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The Changing Role of Women in Minnesota Agriculture

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Women have always played an integral, although often unrecognized, role in agriculture in Minnesota, the United States and around the world. In Minnesota and the United States the number of women recognized as farmers in their own right has more than doubled from 1978, the first year the Census of Agriculture accounted for gender, to 2002, the most recent Census. It is also more common to see women in any number of agricultural professions in the past two decades. Additionally in the past decade, a greater number of women and girls are studying agriculture than ever before. On an international scale the United Nations Food and Agriculture Organization has estimated that women are “responsible for half the world’s food production” (Monchuk, 2006). This article explores the roles of women in agriculture in Minnesota, past, present and future.

Although women and girls have been involved in agriculture for all time, they have been little studied and in literature reviews of the subject matter, there is a dearth of material. Coupled with this, there is an even smaller core of material for women in agriculture in Minnesota. Overall, there is little information on women farmers, but even less on women engaged in other agricultural professions. Based on statistical sources, we can conclude that the involvement of women and girls, by and large, in agriculture is increasing and basic trends in societal development indicate that this should continue to be the case.

Women farmers

Women have farmed alongside their husbands and families since people started cultivating the land. Native Americans were the first women farmers in Minnesota, with limited cultivation of the land and the harvesting of wild rice (USAIN). Historians agree that

women's work was essential for the success of the American family farm (Webb, 1989). However, more often than not women have been viewed by society as a farm housewife or help mate and not a farmer or a farming partner. Research shows women have been filling the roles of farmer in their own right, farm manager or partner for longer than society gives them credit. Sometimes women themselves do not give themselves credit for the work they do: "Oh, I just run for parts or keep the books..." and so on. When asked about specific tasks, women often discover that they really do more for the farm than would at first be indicated.

Historical perspective

Frontier women farmers. Women homesteaded in Minnesota not only with their families and husbands, but as many as 2,400 women homesteaded for at least a year without a husband between 1863 and 1889. Webb estimates that this was about 4% of the total homesteaders who lived on the land during this time period, while others have estimated it at 4%-5%, although because of changes in homestead law it is not possible to obtain an absolute figure for the proportion of single women to total homesteaders (Webb, 1989). These women were in addition to the thousands of other women who were farming alongside their husbands or families as Minnesota was settled.

Webb (1989) found that most of the women on the land who gained title to the land had applied for it in their own name, rather than inheriting it from a male relative. Women who were widowed at the time of their application for land were the most common of the women homesteaders. She also found that many of these widows did not remarry nor did they have sons helping them with the farm, as most sons left home at an early age. Furthermore, she concludes that homesteading gave women the economic means to marry or not. Given that they were financially secure, many chose to homestead alone. Women homesteaders were actively farming their land, as evidenced by the amount of land that was being cultivated and the value of improvements that were made to the land. By the time most women gained title to their land their farms were providing them with income.

In Webb's research, she noted that women farmers, both widows and wives, have existed at all times. Wives were often left to manage farms as husbands went off to war, prospecting, preaching, serving in government or when their husbands moved to town or back East to earn money. The skills gained during these time periods served

them well as many of them ended up homesteading on their own (Webb, 1989).

Morain (2005-08) also examined the roles of pioneer women. In his study of Iowa pioneer farm women he found that although men and women filled different roles, they definitely worked in partnership on farms. It was not unheard of for women to help in the fields if there was pressure to get the crop in, as this was critical to the survival of most farm families. This partnership and working in the fields during high-pressure times would likely be the same for their Minnesota counterparts as similar cultures existed in the two states.

Transition from frontier to modern agriculture. There is little material that discusses the role of women and farming from frontier times to the time of World War II. However, there is a limited discussion of women's extensive list of farm chores; the separate farm roles that women and men played; that women's farm chores sometimes yielded additional income to help support the farm; and that gender roles were not as strict on the farm, as women engaged in men's work when their husbands fell ill (Iowa Pathways, 2005-08). Although a discussion of Iowa farm women, one would expect that the experiences of their Minnesota peers would not be dissimilar, again given the similarities of the farming cultures in the two states.

