS/Office of Ag Materials — Process Scale-Up: Catalytic Partial Oxidation of Erucic Acid to Brassylic Acid — $18,000

George E. Meyer, Kenneth VonBargen, Thomas G. Franti and **David A. Mortensen** — US Environmental Protection Agency — Evaluation of a Sensor Controlled Intermittent Spot Sprayer for Reducing Chemical Input in Agricultural Systems and Improving Water Quality — $103,621

Dean E. Eisenhauer, David D. Jones, Michael F. Kocher and **Raymond J. Supalla** — US Environmental Protection Agency — A Decision making System for Balancing Environmental and Economic Risks of Nitrogen Application Technology — $288,539

Wayne E. Woldt — U.S. Environmental Protection Agency — Development of an in situ Active Soil-Gas Monitoring Method — $134,484

Clinton Jones — National Institute Health — Gene Expression in Sensory Neurons During Herpes Latency — $636,880

Luther D. Clements — USDA/CSRS/Office of Ag Materials — Program Management and Planning for the Advanced Materials from Renewable Resources Program

NEW OR REVISED PROJECTS

The following station projects were approved recently by the USDA Cooperative State Research Service:

NEB-12-135 (Agronomy) Impact of Accelerated Erosion on Soil Properties and Productivity
Investigator: A. Jones
Status: Revised Hatch project effective Oct. 1, 1993 that contributes to regional project NC-174

NEB-13-071 (Animal Science) Utilization of Byproducts in Grain Diets Fed to Feedlot Cattle
Investigator(s): R. A. Stock, T. J. Klopfenstein and T. L. Mader
Status: Revised Hatch project effective July 1, 1994

NEB-13-121 (Animal Science) The Affects Upon Rumen Microbiology from Feeding Distillers Byproducts
Investigator(s): M. Morrison and R. A. Stock
Status: New State project effective Jan. 1, 1994

NEB-13-122 (Animal Science) Gastrointestinal Structure and Function as Related to Nutrition and Body Metabolism
Investigator: E. T. Clemens
Status: New Hatch project effective July 1, 1994

NEB-14-084 (Veterinary and Biomedical Sciences) An Epidemiologic Investigation of Swine Productivity in Nebraska
Investigator: C. E. Dewey
Status: New State project effective Sept. 1, 1994

NEB-15-071 (Biochemistry) Genetic Modification of Chloroplast Rubisco
Investigator: R. J. Spreitzer
Status: New Competitive Grant effective July 1, 1994

NEB-17-060 (Entomology) A National Agricultural Program to Clear Pest Management Agents for Minor Use
Investigator: S. T. Kamble
Status: New Hatch project effective Oct. 1, 1993 that contributes to regional project NRSP-4/IR-4.

NEB-19-004 (Food Processing Center) Midwest Food Manufacturing Alliance
Investigator: S. L. Taylor
Status: New Special Grant effective June 1, 1994

NEB-21-056 (Plant Pathology) Detection of Seedborne Bacteria and Characterization of Bacterial Endophytes
Investigator: A. K. Vidaver
Status: New Hatch project effective Aug. 1, 1994

NEB-27-004 (Agricultural Meteorology) Remotely Sensed Estimates of Productivity, Energy Exchange Processes and Water Stress in Vegetation
Investigator(s): B. L. Blad and E. A. Walter-Shea
Status: Revised Hatch project effective Aug. 1, 1994

NEB-32-003 (Agricultural Experiment Station) Agriculture in Concert with the Environment (ACE) Program for the North Central Region
Investigator: S. S. Waller
Status: New Cooperative Agreement effective Sept. 1, 1994

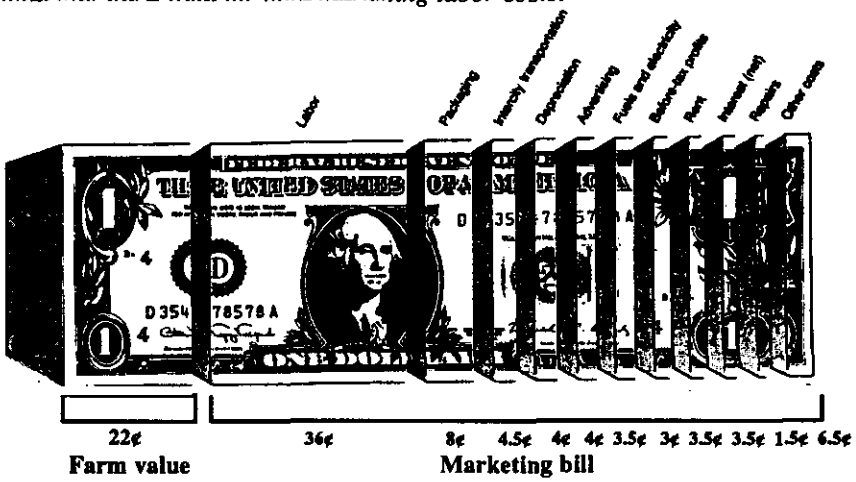
NEB-42-014 (Northeast Research and Extension Center) Biology and Control of the European Corn Borer and Other Selected Insects of Northeast Nebraska
Investigator: J. F. Witkowski
Status: Revised Hatch project effective July 1, 1994

NEB-42-020 (Northeast Research and Extension Center) Effects of Preplant Tillage and Nitrogen Application Method on Nitrate Leaching
Investigator: W. L. Kranz
Status: New Hatch project effective March 18, 1994

NEB-44-049 (Panhandle Research and Extension Center) New Seedbed Preparation Technology for Improved Sugarbeet Emergence
Investigator(s): J. A. Smith, R. G. Wilson and G. D. Binford
Status: New State project effective July 1, 1994

WHAT A DOLLAR SPENT FOR FOOD PAID FOR IN 1993

About one-third went for food marketing labor costs.



Includes food eaten at home and away from home. Other costs include property taxes and insurance, accounting and professional services, promotion, bad debts, and many miscellaneous items.

Income share spent for food

Food expenditures by families and individuals rose but continued their long-term decline as a share of income.

Year	Disposable personal income	Expenditures for food: Away from At home[1]	Expenditures for food: Away from home[2]	Expenditures for food: Total[3]	Share of income: At home	Share of income: home	Share of income: Total
	Billion dollars				Percent		
1970	722.0	74.2	26.4	100.6	10.3	3.7	13.9
1975	1,150.9	115.1	45.9	161.0	10.0	4.0	14.0
1980	1,952.9	178.5	85.4	263.9	8.1	4.4	13.5
1985	2,943.0	229.5	129.4	358.9	7.8	4.4	12.2
1990	4,050.5	303.2	174.2	477.4	7.5	4.3	11.8
1992	4,500.2	319.9	183.5	503.4	7.1	4.1	11.2
1993	4,700.0	325.9	195.0	520.9	6.9	4.2	11.1

[1]Food purchases from grocery stores and other retail outlets, including purchases with food stamps and food produced and consumed on farms, because the value of these foods is included in personal income. Excludes government-donated foods.
[2]Purchases of meals and snacks by families and individuals, and food furnished to employees because it is included in personal income. Excludes food paid for by government and business, such as donated foods to schools, meals in prisons and other institutions, and expense-account meals.
[3]Totals may not add due to rounding.