According to Schwartz (1942), little was known about the farm labor situation in the U.S. during World War I, 1917-18. However with the Great Depression, many people were out of work. Just prior to World War II there was an overabundance of agricultural laborers, and many were underemployed or unemployed, (Kaufman, 1949). The *Saturday Evening Post* (1942) noted that the use of women for field work and other heavier farm tasks had declined steadily to where female help normally was less than 1% of the officially reported work force prior to World War II. This was likely partly due to the fact that there was high unemployment and that men were given preference over women in jobs when they were available, so fewer women may have been working in these "heavier" tasks. No mention was made of farm tasks that historians say were traditionally filled by women: working with poultry, dairy and vegetable gardening. It is also likely that the work of women on farms was somewhat underreported due to not counting what were considered traditional jobs/tasks as not farming. Also, undervaluation of women's work and the societal norms as far as gender roles were likely partially to blame. Farm families were possibly reluctant to admit that females worked outside, or they may

have not recognized that the women were doing farm work.

Once the Second World War started there was a huge drain on the rural population both in men and women serving in uniform. In addition, many people moved to the city to fill jobs left by the people who were off to war. There was also a tremendous need for labor brought on by the massive war manufacturing effort (Schwartz, 1942; Kaufman, 1949). This migration of people out of rural areas left a shortage of agricultural workers. In response to this, Schwartz (1942) had said that women would make an excellent source of replacement workers, but that farmer thinking and government policy must be adjusted to the employment of females as a major element of hired agricultural labor. Women did indeed become a significant part of the labor force. Kaufmann pointed out that inexperienced women and children became part of the labor force from 1940 to 1943, and that agricultural output had increased by 21% during that time. According to a United States Department of Agriculture survey, by 1942 13% of farm workers nationally were women or girls, up from under 1% just a few years previous (*Saturday Evening Post*, 1942).

Although women from urban areas were part of this labor force (Schwartz, 1942), most of the women and girls working on farms during the War years were in fact from farms themselves (*Saturday Evening Post*, 1942). The Post indicated that these females were highly useful and had a good understanding of agriculture that was supplemented by additional training offered by 4-H clubs, high school courses in vocational agriculture, and agricultural colleges.

Modern era. There is another large gap in reporting on women farmers in the period after World War II. Snippets of information were published for the 1950s and '60s from Iowa and Nebraska indicating that farms and farming were changing, and this, coupled with the men who had returned from World War II, changed the roles of many women on the farm yet again. Farms became more specialized and mechanized during this time period. Scwieder (2005-08) noted that women stopped raising chickens, had smaller gardens and increasingly took off-farm jobs in the 1950s. Women were also recognized as working off the farm, but still able to do farm work, if needed, in the mid-1960s (Ganzel, 2007). The trends taking place in these Midwestern states were likely echoed in Minnesota, again due to similar cultural patterns.

Census data and more

We can really only speculate on the number of women farmers between frontier times up until the late 1970s as there were no

counts of farmers according to gender in the Census of Agriculture until 1978. Furthermore, farm data sources in the U.S. assumed that each farm had only one operator until 2002. This assumption was dropped when the 2002 Census of Agriculture and Agricultural Resource Management Survey (ARMS) were conducted. Both the Census and ARMS now count all operators both principal and secondary and ask for detailed information on up to three operators. Every farm has at least one operator, a farmer who makes the day-to-day decisions about the farm business. In the case of farms with more than one operator who makes decisions for the farm, one operator is designated as the principal operator while the others are designated as secondary operators (Hoppe et al., 2007).

The previous practice of reporting only one operator underreported the role of women on farms. Earlier Census surveys with only one operator provided only conservative estimates of women's participation as operators on the farm. The collection of data on multiple operators now helps to account for women involved in farming operations and the involvement of younger generations of farmers of both genders, which previously had been missed (Korb, 2005). Previously, when only one operator was reported, even when a husband-and-wife team were operating the farm, it was substantially more likely that the husband would be indicated as the principal operator. The same is true in regards to age. The more senior male operator would be reported as the principal and the other younger generation would be lost in the reporting.

While it is important to note the trends of women as principal operators, which has been increasing over time (Table 1), it is also important to note that there are many more women active in farming operations who were reported as secondary operators in the 2002 Census of Agriculture. In Minnesota, 6,370 women were reported as principal operators (representing 7.9% of the total number of principal operators), while another 20,156 were reported as secondary operators. In the U.S. there were 847,832 women reported as operators with 237,819 women reported as principals (USDA-NASS, 2004 p. 533, 536). On a national level this data suggests that in 1997, 40% of U.S. farms had at least one woman operator (Korb, 2005). ARMS data from 2004 indicated that 65% of the secondary operators reported were spouses (Hoppe, et al., 2007). The numbers of secondary women operators may even be on the conservative side as both women and men on the farm may not view the woman's role as that of an operator and therefore may not have reported the woman's involvement as an operator.

Table 1: Number of women principal farm operators, Minnesota and United States.

Year	Minnesota			United States		
	Women	Men	Women, % of Total	Women	Men	Women % of Total
1978 1/	2,208	100,755	2.1%	128,170	2,350,470	5.2%
1978 2/	2,208	100,755	2.1%	112,799	2,144,976	5.0%
1982 2/	2,532	91,850	2.7%	121,599	2,119,377	5.4%
1987 2/	2,757	82,322	3.2%	131,641	1,956,118	6.3%
1992 2/	2,931	72,148	3.9%	145,156	1,780,144	7.5%
1997 2/	3,617	69,750	4.9%	165,102	1,746,757	8.6%
1997 1/	4,205	74,550	5.3%	209,784	2,006,092	9.5%
2002 1/	6,370	74,469	7.9%	237,819	1,891,163	11.2%

Source: USDA, National Agricultural Statistics Service (NASS), Agricultural Census from 1987, 1992, 1997 and 2002
 1/Coverage Adjusted; 2/ Not Coverage Adjusted

Note: In 1978 the published numbers were adjusted for coverage — adjusted for incompleteness in the Census mail list. These are the figures labeled “1/ Coverage adjusted”. In 1982, due to lack of funding the coverage survey was not done, and the numbers for 1978 were ‘unadjusted’ to be comparable to the 1982 numbers. In 2002 a coverage adjustment survey was again done, and again, to provide comparability, the 1997 numbers were adjusted and these adjusted figures were published in the 2002 series. The 1978 Minnesota figures for women operators are the same and the reason for this is unknown according to USDA-NASS staff. The numbers that changed so dramatically between 1992 and 2002 are reflective of a change in the way farms are published in the Census. The 2002 Census of Agriculture was the first to be fully coverage adjusted, which means that the numbers include an estimate of the number of farms that were not on the Census mailing list. See 2002 Census Appendix C of Volume 1 for a full explanation of coverage adjustment. http://www.agcensus.usda.gov/Publications/2002/Volume_1_Chapter_1_US/us2appxc.pdf Farms with women principal operators are more likely than their male counterparts not to be on the Census mailing list.

The number of women principal operators has steadily increased over time, while the number of men farming as principal operators has been generally trending downward (Table 1). While Minnesota is seeing growth in women farmers, they are somewhat behind the level of increase nationally. The United States Department of Agriculture National Agricultural Statistics Service works on improving coverage for all farms by adding farms to their mailing list that have not been included in previous Census tabulations, either new farms or farms that may have been previously missed. The 2007 Census of Agriculture may reveal interesting data as more women farmers are included because of an increase in women farmers on the Census mailing list.

There are data on principal operators and their farm characteristics, but they are not necessarily as clear-cut as they may seem. For instance, a primary operator of either gender may have a secondary operator of the opposite sex. This makes for vague delineations on farm characteristics according to gender, as the secondary operators in both cases obviously impact the running of the farm. That being said, there are some differences that may be discerned between farms with women principal operators and those with men as principal operators for Minnesota farms overall.

Farms and acreage operated by women principal operators has gone up while those operated by men have declined in both number of farms and acreage (Table 2). Of the 6,370 women principal operators in Minnesota, 3,746 women were the sole operator / principal operator of their farm, including 518,875 acres. An additional 21,953 were either principal or secondary operators on an additional 21,143 farms, comprising 6,283,961 acres. (USDA-NASS, 2004, p. 558).

Farms with women as principal operators tended to be smaller in acreage than those headed by a male principal operator (Table

Table 2: Minnesota principal female and male operator farms and land farmed.

Number of	Female	Male
Farms 2002	6,370	74,469
Farms 1997	4,205	74,550
Acres 2002	956,511	26,555,759
Acres 1997	718,503	26,842,118

Source: 2002 Agricultural Census, NASS

Table 3: Minnesota farms with women principal operators, land farmed and average farm size.

	1987	1992	1997	2002
Total land in farms	500,157	584,567	718,503	956,511
Total farms	2,757 2/	2,931 2/	4,205 1/	6,370 1/
Farm size				
1-9 acres	NA	273	371	562
10-49 acres	NA	683	1,195	2,216
50-499 acres 3/	NA	1,720	2,367 4/	3,232
500 acres or more	NA	255	272	360
Average farm size 4/ Women principal operators only	181	199	171	150
Average farm size 5/ All farms farmed in MN	312 2/	342 2/	350 1/	340 1/

Source: USDA, National Agricultural Statistics Service, Agricultural Census 1987, 1992, 1997 and 2002

1/ Coverage adjusted

2/Not Coverage adjusted

3/ Census farm size categories changed over time for farms falling into this range.

All farms in a given year within this range were added together and are represented in the 50-499 acre total for each year.

4/Calculated by the author.

5/ Includes all Minnesota farms, those operated by men or women principal operators including those farms that may have women as secondary operators.

NA= data not available

3). Farms in all size categories have been increasing, but the most sizeable increase was for farms in the 10-49 acre category.

In 2002 nearly one-half of the Minnesota farms operated by women principal operators were in the smallest economic classes (less than \$1,000 annually, and \$1,000-\$2,499 annually), compared to 17% of all Minnesota farms. About 9% of the farms with women principal operators were in the largest economic class of \$50,000 or more, compared to 34% of all Minnesota farms (USDA-NASS, 2004, p. 39). The majority of farms farmed by women principal operators were sole proprietorships (92% versus 90.3% for all Minnesota farms). Most of the women owned all of the land they farmed (5,407 out of 6,370 or 85%) rather than renting some or all of their land. This is compared to 63.5% of all farms in Minnesota operating

only owned land. It is quite rare for a woman to rent all of the land that she farms in Minnesota. The numbers for women in sole proprietorship and full ownership land tenure categories has grown over the past few Censuses (USDA-NASS 1994 p. 23 and 2004 p. 39).

In a comprehensive look at the Census data on a national level, Korb (2005) found that at the national level, women typically start farming later in life, attributing this to inheritance of the farm. Of the women in the Census records she studied from 1978 to 1997, 20%-27% of them inherited their farms from men, while the figure for men inheriting from women hovers around 1% for any given Census. This may be one reason why women principal operators in Minnesota mainly own the land they farm, but it does not account for all of it. Another portion of the owned land may be coming from continuing an existing family farm. Nationally, the farms that are continuing from one generation to the next, according to Korb, are farmed mainly by male principal operators (60%-65% versus 30% for women). This dramatic difference reflects the fact that farms and farmland generally continue to be passed down through the male lines in families, rather than the female side. Research conducted by Haberman and Danes (2007) agrees with this data, that males are more likely to have the farm transferred to them. There is a family and societal expectation that sons will continue the farm while daughters are rarely considered in the equation.

The final category for women principal operators is new entrants, which number 42%-48% versus 10% for men, demonstrating that nearly half of women principal operators actually started their own farms. The differences between how women and men enter farming is quite striking, and although this study is national in scope the author ventures that the Minnesota experience likely follows these trends.

In the Census, farms are classified by North American Industry Classification System (NAICS) codes; these codes represent categories or farm types that account for 50% or more of the farm's sales. The two most popular farm types of women principal operators in the 2002 Census were other crop farming, 2,437 farms (or 38% percent of women-operated farms), and other animal production, representing 1,376 farms (22%), in 2002 (USDA-NASS 2004, p. 39). Census researchers have indicated that one of the most popular areas of other animal production is equine production. In the 1997 Census the most common types of farms for women principal operators were oilseed and grain farming (1,457 farms or 35%) and other animal production (735 farms or 17%), followed closely by beef cattle ranching and farming (614 farms or 15%).

Table 4: Overall farm involvement levels. 1/

Level of Involvement	1988	1995
Manages farm by herself	3%	2%
Shares equal responsibility	25%	31%
Bookkeeping, information, financial	23%	27%
Ag production during busy times	22%	14%
Running errands & household	21%	19%
Little or no direct contact	6%	7%

1/ Includes both women not employed off the farm and women employed off the farm.

Source: Danes 1996, Minnesota Farm Women: 1988 to 1995.

The change in farm types from one Census to another was fairly dramatic in oilseed and grain farming from 35% of all farms with women principal operators to 12% in 2002. Other types of farms only changed between 1% and 5 %.

Underestimation comes from both men and women. When asked generally how involved she is, a farm woman may reply that she “just helps out a bit.” But when asked about specific tasks (feeding, bookkeeping, decisions on buying and selling land), she may answer in the affirmative. She is actually more involved than she or anyone around her gives her credit for. In the Danes (1996) study of Minnesota farm women, this is magnified as she asked for responses to particular tasks/ activities. The responses show that farm women are highly involved in the operation and management of Minnesota farms.

Even if women do not merit inclusion as a primary or secondary operator, many of those left out are likely providing valuable services to the farming operation. In fact, research conducted by Danes (1996) suggests that the Census data only begins to tell the story of the role of Minnesota farm women and their roles in the family farm business. Danes surveyed 513 Minnesota farm women in 1988; in 1995 about 77% were re-contacted. She found that women were for the most part highly involved in the management and labor of the operation. Generally, those who were not employed off the farm were more involved, but even those women employed off the farm were providing valuable farm services. Nearly all women, regardless of off-farm employment status were involved in bookkeeping, recordkeeping, running errands and picking up supplies. Over half of those women not employed off the farm were doing regular work

on the farm, and were highly involved in most of the management duties of the farm.

Danes (1996) found that a somewhat smaller percentage of women were managing the farm by themselves than would be indicated by the percentage of women principal operators in the Census (Table 4 and Table 1). However, this could be explained by some women sharing equal responsibility in Danes' research being the listed principal operator in the Census.

Danes (1996) also found that the level of involvement on the farm was different depending on whether women were employed off the farm or not (Table 5). Women employed off the farm showed a higher involvement in bookkeeping and running errands, while half of those not employed off of the farm indicated that they share equal responsibility for the farming operation. A high number of women were making a valuable contribution to the workings of the farm: 96% of the women with no off-farm employment and 88% of those employed off the farm reported making some sort of concrete contribution to the farm. Additionally, the women with perhaps more minor, although key involvement, of running errands and the household were a relatively small percentage of the total population. Danes' work suggests that the recognition of women's work on farms has indeed been considerably less than it should be.

Table 5: Level of involvement, employed off the farm or not.

	Employed off Farm	Not Employed off Farm
Manages farm by herself	1%	2%
Shares equal responsibility	15%	50%
Bookkeeping, information, financial	33%	17%
Ag production during busy times	14%	12%
Running errands & household	25%	15%
Little or no direct contact	11%	3%

*1/ Includes both women not employed off the farm and women employed off the farm
Source: Danes 1996, Minnesota Farm Women: 1988 to 1995*

In 1988, 46% of the women were working off of the farm; in 1995 this had increased to 56%. In 1988, 42% of these women indicated that they were working to provide basic family necessities; by 1995 this number had climbed to 64%. These numbers suggest that women were working off the farm to help maintain family living

levels, but that it was still important for them to be active in the farming operation at some level. Even if they are not directly active in the farming operation on a day-to-day basis, many farm spouses help support the farm family and at times help the farm through lean times. Many families find that the lure of health insurance and regular cash flow from an outside paycheck are important to the vitality of the household (Danes, 1996).

Modern farm women continue on the multi-tasking traditions of their forebears: 37% of the women in the survey reported having a child younger than 18, and 39% reported caring for an elderly relative, while 17% reported both. While volunteer involvement has decreased somewhat over time, they were still active volunteering in educational, youth and civic organizations (Danes, 1996).

Like Danes, Zeuli and Levins (1995) found that the role of women in Minnesota agriculture was more pronounced than many thought, with more women actively farming and women owning 40% of all of the leased farmland in Minnesota. They also found that there were very few differences between the way women and men farm in similar circumstances and that it was important to separate the issue of how the land was farmed from that of gender. Another study posits that women finding barriers in productivist agriculture (high-intensity agriculture) have opted for post-productivist agriculture, possibly because they have a different belief system (Trauger, 2001). Trauger goes further to suggest that women may be helping to lead the alternative agriculture movement.

However, both studies agree that Minnesota women farmers have faced challenges related to gender, including: difficulty securing credit; having to prove themselves more than men in the community; and dealing with condescending sales staff. They also agree that the role of women producers has been studied very little and that it was important to have a better understanding of women farmers. The Zeuli and Levins study (1995) concluded that farming and low female participation warranted a closer look because of the equity and justice issues, especially given the heavy federal subsidies of the agricultural industry.

Another interesting view of Minnesota women farmers is through the Minnesota USDA Farm Service Agency (FSA) and their Farm Loan Program data. In June 2006 the number of women borrowers in the FSA's direct loan program was at 175, while as of June 2008 the number was 203. This showed that in the last two years the number of women FSA direct loan borrowers in Minnesota has increased by 16%. Women borrowers constitute 6% and 7% of the borrowers in the FLP Program in 2006 and 2008 respectively, when

compared to their male counterparts. Only 19 women operators in Minnesota accessed FSA's Guaranteed Loan Program, while the total operators that participated were 1,797. Perhaps even more interestingly is the involvement of women on Minnesota FSA County Committees (COC). Of the 319 COC members, 85 were women or 26.6% of the members (Tadesse, 2008). This high percentage of representation is much more in keeping with the percentage of women principal and secondary operators as reported in the 2002 Census of Agriculture for Minnesota.

Based on the available data and information, it is evident that the role of women in farming has always been important. Their involvement in and leadership of farming operations, however, has been increasing, possibly due in part to better recognition and reporting of their roles.

Women in the broader agricultural sector

Korb (2005) pointed out that the increase in women farmers points to an increase in activity by women in all segments of agriculture. Although no hard public data was available as to how many women are involved in agricultural careers and which agricultural careers they are involved with, the enrollment data from agricultural educational programs points to increased numbers of women and girls being trained in agriculture. This should, in theory, lead to more women in agricultural careers.

The entrance of women and girls into agriculture and related education programs has increased in a substantial way over the decades. This is particularly true in the case of the University of Minnesota College of Food, Agriculture and Natural Resource Sciences, where women now outnumber men in undergraduate degree programs. The natural extension of this is more women in agricultural careers and eventually more women in agricultural leadership positions.

No longer are women and girls a novelty in high school and college classrooms where agriculture is taught. With the education and experience in agriculture, women are stepping out into broader agricultural careers. However, it is difficult to track changes in where women are going in agriculture because of spotty tracking of post graduation placement by higher education institutions and the reluctance of private industry to supply information regarding their employees. That being said, assumptions may be drawn by turning to what we do know.

Students of agriculture

High school agricultural education and the FFA. One of the areas of agriculture that has seen tremendous growth in the involvement of women and girls is the FFA program. The number of females involved in the program has been steadily increasing ever since females were first allowed to join in 1969. (The organization was formed in 1928 for males only.) Formerly called the Future Farmers of America and more recently the FFA program, the mission of “the National FFA Organization is dedicated to making a positive difference in the lives of students by developing their potential for premier leadership, personal growth and career success through agricultural education” (National FFA Organization, 2008).

According to the National FFA Organization, 42% of the students enrolled nationwide in high school agricultural education classes were female, while 30% of all of the FFA advisors were female, and 37% of the enrolled FFA members were female (*Unmistakable Potential*, 2005-06 Annual Report of Agricultural Education, Team Ag Ed). In 2007, 38% of all FFA members were female and more than 50% of the state leadership positions were held by women (National FFA Organization, 2007). Given that females were first admitted for membership in 1969 on the national level and the first national female FFA president was elected in 1982, the progress made in leadership for female members has been quite substantial, especially when compared to other agricultural organizations.

Minnesota data shows that 9,942 females were enrolled in Agriculture, Food and Natural Resource Science (AFNR) programs (previously referred to as agricultural education programs) during the 2007-2008 school year, or almost one third of all 30,638 students enrolled (Tesch and Larson, 2008).

Minnesota FFA had a total of 9,017 members in the 2007-2008 membership year. Most data suggests that the breakdown is about 40%-45% female members and 55%-60% male in the membership numbers across time. The trend line is steady as to enrollment numbers over the past five years. However, in leadership roles the percentages are reversed. About 60% of those involved as officers on the various levels — chapter, region, state officers and those involved in leadership events and Career Development Events — are female. The trend for female Minnesota ANFR instructors has also been upward. The 2007-08 school year saw a total of 228 ANFR teachers, 26% of which were female (Tesch and Larson, 2008). The recent Minnesota trends are very similar to what the FFA is seeing nationally.

The FFA on both the state and national level has certainly accomplished its mission for the youth in its program, but perhaps more than any other agricultural organization it has provided a venue for females interested in agriculture to learn about agriculture and to exercise their interests, as well as serve as leaders, alongside their male peers. The high rate of female involvement indicates that young women are being encouraged to pursue agriculture. With almost 40 years since the first females were allowed into the FFA, we now have multiple generations of females who have participated in the organization, and their involvement has become part of the organizational culture. As this cultural attitude has changed, so may the broader cultural attitude towards women and girls in agriculture as the generations who have experienced significant female involvement in agriculture and agriculture leadership replace the generations who did not.

Collegiate agricultural education. The number of women in programs at the University of Minnesota in the College of Food, Agriculture and Natural Resource Sciences (CFANS) has been increasing over time. Data that was available for the past 20 years (Table 6) shows that there was a substantial increase from fall 1987 to fall 1997, with a leveling off of female enrollment from 1997 to 2007. Given the advancements in the involvement of young women in the FFA organization, it is natural to anticipate that many of these students would gravitate to a college education in agriculture, food and natural resources. The data appears to be bearing this out in regards to enrollment at the University of Minnesota's CFANS, on the St. Paul campus.

Table 6: Undergraduate student enrollment in agriculture, food, environment and related majors, University of Minnesota, St. Paul.

	Fall 1987 1/	Fall 1997 1/	Fall 2007 2/
Number of female students	281	467	1031
Percent of total enrollment	36.3%	56.7%	57.7%
Number of male students	493	356	757
Percent of total enrollment	63.7%	43.3%	42.3%
Total student enrollment	774	823	1788

1/ College of Agriculture, Food and Environmental Sciences

2/ College of Food, Agriculture and Natural Resource Sciences

Source: University of Minnesota, St. Paul, College of Food, Agriculture and Natural Resource Sciences, 2008

Data for a shorter time period at the University of Minnesota, Crookston (UMC) (Table 7) indicates that slightly more women than men were enrolled in associate degree programs at UMC, while more men than women were enrolled in a bachelor’s degree program. Although a lower percentage of women versus men are enrolled at UMC, the nine-year trend for enrollment has held steady, much as it has at the University of Minnesota, St. Paul, CFANS, for women agriculture and related studies majors in recent years. According to enrollment data provided by UMC, the most popular degree areas for women are those that involved equines. This follows the previously reported trend identified in the 2002 Census of Agriculture of the increase in the number of equine farms being operated by women.

It would have been interesting and instructive to be able to review data for a longer period of time for both the University of Minnesota St. Paul and Crookston in relation to women in agricultural majors, but earlier data was not available from either institution at the time of this writing. The data for UMC on bachelor’s program students would also be limited because they did not begin awarding four-year degrees until 1993.

Table 7: Undergraduate student enrollment at University of Minnesota, Crookston, agriculture, natural resources and related majors.

	Fall 1999	Fall 2003	Fall 2007
Associate degree			
Male enrollment	87	67	32
Female enrollment	114	94	51
Not available	0	3	0
Bachelor’s degree			
Male enrollment	494	596	619
Female enrollment	303	389	419
Not available	5	38	21
Total Enrollment			
Male enrollment, percent of total	57.9%	55.9%	57%
Female enrollment, percent of total	41.6%	40.7%	41.2%
Not available, percent of total	0.5%	3.4%	1.8%

Source: University of Minnesota, Crookston, 2008.

Based on the data that is available, it is evident that a large population of women is being educated in agriculture and related fields. The number of women in college degree programs has grown over the decades and one would expect some natural growth in enrollment in agriculture degree programs due to this general trend. The increase in women in agriculture also stems from the rising acceptance of this new generation of women in agriculture, by both their families, who are encouraging their selection of agriculture as a field of study and a subsequent career, and by society. Their involvement in organizations like the FFA also plays a sizeable role by making studying agriculture and a career in agriculture a natural extension of their earlier experiences. Furthermore, the rising number of women in agricultural fields and more mentors encouraging them certainly made a degree and career in agriculture appear to be more viable to a higher number of female students.

Careers after degrees

As was previously noted, very little information is readily available on people in agricultural careers, but the University of Minnesota has started to collect information on where their graduates go once they leave college. Survey data was collected from students graduating fall of 2006 and spring and summer semesters of 2007 (Marshall, 2008). Of those CFANS students surveyed, 77 of the women indicated where they were working once they graduated from the University. Of those 77 it appeared that at least 55 or 71% of the women were engaged in a career related to agriculture, food, natural resources and allied fields. Of the remaining women graduates, either their specified position or company was ambiguous as to its relation to the graduate's training or it definitely was unrelated to the training. In other cases they did not specify where they were working. In comparison, 68 men responding to the survey provided information as to where they worked. It was obvious in 63% of the cases that they were working for an agricultural, food, or natural resource firm/organization, while the remainder were ambiguous or definitely not related to their field of study. The remaining male graduates did not specify where they were working. In fact, of the 362 total students responding to the survey, about 60% did not specify where they were working. Although the data is extremely limited, it does provide some insight as to what initially happens once a student graduates. Recent women graduates from the University of Minnesota CFANS are entering their intended fields at a reasonably high percentage. It is unknown as to what the experience of earlier graduates was and what the retention rates are

in agricultural careers, but the initial data point to a high percentage of women entering agricultural careers.

Women in agricultural leadership

Kajer (1996) found that most farm organizations have recognized the value of women's participation but that women have historically filled subordinate leadership positions. He also found that farm organizations that were founded "primarily as protest movements in times of farm crisis and unrest were specifically structured to integrate women into the organization and give them access to leadership positions." However, other groups divided responsibilities along more traditional gender lines with women's committees or auxiliaries. Some organizations have encouraged and achieved a significant level of participation by women as members and leaders while others have a poor record of women's participation. Danes (1997) found that while one in two men reported participation in farm organizations, a little less than one in five women reported the same.

More recently, women-focused agricultural organizations have developed, providing women interested in agriculture a voice in agricultural policy, education and leadership. American Agri-Women came into being in 1974 with Minnesota forming an affiliate organization in 1978. American Agri-Women represents nationally over 35,000 women involved in production agriculture and other agricultural careers. Agri-Women initially formed from the efforts of farm women across the United States and broadened its membership in more recent years to women in all agricultural careers. Women Involved in Farm Economics (WIFE) formed in 1976 as another national organization with state chapters to provide women with a voice in agriculture. Although these organizations have several reasons for existing, one of the reasons for their initiation can certainly be tied to the lack of opportunities for women in agriculture and particularly in the area of agricultural leadership that was prevalent at the time of their inception. The women who were initially involved in forming these organizations had largely been held back from leadership in traditional farm and agricultural organizations. Their pent-up ability came out in the formation of their own organizations.

Kajer (1996) noted that traditional attitudes are an impediment to women rising in leadership roles in agriculture, but that gains have been made in recent years in some organizations. He indicated that overall attitudes toward women actively participating and filling leadership roles remain a barrier to more women becoming involved.

Although Kajer's work is over a decade old, what he observed is still true to some extent. Progress is being made in varying degrees, however. Certainly some of this progress may be attributed to more acceptance by broader society of different gender roles for both women and men and the increased recognition of the important role that women play in farming operations. Additionally, more women are studying agriculture and entering agricultural careers, whether it be farming or another agricultural profession and that has increased the size of the pool from which to draw. The increased numbers of women in agricultural careers are coming into their own and are taking on more leadership roles. Furthermore, there is a change in expectations among young women and their male peers as to their role in agriculture. The high rate of involvement in leadership roles of females in the FFA, which is unlike any other mixed gender agricultural organization, has shown a large number of women that they can and should be agricultural leaders, while their male counterparts have grown up with this as the norm. This has helped to lay the foundation for more women to be in leadership roles as they go out into the broader agricultural community.

Kajer's study states that more women should be involved in agricultural leadership, that leadership potential is being wasted, and the industry is suffering from the absence of women. "The increased involvement of farm women would not only increase the leader pool to draw from, but would also bring to the table special talents and interests in which women are thought to excel over men" (Kajer, 1996).

In a resource-based industry such as agriculture, where the management of limited resources is critical to the success of the business, it seems ridiculous that nearly half of the available resources in terms of the human leadership component would not be fully utilized by agricultural organizations and in some cases not utilized at all. There is tremendous untapped potential that is just beginning to be realized. As the newer generations of agriculturalists come to the fore, the expectation is that this underutilized resource will be more fully employed.

Conclusion

The changing role of women in agriculture is a combination of the new-found recognition for women's roles and the increase in the actual numbers of women seeking agricultural education and professions. The latter is evidenced by Census information; secondary and collegiate agricultural and FFA program enrollment; and first-job choices upon leaving college. Women are also increasing

their roles in agricultural leadership but generally at a slower rate than their gains in other aspects of agriculture.

To get a truer appreciation of the changing roles of women in agriculture, more study is needed. Based on the information and data reviewed for this article, it is obvious that there are few resources to go on to develop a full understanding of women's involvement and experiences in farming and more broadly in agriculture. The lack of information may be due to the lack of recognition or undervaluation of women's roles in agriculture or it may be that women are under recognized and undervalued because of the lack of information.

From a policy perspective it is important to ensure that women are understood and counted as their needs for services and programs may be different from those of their male counterparts. For example, a lack of funding on the federal level for collecting agricultural statistics creates problems in ensuring that women are fairly represented in statistical figures that may be used to determine policy decisions impacting farmers. As Zeuli and Levins pointed out, there are also potential equity and justice issues involving women, especially given the heavy federal subsidies of the agricultural industry. Bottom line, it is important for policy makers to understand who they are making policies for, whether it be on the basis of gender, age, ethnicity or any other factor that may influence the needs and experiences of those who the policies are meant to impact.

Furthermore, agriculture and society as a whole will benefit from a truer understanding of all of the people involved in agriculture.

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